PEOs for the Institution-UG

PEO1. The graduates will apply appropriate theory and scientific knowledge to participate in activities that support humanity and economic development nationally and globally, developing as leaders in their fields of expertise.

PEO2. The graduates pursue lifelong learning and continuous improvement of the knowledge and skills with the highest professional and ethical standards.

PEOs for the UG Departments

Mathematics:

PEO3: The graduates will demonstrate the ability to utilize effectively the variety of teaching techniques and class room strategies and develop confidence to appear for competitive examinations and occupy higher levels of academic and administrative fields.

B.Sc. Mathematics (PO)

| РО | Upon completion of the B.Sc. Degree Programme, the |
|--------|--|
| No. | graduateswill be able to: |
| PO - 1 | equip students with hands on training through various courses to enhance entrepreneurshipskills. |
| PO - 2 | impart communicative skills and ethical values. |
| PO - 3 | face challenging competitive examinations that offer rewarding careers in science and education. |
| PO - 4 | apply the acquired scientific knowledge to face day to day needs and reflect upon |
| | green |
| | initiatives to build a sustainable environment. |

B.Sc. Mathematics (PSO)

| PSO No. | Upon completion of the B.Sc. Degree Programme, the graduates will be able to: | PO addressed |
|------------|---|--------------|
| PSO - 1 | acquire a strong foundation in various branches of mathematics to formulate real life problems into mathematical models | PO 4 |
| PSO - 2 | apply the mathematical knowledge and skills to develop problem solvingskills cultivating logical thinking and face competitive examinations with confidence. | PO 3, 4 |
| PSO - 3 | develop entrepreneurial skills based on ethical values, become empowered and self dependent in society. | PO 1,2 |
| PSO - 4 | enhance numerical ability and address problems in interdisciplinary areas which would help in project and field works. | PO 1 |
| PSO - 5 | pursue scientific research and develop new findings with global impact using latest technologies. | PO 4 |

| Semester | :I | Major Core I |
|--------------------|--|---------------------|
| Name of the Course | : Differential Calculus and Trigonometry | |
| Subject code | : MC2011 | |

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives:

To impart knowledge on applications of Differential Calculus and important concepts of Trigonometry.
To enhance problem solving skills.

| СО | Upon completion of this course the students | PSO | CL |
|--------|---|-----------|-------|
| | will be able to: | addressed | |
| CO - 1 | Recall the idea of derivative, rules of differentiation | PSO - 1 | R |
| | and understand the concept of p-r equation. | | |
| CO - 2 | Learn the concepts of curvature, circle of curvature, | PSO - 2 | U, Ap |
| | evolute and apply the concepts to solve problems. | | |
| CO - 3 | Recognize the rules of identifying asymptotes and | PSO - 3 | Ap, U |
| | employ the same to different curves. | | |
| CO - 4 | Acquire the knowledge about hyperbolic functions and | PSO - 1 | U, E |
| | compare it with circular functions, trigonometric | | |
| | functions, inverse trigonometric functions and their | | |
| | properties. | | |
| CO - 5 | Categorize the methods of finding the sum of | PSO - 8 | An |
| | trigonometric series. | | |

Total contact hours: 90 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/ |
|------|---------|--|---------|--|----------------------------------|---------------------|
| | | | hours | | | evaluation |
| Ι | Curvatu | re | | | | |
| | 1. | Introduction and definition of pedal equation | 2 | Recall the idea of derivative, rules of differentiation and understand the concept of p-r equation | Lecture | Test |
| | 2. | Problems related to p-r equations | 6 | Apply the concept of p-r equation in problems | Lecture with illustrations | Group Discussion |
| | 3. | Introduction, definition and theorems based on of curvature | 3 | To understand the definition of curvature and learn the theorems | Lecture | Test |
| | 4. | Radius of curvature in different forms | 2 | To understand the definitions of closed sets and limit points with examples and theorems | Lecture | Test |
| | 5. | Problems related to Radius of curvature | 2 | To identify Hausdorff spaces and practice various theorems | Lecture with illustrations | Group discussion |
| II | C | Centre of curvature, E | Evolute | | | |

| | 1. | Definition and | 5 | To understand the | Lecture | Test |
|-----|---------|------------------------|------------|--------------------------|--------------|------------|
| | | problems based on | | definition of centre of | | |
| | | centre of curvature | | curvature of the curve | | |
| | | of the curve | | | | |
| | 2. | Definition and | 5 | To understand the | Lecture | O&A |
| | | problems related to | - | definition of evolute of | | |
| | | evolute of the curve | | the curve and practice | | |
| | | | | problems | | |
| - | 3. | Definition and | 5 | To practice various | Lecture | Formative |
| | | problems on circle | | problems related to | | Assessment |
| | | of curvature | | circle of curvature | | Test |
| III | A | symptotes | • | | | |
| | 1. | Definition and | 3 | To understand the | Lecture | Quiz |
| | | methods of finding | | methods of finding | | |
| | | asymptotes for the | | asymptotes | | |
| | | curve $y=f(x)$ and | | | | |
| | | f(x,y)=0 | | | | |
| | 2. | Working rule to | 2 | Recognize the rules of | Lecture | Test |
| | | find the inclined | | identifying asymptotes | with | |
| | | asymptotes | | | illustration | |
| | 3. | Problems on linear | 5 | To apply the rules to | Lecture | Brain |
| | | asymptotes and | | different curves | with group | stoming |
| | | intersection of | | | discussion | _ |
| | | curves | | | | |
| | 4. | Problems based on | 5 | To apply the rules to | Lecture | Assignment |
| | | inclined asymptotes | | different curves | | - |
| IV | Hyperbo | lic functions, Logarit | hm of Con | nplex numbers | | • |
| | 1. | Introduction and | 2 | Acquire the knowledge | Lecture | Quiz |
| | | definition of | | about hyperbolic | with | |
| | | Hyperbolic | | functions | illustration | |
| | | functions | | | | |
| | 2. | Problems based on | 4 | To compare with | Lecture | Q&A |
| | | hyperbolic | | circular functions, | | |
| | | functions | | | | |
| | 3. | Definitions and | 4 | Acquire the knowledge | Lecture | Slip Test |
| | | Problems based on | | about inverse | | |
| | | inverse hyperbolic | | hyperbolic functions | | |
| | | functions | | | | |
| | 4. | Separate into real | 5 | To distinguish various | Lecture | Formative |
| | | and imaginary parts | | hyperbolic functions, | | Assessment |
| | | of hyperbolic and | | trigonometric functions, | | Test |
| | | inverse hyperbolic | | inverse trigonometric | | |
| | | functions | | functions | | |
| V | S | ummation of Trigono | metric Sei | ries | - | |
| | 1. | Introduction and | 4 | To analyze the methods | Lecture | Quiz |
| | | Illustrations based | | of finding the sum of | with | |
| | | on method of | | trigonometric series | illustration | |
| | | difference | | | | |
| | 2. | Theorem and | 7 | To categorize problems | Lecture | Test |
| 1 | | problems on sum of | | on sum of sines and | | 1 |

| | sines and cosines of | | cosines of n angles in | | |
|----|----------------------|---|------------------------|---------|------------|
| | II aligies III A.r | | A.r | | |
| 3. | Introduction of | 1 | To know C+iS method | Lecture | Slip Test |
| | C+iS method | | | | |
| 4. | Problems related to | 3 | To apply C+iS method | Lecture | Assignment |
| | C+iS method | | to find the sum of | | _ |
| | | | trigonometric series | | |

Course Instructor: Dr.K.Jeya Daisy Course Instructor: Ms. V. Princy Kala

HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

| Semester | : I Allied I |
|--------------------|--|
| Name of the Course | : Algebra and Calculus (for Physics and Chemistry) |
| Subject code | : MA2011 |

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives:

1. To impart knowledge in concepts related to Algebra.

2. To solve problems in Physical Science.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|---|------------------|------|
| CO - 1 | Recall the fundamentals of algebraic equations, matrices and rules of integration | PSO - 1 | R |
| CO - 2 | Practice the formation of equations and compute symmetric functions of roots in terms of coefficients | PSO - 2 | Ар |
| CO - 3 | Revise the properties of eigen values of the matrices | PSO - 3 | Е |
| CO - 4 | Learn Beta, Gamma functions and evaluate integrals using them | PSO - 4 | E, U |
| CO - 5 | Practice the expansion of Fourier series and utilize the same for higher studies | PSO - 5 | Ap |

Total contact hours: 90 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lecture hours | Learning outcome | Pedagogy | Assessment/ Evaluation |
|------|--|------------------------|------------------|-----------------------|-------------|---------------------------|
| Ι | Theory of the second se | of equations | | | | |
| | 1. | Basic definition about | 3 | To recall the | Lecture | Short Test |
| | | Polynomial and its | | fundamentals of | | |
| | | roots. Fundamental | | algebraic equations, | | |
| | | Theorem of Algebra and | | matrices and rules of | | |
| | | related theorems | | integration | | |
| | | without proof | | | | |
| | 2. | Formation of equations | 3 | Practice the | Lecture and | Test |
| | | of lowest degree with | | formation of | group | |

| | | rational coefficients and | | equations and to | discussion | |
|----|---------------------------------|--|-----|--|---------------------------|---|
| | | solving equations when | | solve equations | | |
| | | one root and two roots | | when one root and | | |
| | | given. | | two roots given. | | |
| | 3 | Formation of equation | 3 | Practice the | Lecture | Test |
| | 5. | of the lowest degree | U U | formation of | Leeture | 1050 |
| | | with rational | | equations and | | |
| | | coefficients whose roots | | compute symmetric | | |
| | | are given | | functions of roots in | | |
| | | | | terms of coefficients | | |
| | | | | whose roots are | | |
| | | | | given | | |
| | 1 | Proving that the given | 2 | To Prove that the | Lecture | Test |
| | ч. | equation has no | 2 | given equation has | Lecture | 1050 |
| | | imaginary roots and | | given equation has | | |
| | | Palation between roots | | and understand the | | |
| | | and coefficients | | rolation botwoon | | |
| | | and coefficients | | roots and | | |
| | | | | coefficients | | |
| | 5 | Solving equations if | 2 | To Solve equations | Locturo | Test |
| | 5. | their roots are in G P | 2 | if their roots are in | Lecture | 1051 |
| | | ΛD | | | | |
| | 6 | A.I Solving equations and | 2 | To Solve equations | Locturo | Test |
| | 0. | finding equal roots two | 2 | and finding equal | Lecture | 1051 |
| | | pairs of equal roots | | roots two pairs of | | |
| | | roots which are in some | | aqual roots roots | | |
| | | rotio | | equal loois, loois | | |
| | | Tatio. | | which are in some | | |
| | | | | ratio | | |
| п | Transfo | rmation of equations | | ratio. | | |
| II | Transfo | rmation of equations | 3 | ratio. | Lecture and | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times | 3 | ratio. To understand the | Lecture and | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$ | 3 | ratio. To understand the transformation of equations and | Lecture and discussion | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. | 3 | To understand the transformation of equations and formation of | Lecture and discussion | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. | 3 | ratio. To understand the transformation of equations and formation of equation whose roots | Lecture and discussion | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots | Lecture and discussion | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$ | Lecture and discussion | Test |
| II | Transfo 1 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. | Lecture and discussion | Test |
| II | Transfo 1 2 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the | Lecture and discussion | Test Formative |
| | Transfo 1 2 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are pagative of the roots of | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are a posetive of the | Lecture and discussion | Test Formative Assessment |
| II | Transfo 1 2 | rmation of equationsFormation of equationwhose roots are k timesthe roots of $f(x) = 0$.Form the equationwhose roots arenegative of the roots ofthe given equation and | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given | Lecture and discussion | Test Formative Assessment |
| II | Transfo 1 2 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose | Lecture and discussion | Test Formative Assessment |
| II | Transfo 1 2 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. Form the equation whose roots are negative of the roots of the given equation and whose roots are diminiched by <i>h</i> | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished | Lecture and discussion | Test Formative Assessment |
| II | Transfo 1 2 | rmation of equationsFormation of equationwhose roots are k timesthe roots of $f(x) = 0$.Form the equationwhose roots of $f(x) = 0$.Form the equationwhose roots arenegative of the roots ofthe given equation andwhose roots arediminished by h | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h | Lecture and discussion | Test Formative Assessment |
| | Transfo 1 2 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by hSolve the equation | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h To identify the | Lecture and discussion | Test Formative Assessment |
| | Transfo 1 2 3 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by hSolve the equation whose roots are equal in | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h To identify the equation whose roots | Lecture and discussion | Test Formative Assessment Test |
| | Transfo 1 2 3 | rmation of equationsFormation of equationwhose roots are k timesthe roots of $f(x) = 0$.Form the equationwhose roots arenegative of the roots ofthe given equation andwhose roots arediminished by hSolve the equationwhose roots are equal in | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in | Lecture and discussion | Test Formative Assessment Test |
| | Transfo 1 2 3 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h Solve the equation whose roots are equal in magnitude but opposite in sign to the roots of | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in magnitude but | Lecture and discussion | Test Formative Assessment Test |
| | Transfo 1 2 3 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> Solve the equation whose roots are equal in magnitude but opposite in sign to the roots of f(x) = 0 and to increase | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in magnitude but opposite in sign to | Lecture and discussion | Test Formative Assessment Test |
| | Transfo 1 2 3 | rmation of equations Formation of equation whose roots are k times the roots of $f(x) = 0$. Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> Solve the equation whose roots are equal in magnitude but opposite in sign to the roots of f(x) = 0 and to increase the roots of $f(x) = 0$ by h | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in magnitude but opposite in sign to the roots of $f(x) = 0$. | Lecture and discussion | Test Formative Assessment Test |
| | Transfo 1 2 3 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by h Solve the equation whose roots are equal in magnitude but opposite in sign to the roots of $f(x) = 0$ and to increase the roots of $f(x) = 0$ by h | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in magnitude but opposite in sign to the roots of $f(x) = 0$ and to increase the | Lecture and discussion | Test Formative Assessment Test |
| II | Transfo 1 2 3 | rmation of equationsFormation of equation whose roots are k times the roots of $f(x) = 0$.Form the equation whose roots are negative of the roots of the given equation and whose roots are diminished by hSolve the equation whose roots are equal in magnitude but opposite in sign to the roots of $f(x) = 0$ and to increase the roots of $f(x) = 0$ by h | 3 | ratio. To understand the transformation of equations and formation of equation whose roots are k times the roots of $f(x) = 0$. To identify the equation whose roots are negative of the roots of the given equation and whose roots are diminished by <i>h</i> To identify the equation whose roots are equal in magnitude but opposite in sign to the roots of $f(x) = 0$ and to increase the roots of $f(x) = 0$ but the | Lecture and discussion | Test Formative Assessment Test |

| | 4 | Solving the given equation and find the real root using Newton's method. | 3 | To calculate the given equation and find the real root using Newton's method. | Lecture | Test |
|---|---|---|---|--|------------------------|-------------------------|
| | 5 | Finding positive and negative roots of the equation using Newton's method. | 3 | To identify positive and negative roots of the equation using Newton's method. | Lecture and discussion | Test |
| ш | N | Aatrices | | | | |
| | 1 | Basic concepts of matrix addition, matrix multiplication and rank of a matrix and definitions | 3 | To understand the basic concepts in matrices | Lecture | Test |
| | 2 | Test the consistency of the system of given homogenous equations and solving if it is consistent. | 2 | To solve homogenous equations if it is consistent. | Lecture and discussion | Test |
| | 3 | Cayley Hamilton theorem and Solving problems based on Cayley Hamilton theorem | 2 | To understand Cayley Hamilton theorem solve problems based on it | Lecture | Test |
| | 4 | Defining matrix polynomial, Characteristic matrix, Characteristic polynomial and Characteristic equation | 2 | To identify Characteristic matrix, Characteristic polynomial and Characteristic equation | Lecture | Test |
| | 5 | Evaluating the sum and product of the eigen values of the matrix without actually finding the eigen values. | 2 | To evaluate the sum and product of the eigen values of the matrix without actually finding the eigen values | Lecture | Test |
| | 6 | Evaluating Characteristic roots, eigen values and eigen vectors of the matrix. | 2 | To evaluate Characteristic roots, eigen values and eigen vectors of the matrix. | Lecture | Test |
| | 7 | Evaluating the sum and product of the eigen values of the matrix without finding the roots of the characteristic equation. | 1 | To evaluate Characteristic roots, eigen values and eigen vectors of the matrix. | Lecture | Formative Assessment |
| | 8 | Evaluating the | 1 | To evaluate | Lecture | Test |

| | | characteristic vectors | | Characteristic roots. | | |
|----|---|----------------------------|----------|----------------------------|-------------|------------|
| | | corresponding to each | | eigen values and | | |
| | | characteristic root of the | | eigen vectors of the | | |
| | | given matrix. | | matrix. | | |
| IV | I | Beta and Gamma function | S | L | | |
| | 1 | Introduction to Beta, | 4 | To learn Beta, | Lecture and | Test |
| | | Gamma functions, its | | Gamma functions | discussion | |
| | | properties | | and its properties. | | |
| | 2 | Evaluation of integrals | 2 | To evaluate integrals | Lecture | Test |
| | | using Beta Functions | | using Beta Functions | | |
| | 3 | Proving duplication | 3 | To prove | Lecture | Test |
| | | formula. | | duplication formula. | | |
| | 4 | Problems based on | 3 | To solve problems | Lecture | Test |
| | | Beta and Gamma | | based on Beta and | | |
| | | functions. | | Gamma functions. | | |
| | 5 | Proving some results on | 3 | To prove some | Lecture | Test |
| | | Beta and Gamma | | results on Beta and | | |
| | | functions. | | Gamma functions. | | |
| V | I | Fourier Series Expansion | | | | |
| | 1 | Fourier Series | 2 | To understand | Lecture | Test |
| | | Expansion and Fourier | | Fourier Series | | |
| | | coefficients | | Expansion and | | |
| | | | | Fourier coefficients | | |
| | 2 | Explanation of Sine | 2 | To identify Sine | Lecture | Test |
| | | Series and Cosine | | Series and Cosine | | |
| | | Series and results based | | Series and results | | |
| | | on them | | based on them | | |
| | 3 | Evaluate the Fourier | 3 | To evaluate the | Lecture | Test |
| | | Sine series and Fourier | | Fourier Sine series | | |
| | | Cosine series for the | | and Fourier Cosine | | |
| | | given function. | | series for the given | | |
| | | | | function. | | |
| | 4 | Evaluate the Half range | 3 | To evaluate the Half | Lecture | Test |
| | | Fourier Sine Series and | | range Fourier Sine | | |
| | | Fourier Cosine Series | | Series and Fourier | | |
| | | for the given function. | | Cosine Series for | | |
| | | | | the given function. | | |
| | 5 | Evaluate the Fourier | 3 | To evaluate the | Lecture | Test |
| | | series for the given | | Fourier series for the | | |
| | | function and deduce | | given function and | | |
| | | certain results. | | deduce certain | | |
| | | | | results. | _ | |
| | 6 | Evaluate the Fourier | 2 | To evaluate the | Lecture | Formative |
| | | series for the given | | Fourier series for the | | Assessment |
| | | tunction in the intervals | | given function in the | | |
| | | $(-\pi,\pi)$ and $(0,\pi)$ | | intervals $(-\pi,\pi)$ and | | |
| | | | | $(0,\pi)$ | | |

Course Instructor: Dr.K.Jeya Daisy& Dr. Jancy Vini

HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

Semester: IName of the Course: Quantitative Aptitude – I(NME)Course Code: MNM201

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 4 | 2 | 60 | 100 |

Objectives: 1. To develop the quantitative aptitude of the students.

2.To solve problems required for various competitive examinations.

| СО | Upon completion of this course the students will be able to : | PSO addressed | CL |
|--------|--|------------------|-------|
| CO - 1 | apply BODMAS rule for simplification and determine missing numbers in a sequence | PSO - 1 | R |
| CO - 2 | express numbers in the base of a fraction of 100. | PSO - 2 | U |
| CO - 3 | employ the problems related to the division of profit and loss of a business. | PSO - 4 | Ар |
| CO - 4 | measure the relative magnitude of two quantities in an effective way. | PSO - 2 | С |
| CO - 5 | construct and develop mathematical solutions to simple real life problems. | PSO - 1 | Ар |
| CO - 6 | learn ratio and proportion and practice duplication and triplication of ratios | PSO - 4 | U, Ap |

Unit I

Simplification - BODMAS rule - Modulus of a real number - Virnaculum - Some real life problems, Missing numbers in the expression.

Unit II

Percentage - Concepts of Percentage – Results on Population - Results on Depreciation.

Unit III

Profit and Loss – Cost price – Selling Price – Profit or Gain – Loss – gain percentage - loss percentage. Unit IV

Ratio and proportion – Fourth, third and mean proportionals – comparison of ratios, compound ratio – duplicate and subduplicate ratio- triplicate and subtriplicate ratio – variation.

Unit V

Partnership – Ratio of Division of Gains - Working and Sleeping partners – Chain Rule - Direct proportion – Indirect proportion.

| Total cont | act hours: 60 | (Including | lectures, | assignments | and tests) |
|------------|---------------|------------|-----------|-------------|------------|
| | | | | | |

| 10 | Total contact hours. ov (including lectures, assignments and tests) | | | | | | | | |
|------|---|----------|------------------|-------------------|----------|--------------------------|--|--|--|
| Unit | Section | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ valuation | | | |
| I | BODN | IAS rule | | | | | | | |

| | 1. | Simplification of numbers, BODMAS rule, Examples based on BODMAS rule | 2 | To apply BODMAS rule for simplification | Lecture through googlemeet | Online Quiz |
|-----|-----------|---|---|---|----------------------------------|--|
| | 2. | Modulus of a real number, Examples related to Modulus of a real number | 2 | To solve problems based on modulus of a real number | Lecture through googlemeet | Online test |
| | 3. | Virnaculam (Bar), Illustrations based on Virnaculam, Missing numbers in the given expression | 2 | To learn about Virnaculam and to determine missing numbers in a sequence | Lecture through googlemeet | Online Assignment |
| П | Percent | age | | | | |
| | 1. | Concepts of Percentage | 2 | To understand the basic concepts of percentage | Lecture through googlemeet | Online Assignment |
| | 2. | Results on Population | 2 | To acquire detailed knowledge on results on population | Lecture through googlemeet | Online test |
| | 3. | Results on Depreciation. | 2 | To solve the problems on depreciation. | Lecture through googlemeet | Formative Assessment online Test |
| III | Profit ar | nd Loss | | | | |
| | 1. | Cost price and Selling Price | 2 | To understand the concepts of cost price and selling price | Lecture through googlemeet | Online Quiz |
| | 2. | Profit or Loss | 2 | To solve problems on profit or loss | Lecture through googlemeet | Online test |
| | 3. | Gain percentage - loss percentage. | 2 | To learn techniques to solve problems involving gain percentage | Lecture through googlemeet | Online Assignment |
| IV | Ratio an | d proportion | | | | |
| | 1. | Fourth, third and mean proportionals | 2 | To understand about Fourth, third and mean proportionals | Lecture through googlemeet | Online Quiz and group discussion |
| | 2. | comparison of ratios, compound ratio, duplicate and | 2 | To solve problems on ratios and compare them | Lecture through googlemeet | Online test |

| | | subduplicate ratio | | | | |
|---|----------|---------------------------------------|---|--|----------------------------------|--|
| | 3. | triplicate and subtriplicate ratio | 2 | To learn about triplicate and subtriplicate ratio | Lecture through googlemeet | Online Assignment |
| V | Partners | ship | | | | |
| | 1. | Ratio of Division of Gains | 2 | To understand the basic concepts of partnersip | Lecture through googlemeet | Online Assignment |
| | 2. | Working and Sleeping partners | 2 | To acquire skills to solve problems involving Working and Sleeping partners | Lecture through googlemeet | Online test |
| | 3. | Chain Rule | 2 | To study about chain rule and to solve the problems related to chain rule | Lecture through googlemeet | Formative Assessment online Test |

Course Instructor: Ms.T.Sheeba Helen **Course Instructor: Dr.J.C.Evelin**

HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

| Semester | : II | Major Core II |
|--------------------|-------------------------|---------------------|
| Name of the Course | : Classical Algebra and | d Integral Calculus |
| Course Code | : MC2021 | - |

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives:1. To give a sound knowledge in Classical Algebra.2. To solve problems in applications of Integral Calculus.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|--|------------------|--------|
| CO - 1 | recall the fundamentals of algebraic equations and rules of integration. | PSO - 1 | R |
| CO - 2 | apply fundamental theorem of algebra in framing and solving equations | PSO - 5 | U |
| CO - 3 | choose appropriate method for transformation of equations | PSO - 2 | Ар |
| CO - 4 | develop the skill of evaluation of double and triple integrals over different regions | PSO - 3 | Ар |
| CO - 5 | identify Beta, Gamma functions and utilize them for the evaluation of definite integrals | PSO - 5 | Ap,E |
| CO - 6 | develop the Fourier Series expansion in any interval and apply the same for solving technical and physical problems | PSO - 4 | Ap, An |

| Unit | Section | Topics | Lectu | Learning outcomes | Pedagogy | Assessment/ |
|------|---------|--------------------------|-------|----------------------|--------------|--------------|
| | | | re | | | evaluation |
| | | | hours | | | |
| Ι | Theor | y of equations | | | | |
| | 1 | Preliminaries about | 4 | Explain the primary | Lecture | Evaluation |
| | | equations and reminder | | concepts of | with | through |
| | | theorem | | Fundamental theorem | Illustration | appreciative |
| | | Fundamental theorem | | of Algebra | | inquiry |
| | | of Algebra | | Problems based on | | |
| | | Problems based on | | reminder theorem | | |
| | | reminder theorem | | | | |
| | | Problems based on | | | | |
| | | Fundamental theorem | | | | |
| | | of Algebra | | | | |
| | 2 | In an equation with real | 3 | To distinguish | Lecture | Evaluation |
| | | coefficients, imaginary | | between imaginary | | through |
| | | roots occur in pairs | | roots occur in pairs | | quizzes and |
| | | In an equation with | | and irrational roots | | discussions. |
| | | rational coefficients, | | occur in pairs | | |

| Total contact hours: | 90 | (Including | lectures. | assignments | and tests) |
|-----------------------------|-----|------------|-----------|-------------|------------|
| | ~ ~ | (| | | |

| | 1 | | | | | |
|---|----------|--|---|--------------------------|--------------|-------------------------|
| | | irrational roots occur in | | | | |
| | | pairs | | | | |
| | | Relations between | | | | |
| | | roots and coefficients | | | | |
| | 2 | | 1 | | T (| |
| | 3 | Forming the equation | 4 | To understand | Lecture | Shp Test |
| | | whose roots are | | theFormation of the | With | |
| | | the given equation | | equation whose roots | Inustration | |
| | | Example 2 Forming the equation | | are in A.P, GP, HP | | |
| | | roming the equation | | | | |
| | | Forming the equation | | | | |
| | | whose roots are in G P | | | | |
| | | Forming the equation | | | | |
| | | whose roots are in H P | | | | |
| | 4 | Symmetric functions of | 4 | То | Discussion | Quiz and |
| | | the roots | | understandNewton's | with | Test |
| | | Sum of r th powers of | | theorem on the sum of | Illustration | 1050 |
| | | the roots | | the powers of the roots | mustration | |
| | | Newton's theorem on the | | | | |
| | | sum of the powers of the | | | | |
| | | roots. | | | | |
| | | Problems based on | | | | |
| | | Newton's theorem | | | | |
| П | Transfor | rmation of Equations | | | | |
| | 1 | Transform an equation | 4 | To identify the | Lecture | Evaluation |
| | | into another whose | | Reciprocal equations | with | through |
| | | roots are the roots of | | Standard form of | Eamples | discussions. |
| | | the given equation with | | reciprocal equations | 1 | |
| | | signs changed | | 1 1 | | |
| | | Transform an equation | | | | |
| | | into another whose | | | | |
| | | roots are m times the | | | | |
| | | roots of the given | | | | |
| | | equation | | | | |
| | | Reciprocal equations | | | | |
| | | Standard form of | | | | |
| | | reciprocal equations | | | | |
| | 2 | Any reciprocal | 4 | To solve different types | Lecture | Evaluation |
| | | equation can be | | of reciprocal equations | | through |
| | | 1 | | 1 1 | | U |
| | | reduced to a Standard | | | | appreciative |
| | | reduced to a Standard reciprocal equation | | | | appreciative inquiry |
| | | reduced to a Standard reciprocal equation Solving different types | | | | appreciative inquiry |
| | | reduced to a Standard reciprocal equation Solving different types of reciprocal equations | | | | appreciative inquiry |

| | | decreasing the roots of | | | | |
|-----|----------|--------------------------|---|-------------------------|--------------|--------------|
| | | a given equation by a | | | | |
| | | given quantity | | | | |
| | 3 | Removal of terms | 4 | To calculate problems | Lecturewit | Formative |
| | _ | Descarte's rule of signs | | related to Descarte's | h | Assessment |
| | | Descarte's rule of signs | | rule of signs | Illustration | Test |
| | | for negative roots | | | | |
| | | Problems related to | | | | |
| | | Descarte's rule of signs | | | | |
| | 4 | Rolle's theorem. | 3 | To calculate problems | Group | Slip Test |
| | | Problems related to | | related toRolle's | Discussion | 1 |
| | | Rolle's theorem. | | theorem | | |
| III | Double i | ntegrals | | | 1 | |
| | 1 | Introduction about | 3 | Explain the primary | Lecture | Evaluation |
| | | integration and Double | | concepts of Double | with | through |
| | | integrals | | integrals | Illustration | discussions. |
| | | Evaluation of double | | | | |
| | | integrals with constant | | | | |
| | | limits in cartesian co- | | | | |
| | | ordinates | | | | |
| | | Evaluation of double | | | | |
| | | integrals with constant | | | | |
| | | limits in polar co- | | | | |
| | | ordinates | | | | |
| | 2 | Evaluation of double | 4 | Calculate the integrals | Lecture | Evaluation |
| | | integrals with variable | - | over a specified region | with | through |
| | | limits in cartesian co- | | bounded by straight | Illustration | appreciative |
| | | ordinates | | lines | | inquiry |
| | | Evaluation of double | | | | |
| | | integrals with variable | | | | |
| | | limits in polar co- | | | | |
| | | ordinates | | | | |
| | | Evaluation of double | | | | |
| | | integrals over a | | | | |
| | | specified region | | | | |
| | | bounded by straight | | | | |
| | | lines | | | | |
| | 3 | Evaluation of double | 4 | To apply the double | Lecture | Formative |
| | | integrals over a | | integrals over a | | Assessment |
| | | specified region | | specified region | | Test |
| | | bounded by different | | bounded by different | | |
| | | curves | | curves | | |
| | | Working rule for | | | | |
| | | changing the order of | | | | |
| | | integration | | | | |
| | | Problems on changing | | | | |

| | | the order of integration | | | | |
|----|----------|--------------------------|---|-------------------------|--------------|--------------|
| | 4 | Introduction about | 4 | Evaluate the double | Lecture | Slip Test |
| | | triple integrals | | integrals and triple | and group | - |
| | | Evaluation of double | | integrals | discussion | |
| | | integrals with constant | | C | | |
| | | limits | | | | |
| | | Evaluation of double | | | | |
| | | integrals with variable | | | | |
| | | limits | | | | |
| IV | Beta and | l Gamma functions | | | | |
| | 1 | Definition and | 4 | Explain the primary | Lecture | Evaluation |
| | | existence of Beta and | | concepts of Beta and | with | through |
| | | Gamma functions | | Gamma functions | Illustration | discussions. |
| | | Properties of Gamma | | | | |
| | | function | | | | |
| | | Properties of Beta | | | | |
| | | function | | | | |
| | | Relation between Beta | | | | |
| | | and Gamma functions | | | | |
| | 2 | Computation of Beta | 4 | To understand the | Lecture | Evaluation |
| | | and Gamma functions | | theorems and problems | and group | through |
| | | Evaluation of integrals | | based on Beta and | discussion | Assignment |
| | | using properties of | | Gamma functions | | 6 |
| | | Gamma function | | | | |
| | | Equivalent definitions | | | | |
| | | of Beta function | | | | |
| | 3 | Evaluation of integrals | 4 | To know | Lecture | Formative |
| | _ | using properties of | | aboutproperties of Beta | with | Assessment |
| | | Beta function | | function | Illustration | Test |
| | | Finding the value of | | | | |
| | | standard definite | | | | |
| | | integrals in terms of | | | | |
| | | Beta and Gamma | | | | |
| | | functions | | | | |
| | 4 | Duplication formula | 2 | To understand | Lecture | Slip Test |
| | | Deductions using | | Duplication formula | with | ~ <u>r</u> |
| | | Duplication formula | | F | Illustration | |
| V | Fourier | series | | | | |
| | 1 | Definition and basic | 4 | Explain the basic | Lecture | Evaluation |
| | | properties of odd and | | properties of odd and | | through |
| | | even functions | | even functions | | discussions. |
| | | Introduction of Fourier | | | | |
| | | series expansion | | | | |
| | | Computation of | | | | |
| | | Fourier coefficients | | | | |
| | 2 | Development of | 4 | To understand Fourier | Lecture | Formative |

| | Fourier series over an | | series expansion and | with | Assessment |
|-------|-----------------------------|---|-----------------------------|--------------|------------|
| | interval of length 2π | | half range Fourier series | Illustration | test |
| | Deduction of sum of | | expansion | | |
| | series from Fourier | | | | |
| | series expansion | | | | |
| | Introduction of half | | | | |
| | range Fourier series | | | | |
| 2 | Development of helf | 2 | To coloulate Droblems | Lastura | Clin Test |
| 3 | | 3 | To calculate Problems | Lecture | Shp Test |
| | range sine series over | | dased on han range | Willi | |
| | an interval of length π | | sine, cosine series over | mustration | |
| | Development of half | | an interval of length π | | |
| | range cosine series over | | | | |
| | an interval of length π | | | | |
| | Deduction of sum of | | | | |
| | series from half range | | | | |
| | Fourier series | | | | |
| | expansion | | | | |
| 4 | Development of | 4 | To differentiatehalf | Lecture | Home |
| | Fourier series over an | | range sine series over | with | Assignment |
| | arbitrary interval | | an arbitrary interval | Illustration | |
| | Development of half | | And half range cosine | | |
| | range sine series over | | series over an arbitrary | | |
| | an arbitrary interval | | interval | | |
| | Development of half | | | | |
| | range cosine series | | | | |
| | over an arbitrary | | | | |
| | interval | | | | |

Course Instructor: Dr.L.Jesmalar Course Instructor: Ms. V. Princy Kala & Ms. V.G. Michael Florance HoD:Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

Semester: IIAllied IIName of the Course: Vector Calculus and Differential Equations(for Physics and Chemistry)Subject code:MA2021

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives:

1. To introduce the concept of vector operators.

2. To impart the mathematical knowledge essential for solving problems in Physical Science.

| СО | Upon completion of this course the students will be able to : | PSO addressed | CL |
|--------|--|------------------|----|
| CO - 1 | explain the physical meaning and properties of curl and divergence | PSO - 1 | U |
| CO - 2 | practice the computation of line integrals, surface integrals | PSO - 2 | Ар |
| CO - 3 | use computational tools to solve problems and applications of partial differential equations of first order. | PSO - 2 | Ар |
| CO - 4 | find the complementary function and particular integral of a differential equation by using appropriate methods. | PSO - 5 | U |
| CO - 5 | use Laplace transform and their inverse to solve differential equations. | PSO - 3 | Ар |

Total contact hours: 90 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/ |
|------|---------|----------------------|---------|--------------------------|--------------|--------------|
| | | | hours | | | evaluation |
| Ι | Vector | r Differentiation | | | | |
| | 1 | Revision of dot and | 4 | To recall the operations | Lecture | Brainstormin |
| | | cross product of | | on vectors and | with | g |
| | | vectors, Definition | | understand its functions | Illustration | |
| | | and theorems on | | | | |
| | | differentiation of | | | | |
| | | Vectors | | | | |
| | 2 | Gradient of a scalar | 3 | To study gradient in | Lecture. | Appreciative |
| | | function and its | | detail and apply its | Group | inquiry |
| | | properties, | | properties to solve | discussion | |
| | | Problems based on | | problems | | |
| | | Gradient | | | | |
| | 3 | Equation of tangent | 4 | To understand the | Lecture, | Test |
| | | plane and normal | | tangent plane and | Small | |
| | | line for a single | | normal line and its | groups | |
| | | surface, Equation of | | various functions | | |

| | | and finding the complementary function | | | | |
|----|----------|--|---|--|-----------------------|-------------------------|
| | | coefficients, Formation of | | by using an appropriate method | | |
| | 1 | Linear Differential equations with | 4 | linear differential equations and to find the complementary function | Debate | choice questions |
| | Linear L | Introduction of | Δ | To study the basics of | Lecture | Multiple |
| тп | Linear F | over a plane | | | | |
| | | Evaluation of | | integrals | | |
| | 4 | Definition of surface integrals, | 4 | To practice the computation of surface | Group Discussion | Seminar |
| | | force, Projection of a surface over a plane | | projection | method | Test |
| | 3 | Computation of work done by a | 3 | To compute work done and understand | Lecture, inductive | Formative Assessment |
| | | integrals over curves in a plane, Evaluation of line integrals over curves in a surface | | integrals over different surface | based | |
| | 1 | Definition of line integrals and work done by a force, Parametric equation of curves Evaluation of line | 3 | To practice the computation of line integrals To evaluate line | Lecture, problem | Slip test |
| II | Vector I | ntegration | | | · | • |
| | | vectors and its properties, Solenoidal and irrotational vectors | | irrotational vectors | | |
| | 4 | Divergence of vectors and its properties, Curl of | 4 | To study in detail divergence, curl, solenoidal and | Lecture, Jigsaw | Quiz |
| | | the intersection of two surfaces, Angle between two surfaces | | | | |
| | | tangent line and normal plane for | | | | |

| | | | | 1 | 1 | |
|----|--------|----------------------------------|----|----------------------------|--------------|------------|
| | 2 | Finding the | 4 | To find the particular | Lecture | Test |
| | | particular integral | | integral of a differential | with | |
| | | for e ^{ax,} Finding the | | equation by using an | Illustration | |
| | | particular integral | | appropriate method | | |
| | | for cos ax, sin ax | | | | |
| | 3 | Finding the | 3 | To find the particular | Lab | Slip test |
| | | particular integral | | integral of a differential | | 1 |
| | | for $e^{ax}f(x)$. Finding | | equation by using an | | |
| | | the particular | | appropriate method | | |
| | | integral for $x^{n}f(x)$ | | | | |
| | Δ | Introduction of | 1 | To study few methods to | Group | Formative |
| | т | homogeneous | - | convert the | Discussion | Assessment |
| | | linear equations | | homogonoous lineer | Discussion | Tost |
| | | Conversion of | | noniogeneous intea | | 1051 |
| | | | | equations into | | |
| | | nomogeneous | | differential equations | | |
| | | linear equations | | | | |
| | | into linear | | | | |
| | | differential | | | | |
| | | equations with | | | | |
| | | constant | | | | |
| | | coefficients | | | | |
| IV | Partia | l Differential equation | ns | | | |
| | 1 | Introduction of | 3 | To understand the basics | Lecture | Quiz |
| | | Partial differential | | and the formation of | with | |
| | | equations, | | partial differential | Illustration | |
| | | Formation of | | equations | | |
| | | Partial differential | | | | |
| | | equations by | | | | |
| | | eliminating the | | | | |
| | | unknown constants, | | | | |
| | 2 | Formation of | 3 | To study the methods of | Lecture | Test |
| | _ | Partial differential | C | formation and the | and small | |
| | | equations by | | solution of partial | groups | |
| | | eliminating the | | differential equations | 8- ° ° P ° | |
| | | arbitrary functions | | anterentiar equations | | |
| | | Methods of solving | | | | |
| | | Partial differential | | | | |
| | | austions | | | | |
| | 2 | Standard form of | 2 | To study about | Disquesion | Test |
| | 5 | | 3 | To study about | Discussion | Test |
| | | Lagrange s | | Lagrange's equation and | | |
| | | equation, General | | the methods to find its | | |
| | | solution of | | solutions | | |
| | | | | | | |
| | | Lagrange s | | | | |
| | | equation | | | | |
| | 4 | equation Solving Lagrange's | 3 | To use computational | Lecture | Brain |

| | | of grouping | | and applications of | Discussion | |
|---|---------|---------------------|---|---------------------------|--------------|------------|
| | | | | partial differential | | |
| | | | | equation of first order | | |
| | 5 | Solving Lagrange's | 3 | To use computational | Lecture | Test |
| | | equation by method | | tool to solve problems | with | |
| | | of multipliers | | and applications of | Illustration | |
| | | | | partial differential | | |
| | | | | equation of first order | | |
| V | Laplace | Transform | | 1 | 1 | 1 |
| | 1 | Definition of | 3 | To know the basics and | Lecture | Test |
| | | Laplace Transform, | | the properties of Laplace | and Debate | |
| | | Properties of | | Transform | | |
| | | Laplace Transform | | | | |
| | 2 | Computation of | 3 | To solve problems on | Lecture | Formative |
| | | Laplace Transform | | Laplace Transform | with | Assessment |
| | | of standard | | | Illustration | test |
| | | functions, Problems | | | | |
| | | on Laplace | | | | |
| | | Transform | | | | |
| | 3 | Definition of | 3 | To know the basics and | Lecture | Short test |
| | | Inverse Laplace | | the properties of Inverse | and Lab | |
| | | Transform, | | Laplace Transform | | |
| | | Properties of | | | | |
| | | Inverse Laplace | | | | |
| | | Transform | | | | |
| | 4 | Computation of | 3 | To use the Inverse | Lecture | Assignment |
| | | Inverse Laplace | | Laplace Transform to | and small | |
| | | Transform of | | solve the differential | groups | |
| | | specific functions, | | equation | | |
| | | Problems on | | | | |
| | | Inverse Laplace | | | | |
| | | Transform | | | | |
| | 5 | Solving Linear | 3 | To use Laplace | Lecture | Quiz and |
| | | Differential | | transform to solve the | with | Test |
| | | equations using | | differential equation | Illustration | |
| | | Laplace Transform | | | | |

Course Instructor: Dr. K. Jeya Daisy

HoD:Dr. V. M. Arul Flower Mary

HoD(SF): Mrs. J. Anne Mary Leema

SemesterIIName of the Course: Quantitative Aptitude - II (NME)Course Code: MNM202

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 4 | 2 | 60 | 100 |

Objectives: 1.To develop the quantitative aptitude of the students 2.To solve problems needed for various competitive examinations.

Course Outcome

| СО | Upon completion of this course the students will be ableto: | PSO addressed | CL |
|--------|---|------------------|-------|
| CO - 1 | frame equations and solve problems involving ratios and fractions. | PSO - 2 | Ар |
| CO - 2 | calculate the area and compare the objects on the basis of their size and area. | PSO - 1 | Ар |
| CO - 3 | change the form of the number using logarithm and make tedious and confusing calculations simple. | PSO - 4 | An |
| CO - 4 | have sufficient knowledge about the basis of calculation. | PSO - 2 | U, Ap |
| CO - 5 | study the concept related to time, speed and distance. | PSO - 4 | Ар |

Total contact hours: 30 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lectu re hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|------|---------|--|----------------------|--|-----------------------------|----------------------------|
| Ι | Problem | s on Numbers | | | | |
| | 1. | Problems on Numbers | 3 | To understand the basic concepts of numbers | Lecture thro google meet | Online Test |
| | 2. | Framing and solving equations involving unknown numbers | 3 | To frame and solve equations | Lecture thro google meet | Online quiz, Assignment |
| II | Problem | s on Trains | • | | | |
| | 1. | Problems on Trains | 2 | To study basic concepts | Lecture thro google meet | Online Test, Assignment |
| | 2. | Time taken by a train to cover | 2 | To solve problems on time taken by a train to | Lecture thro google meet | Online Quiz |

| | | <i>l</i> metres, <i>l</i> + <i>b</i> metres | | cover <i>l</i> metres, <i>l</i> + <i>b</i> metres | | |
|-----|----------|--|---|--|--|--|
| | 3. | Relation between a train and stationary/moving body | 2 | To solve problems related to train and stationary/moving body | Lecture thro google meet | Formative Assessment online Test |
| III | Compou | ind Interest | | | | |
| | 1. | Compound Interest | 3 | To recall the formulae of Compound interest | Lecture thro google meet | Online Test, Assignment |
| | 2. | Interest compounded annually, half yearly and quarterly, different rates for different years | 3 | To employ the problems related interest compounded annually, half yearly and quarterly, different rates for different years | Lecture thro google meet | Formative Assessment online Test |
| IV | Logarith | nms | | | | |
| | 1. | Logarithms | 2 | To study the rules of Logarithms | Lecture thro google meet | Online Test |
| | 2. | Properties of Logarithms | 2 | To solve problems by applyingthepropertiesof logarithms | Lecture thro google meet | Online Assignment |
| | 3. | Common Logarithms | 2 | To solve problems of Common Logarithms | Lecture thro google meet and Group discussion | Online Quiz |
| V | Area | 1 | | 1 | 1 | |
| | 1. | Area - Results on Triangles- Pythagoras theorem, median, centroid | 3 | To learn the formulae and results | Lecture thro google meet | Online Quiz, Test |
| | 2. | Area of a triangle and rectangle | 3 | To find Area of the given field | Lecture thro google meet | Formative Assessment online Test |

Course Instructor: Dr. M.R. Angel Jebitha, Ms.J.C.MahizhaHoD: Dr. V. M. Arul Flower MaryCourse Instructor: Dr.C.JenilaHoD(SF): Mrs. J. Anne Mary Leema

| Semester Name of the course Course Code | | : III | : III Major Core III | | | | | |
|---|---------|--|----------------------|--------------------|------|--|--|--|
| | | : Differential Equations and Vector Calculus | | | | | | |
| | | : MC2031 | | | | | | |
| | No of l | hours ner week | Credits | Total No. of hours | Mark | | | |

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 4 | 90 | 100 |

Objectives:

1. To gain deeper knowledge in differential equations, differentiation and integration of vector functions.

2. To apply the concepts in higher mathematics and physical sciences.

| СО | Upon completion of this course the students will be able to : | PSO addressed | CL |
|--------|--|------------------|----|
| CO - 1 | distinguish linear, nonlinear, ordinary and partial differential equations | PSO - 4 | An |
| CO - 2 | solve linear differential equations with constant and variable coefficients | PSO - 5 | U |
| CO - 3 | explain the basic properties of Laplace Transforms and Inverse Laplace Transforms. | PSO - 1 | U |
| CO - 4 | use the Laplace transform to find the solution of linear differential equations | PSO - 2 | Ар |
| CO - 5 | learn methods of forming and solving partial differential equations | PSO - 3 | U |
| CO - 6 | learn differentiation and integration of vector valued functions | PSO - 4 | U |

Total contact hours: 90 (Including lectures, assignments and tests)

| Unit | Sect | tion | Topics | Lectu | Learning outcome | Pedagogy | Assessment |
|------|------|-----------------|--------------------|-------|---------------------|--------------|------------------|
| | | | | re | | | /Evaluation |
| | | | | hours | | | |
| Ι | Lin | ear Diff | erential equations | 5 | | | |
| | 1 | Introdu | uction of Linear | 5 | Distinguish linear, | Lecture | Evaluation |
| | | Differe | ential equations | | nonlinear, ordinary | with | through: |
| | | with co | onstant | | and partial | illustration | Short test on |
| | | coeffic | cients, Formation | | differential | | finding the |
| | | of aux | illary equation | | equations, Solve | | particular |
| | | and fir | nding the | | linear differential | | integral |
| | | comple | ementary | | equations with | | |
| | | function | on, Finding the | | constant and | | |
| | | particu | lar integral for | | variable | | Short test on |
| | | e ^{ax} | | | coefficients | | homogeneous |
| | 2 | Findin | g the particular | 3 | Solve linear | Lecture | linear equations |

| | | integral for cos ax, sin | | differential | with PPT | |
|----|-----|---|----------------------------|--|--|--|
| | | ax, Finding the | | equations with | Illustratio | |
| | | particular integral for | | constant and | n | |
| | | $e^{ax}f(x)$ | | variable | | |
| | | | | coefficients | | |
| | 3 | Finding the particular | 3 | Distinguish linear, | Lecture | |
| | | integral for $x^n f(x)$, | | nonlinear, ordinary | with | Formative |
| | | Introduction of | | and partial | illustration | Assessment- I |
| | | homogeneous linear | | differential | | |
| | | equations Conversion | | equations Solve | | |
| | | of homogeneous | | linear differential | | |
| | | linear equations into | | equations with | | |
| | | linear differential | | constant and | | |
| | | initial unitificial | | | | |
| | | equations with constant | | variable | | |
| | - | coefficients | 2 | coefficients | T | |
| | 4 | Solving homogeneous | 3 | Solve linear | Lecture | |
| | | linear equations using | | differential | with | |
| | | the logarithmic | | equations with | illustration | |
| | | substitution, Solving | | constant and | | |
| | | homogeneous linear | | variable | | |
| | | equations using the nev | 7 | coefficients | | |
| | | operator | | | | |
| II | Lap | olace Transform | | | | |
| | | | | | | |
| | 1 | Definition of | 3 | Explain the basic | Lecture | Short test on |
| | 1 | Definition of Laplace | 3 | Explain the basic properties of | Lecture with PPT | Short test on Computation of |
| | 1 | Definition of Laplace Transform, | 3 | Explain the basic properties of Laplace Transform | Lecture with PPT Illustratio | Short test on Computation of Laplace |
| | 1 | Definition of Laplace Transform, Properties of | 3 | Explain the basic properties of Laplace Transform and inverse Laplace | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of |
| | 1 | Definition of Laplace Transform, Properties of Laplace | 3 | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, | 3 | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o | 3 F | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace | 3 Î | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of | 3 f | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard | 3 f | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions | 3 f | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 1 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions | 3 E | Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n | Short test on Computation of Laplace Transform of standard functions |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic | Lecture with PPT Illustratio n Lecture | Short test on Computation of Laplace Transform of standard functions |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of | Lecture with PPT Illustratio n Lecture with | Short test on Computation of Laplace Transform of standard functions |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Problems on | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of | 3 F 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace | 3 f 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace | 3 5 5 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functions Problems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform | 3 F 5 F 3 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |
| | 2 | Definition of Laplace Transform, Properties of Laplace Transform, Computation o Laplace Transform of standard functionsProblems on Laplace Transform, Definition of Inverse Laplace Transform, Properties of Inverse Laplace Transform Properties of Inverse Laplace Transform | 3 F 5 5 F 3 | Explain the basic properties of Laplace Transform and inverse Laplace Transform Explain the basic properties of Laplace Transform and inverse Laplace Transform | Lecture with PPT Illustratio n Lecture with illustration | Short test on Computation of Laplace Transform of standard functions Assignment on the related problem |

| | | specific | | and inverse Laplace | | |
|---|--------------|------------------------|---|----------------------|--------------|----------------|
| | | functions, | | Transform | | |
| | | Problems on | | | | |
| | | Inverse Laplace | | | | |
| | | Transform | | | | |
| | 4 | Solving Linear | 4 | Use the Laplace | Lecture | Formative |
| | | Differential | | transform in finding | with | Assessment –II |
| | | equations using | | the solution of | illustration | |
| | | Laplace | | linear differential | | |
| | | Transform. | | equations | | |
| | | Solving | | - 1 | | |
| | | simultaneous | | | | |
| | | equations using | | | | |
| | | Lanlace | | | | |
| | | Transform | | | | |
| Ш | Partial Diff | erential equation | s | | | |
| | | Introduction of | 4 | Learn methods of | Lecture | Short test on |
| | 1 | Partial | - | forming and | with | formation of |
| | | differential | | solving partial | illustration | Partial |
| | | equations | | differential | mustration | differential |
| | | Equations, | | equations | | equations by |
| | | Portial | | equations | | equations by |
| | | Falual differential | | | | unitro unit |
| | | | | | | unknown |
| | | equations by | | | | constants, and |
| | | eliminating the | | | | arbitrary |
| | | unknown | | | | function. |
| | | constants, | | | | |
| | | Formation of | | | | |
| | | Partial | | | | |
| | | differential | | | | |
| | | equations by | | | | |
| | | eliminating the | | | | |
| | | arbitrary | | | | |
| | | functions | | | | |
| | 2 | Methods of | 3 | Learn methods of | Lecture | |
| | | solving Partial | | forming and | with PPT | Quiz |
| | | differential | | solving partial | Illustratio | |
| | | equations, | | differential | n | |
| | | Standard form | | equations | | |
| | | of Lagrange's | | - | | |
| | | equation, | | | | |
| | | General | | | | |
| | | solution of | | | | Formative |
| | | Lagrange's | | | | Assessment-III |
| | | equation | | | | |
| | 3 | Solving | 4 | Learn methods of | Lecture | |

| | | Lagrange's | | forming and | with | |
|----|--|--|---|--|--|---|
| | | equation by | | solving partial | illustration | |
| | | method of | | differential | | |
| | | grouping | | equations | | |
| | | Solving | | oquations | | |
| | | Lagrange's | | | | |
| | | equation by | | | | |
| | | requation by | | | | |
| | | multipliers | | | | |
| | 1 | Solution of | 1 | Learn methods of | Lecture | |
| | + | L'agrange's | 4 | forming and | Discussio | |
| | | Lagrange s | | solving partial | Discussio | |
| | | equation using | | differential | 11 | |
| | | | | differential | | |
| | | suitable | | equations | | |
| | | multipliers, | | | | |
| | | Explanation of | | | | |
| | | Charpit's | | | | |
| | | method, | | | | |
| | | Finding the | | | | |
| | | solution of | | | | |
| | | PDE using | | | | |
| | | Charpit's | | | | |
| | | method | | | | |
| | | method | | | | |
| IV | Vector Di | ferentiation | | | | |
| IV | Vector Dif | ferentiation Revision of dot | 4 | Learn | Lecture | |
| IV | Vector Dif | ferentiation Revision of dot and cross product | 4 | Learn differentiation and | Lecture with PPT | Short test on |
| IV | Vector Dif | ferentiation Revision of dot and cross product of vectors, | 4 | Learn differentiation and integration of | Lecture with PPT Illustratio | Short test on gradient & |
| IV | Vector Dif | ferentiation Revision of dot and cross product of vectors, Definition and | 4 | Learn differentiation and integration of vector valued | Lecture with PPT Illustratio n | Short test on gradient & differentiation of |
| IV | Vector Dif | Terentiation Terentiation Revision of dot and cross product of vectors, Definition and heorems on | 4 | Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif | ferentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of | 4 | Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif | Terentiation Terentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient | 4 | Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif | ferentiation revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function | 4 | Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif | ferentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function and its properties | 4 | Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 I 2 I | Terentiation Ferentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function and its properties Problems based on | 4 | Learn differentiation and integration of vector valued functions Learn | Lecture with PPT Illustratio n | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 1 2 1 | FerentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equation | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and | Lecture with PPT Illustratio n Lecture with | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 1 | ferentiation ferentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function and its properties Problems based on Gradient, Equation of tangent plane | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 I 2 I 0 0 2 I 0 0 2 I | TherentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line for | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 2 I 0 I 0 I 1 I | FerentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface, | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 0 0 2 1 0 0 2 1 1 1 | FerentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface,Equation of | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors |
| IV | Vector Dif 1 I 2 I 0 0 2 I 0 0 1 I 1 I 1 I 2 I 0 0 1 I 1 I 1 I 1 I 1 I 2 I 0 0 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I | TherentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface,Equation ofangent line and | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |
| IV | Vector Dif 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 2 I 0 I 1 I 1 I | IntentionTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface,Equation ofangent line andaormal plane for | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |
| IV | Vector Dif 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | IntentionferentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface,Equation ofangent line andnormal plane forhe intersection of | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |
| IV | Vector Dif | TherentiationTerentiationRevision of dotand cross productof vectors,Definition andheorems onlifferentiation ofVectors, Gradientof a scalar functionand its propertiesProblems based onGradient, Equationof tangent planeand normal line fora single surface,Equation ofangent line andnormal plane forhe intersection ofwo surfaces | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |
| IV | Vector Dif 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 2 I 0 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I 1 I | Terentiation Terentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function and its properties Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of angent line and normal plane for he intersection of wo surfaces Angle between | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |
| IV | Vector Dif 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 0 0 2 1 0 0 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | ferentiation ferentiation Revision of dot and cross product of vectors, Definition and heorems on lifferentiation of Vectors, Gradient of a scalar function and its properties Problems based on Gradient, Equation of tangent plane and normal line for a single surface, Equation of angent line and normal plane for he intersection of wo surfaces Angle between wo surfaces, | 4 | Learn differentiation and integration of vector valued functions Learn differentiation and integration of vector valued functions Learn differentiation and | Lecture with PPT Illustratio n Lecture with illustration | Short test on gradient & differentiation of Vectors Formative Assessment-I |

| | 4 | vectors and its properties, Curl of vectors and its properties Solenoidal and irrotational vectors, Harmonic vectors and Laplace's equation, Problems based on divergence and curl | 4 | vector valued functions Learn differentiation and integration of vector valued functions | Lecture with illustration | Short test on Divergence, Curl , Solenoidal and irrotational vectors, Formative Assessment-II |
|---|----------|--|---|--|-----------------------------------|--|
| V | Vector I | ntegration | | | | |
| | 1 | Definition of line integrals and work done by a force, Parametric equation of curves, Evaluation of line integrals over curves in a plane, Evaluation of line integrals over curves in a surface | 4 | Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem | Lecture with illustration | Short test on Evaluation of line integrals |
| | 2 | Computation of work done by a force, Projection of a surface over a plane, Definition of surface integrals, Evaluation of surface integrals over a plane | 4 | Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence theorem, Apply the concepts to solve problems in physical sciences and engineering | Lecture with Discussio n | Formative Assessment-II |
| | 3 | Evaluation of surface integrals over a cube and parrelopiped, Evaluation of surface integrals | 4 | Evaluate line and surface integrals using Green's theorem, Stoke's theorem and Gauss divergence | Lecture with illustration | Short test on Green's theorem&Stoke' s theorem |

| | over a sphere, | | theorem, Apply the | | |
|---|--------------------|---|--------------------|--------------|----------------|
| | cylinder and cone, | | concepts to solve | | |
| | Statement and | | problems in | | Short test on |
| | verification of | | physical sciences | | Gauss |
| | Green's theorem | | and engineering | | Divergence |
| 4 | Statement and | 4 | Evaluate line and | Lecture | theorem |
| | verification of | | surface integrals | with | |
| | Stoke's theorem, | | using Green's | illustration | Formative |
| | Statement and | | theorem, Stoke's | | Assessment-III |
| | verification of | | theorem and Gauss | | |
| | Gauss Divergence | | divergence | | |
| | theorem | | theorem, Apply the | | |
| | | | concepts to solve | | |
| | | | problems in | | |
| | | | physical sciences | | |
| | | | and engineering | | |

Course Instructor: Dr. K. Jeya Daisy Course Instructor: Dr.C.Jenila HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

Major Core IV

| Semester | : III |
|--------------------|------------------|
| Name of the Course | :Real Analysis I |
| Course Code | : MC2032 |

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 5 | 4 | 75 | 100 |

Objectives:

1. To introduce the primary concepts of sequences and series of real numbers.

2. To develop problem solving skills.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|-------|---|------------------|----|
| CO- 1 | explain the primary concepts of sequences and series of real numbers | PSO - 1 | U |
| CO- 2 | define convergence and divergence of sequences and series | PSO - 1 | R |
| CO- 3 | distinguish between convergence and divergence of sequences and series | PSO - 2 | U |
| CO- 4 | relate the behavior of monotonic and geometric sequences and series | PSO - 5 | Ар |
| CO- 5 | calculate the limit and peak point of sequences | PSO - 3 | An |
| CO- 6 | analyze the importance of Cauchy's general principle of convergence of sequences and series | PSO - 4 | An |

Total contact hours: 75 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lectu | Learning outcomes | Pedagogy | Assessment/ |
|------|---------|---------------------------|-------|----------------------|--------------|--------------|
| | | | re | | | evaluation |
| | | | hours | | | |
| Ι | Prelin | ninaries | | | | |
| | 1 | Preliminaries – | 3 | Explain the primary | Lecture | Evaluation |
| | | Mathematical Induction | | concepts of the | with | through |
| | | | | Mathematical | Illustration | appreciative |
| | | | | Induction. | | inquiry |
| | 2 | Finite and Infinite Sets. | 3 | To distinguish | Lecture | Evaluation |
| | | | | between finite and | with PPT | through |
| | | | | infinite set. | | quizzes and |
| | | | | | | discussions. |
| | 3 | Theorems based on the | 3 | To understand the | Lecture | Slip Test |
| | | Real Numbers and the | | theorems based on he | with | |
| | | algebraic and order | | Real Numbers and the | Illustration | |

| r | | | | | | |
|-----|----------|--|---|--|-------------------------------------|--|
| | | properties of R. | | algebraic and order properties of R. | | |
| | 4 | Absolute value and the real line. | 3 | To understandAbsolute value and the real line. | Discussion with Illustration | Quiz and Test |
| II | The real | numbers | | | | |
| | 1 | The Real Numbers-The completeness property of R. | 3 | To know aboutThe completeness property of R. | Lecture with PPT | Evaluation through discussions. |
| | 2 | Applications of the supremum property. | 3 | To know aboutApplications of the supremum property. | Lecture | Evaluation through appreciative inquiry |
| | 3 | Intervals. | 3 | To identify Intervals. | Lecture | Formative Assessment Test |
| III | Sequence | es | | | 1 | |
| | 1 | Sequences- Definitions Range of Sequences, Limit of a Sequence, Bounded Sequence. | 3 | Explain the primary concepts of sequences and series of real numbers | Lecture with Illustration | Evaluation through appreciative inquiry |
| | 2 | Theorems based on bounded Sequence, Problems based on bounded Sequence, Monotonic Sequence. | 3 | To distinguish between bounded and monotonic sequences | Lecture with PPT | Evaluation through quizzes and discussions. |
| | 3 | Theorems based on Monotonic Sequence Convergent Sequence Theorems based on Convergent Sequence | 3 | To understand the theorems based onConvergent Sequence and Divergent Sequence | Lecture with Illustration | Slip Test |
| | 4 | Behavior of monotonic sequence. | 3 | To understandBehavior of monotonic sequence. | Discussion with Illustration | Quiz and Test |
| IV | Subsequ | iences | | | | |
| | 1 | Subsequences- Definition Theorems based onSubsequences Subsequences- Examples | 2 | Explain the primary concepts of Subsequences | Lecture with PPT Illustration | Evaluation through discussions. |
| | 2 | Peak points | 3 | Calculate the limit and | Lecture | Evaluation |

| | | Peak points-Examples Limit points Limit points-Examples | | peak point of sequences | with Illustration | through appreciative inquiry |
|---|-----------|--|---|---|-------------------------------------|---------------------------------------|
| | 3 | Cauchy sequences- Definition Cauchy sequences- examples | 3 | To apply the principles of Cauchy sequences | Lecture | Formative Assessment Test |
| | 4 | Theorems based on The upper and lower limits of a sequence. | 3 | To identify the upper and lower limits of a sequence. | Group Discussion | Slip Test |
| V | Series of | positive terms | | | | |
| | 1 | Series-Definition& Examples Series, Infinite series- Examples | 3 | Explain the primary concepts of series of real numbers | Lecture with PPT Illustration | Evaluation through discussions. |
| | 2 | Theorems and problems based on Comparison Test. | 3 | To understand the Theorems and problems based on Comparison Test. | Lecture and group discussion | Evaluation through Assignment |
| | 3 | Problems based on Kummer's Test, D'Alembert's Ratio Test, De Morgan and Bertrand's Test and Gauss Test. | 3 | To solve the Problems based on Kummer's Test, D'Alembert's Ratio Test, De Morgan and Bertrand's Test and Gauss Test. | Lecture with Illustration | Formative Assessment Test |
| | 4 | Problems based on Root Test and Condensation Test. | 3 | To solve the Problems based on Root Test and Condensation Test. | Lecture with Illustration | Slip Test |
| | 5 | Problems based on Integral Test. | 2 | To solve the Problems based on Integral Test. | Lecture with Illustration | Quiz and Test |

Course Instructor: Dr. Angel Jebitha Course Instructor: Dr.S.Kavitha HoD:Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

SEMESTER

III

Name of the Course : Probability Theory and Distributions (Allied)

Course Code

: MA2031

| No. of hours per week | Credit | Total No. of hours | Marks |
|--------------------------|--------|--------------------|-------|
| 5 | 5 | 75 | 100 |

Objectives: 1. To impart knowledge on the basic concepts of Probability theory and Probability

distributions.

2. To apply the theory in real life situations.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|---|------------------|----|
| CO - 1 | recall the definition of probability and set functions | PSO - 1 | R |
| CO - 2 | differentiate between probability and conditional probability and compute according to the requirement | PSO - 4 | An |
| CO - 3 | understand the definition of random variables, their types and related concepts | PSO - 1 | U |
| CO - 4 | detect the different probability distributions which are widely used | PSO - 4 | An |
| CO - 5 | apply the techniques to prove the properties of probability and related distributions | PSO - 5 | Ар |
| CO - 6 | choose the suitable probability distribution corresponding to a given data | PSO - 5 | E |

Total contact hours: 75 (Including lectures, assignments and tests)

| Unit | Sections | Topics | Lecture | Learning | Pedagogy | Assessment/ |
|------|-----------|---|---------|---|---------------------------------|-------------|
| | | | hours | Outcome | | Evaluation |
| Ι | Probabili | ty | | | | |
| | 1 | Probability, Experiment, sample space | 2 | To recall the definition of probability and set functions and understand the definition of random | Lecture with Illustration | Short Test |

| | | | . 1 1 1 . | | |
|---|---|---|---|---|----------------|
| | | | variables, their | | |
| | | | types and related | | |
| | | - | concepts | | |
| 2 | Example and | 3 | To recall the | Lecture | Test |
| | Theorems | | definition of | with | |
| | based on | | probability and | Illustration | |
| | Events, | | to apply the | | |
| | Problems | | techniques to | | |
| | based on | | prove the | | |
| | events and | | properties of | | |
| | sample space | | probability and | | |
| | | | related | | |
| | | | distributions | | |
| 3 | Conditional | 3 | To recall the | Lecture | Quiz and Test |
| | probability, | | definition of | with PPT | |
| | Problems | | probability and | Illustration | |
| | based on | | apply the | | |
| | Conditional | | techniques to | | |
| | probability | | prove the | | |
| | | | properties of | | |
| | | | probability and | | |
| | | | related | | |
| | | | distributions | | |
| 4 | Properties – | 3 | To detect the | Lecture | Formative |
| | Indonandant | | different | with | Assessment |
| | mdependent | | | | 71550551110111 |
| | events, | | probability | Illustration | Test |
| | events, Theorems | | probability distributions | Illustration | Test |
| | events, Theorems based on | | probability distributions which are | Illustration | Test |
| | events, Theorems based on independent | | probability distributions which are widely used and | Illustration | Test |
| | events, Theorems based on independent events, | | probability distributions which are widely used and to recall the | Illustration | Test |
| | events, Theorems based on independent events, Problems | | probability distributions which are widely used and to recall the definition of | Illustration | Test |
| | events, Theorems based on independent events, Problems based on | | probability distributions which are widely used and to recall the definition of probability and | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent | | probability distributions which are widely used and to recall the definition of probability and apply the | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent events. | | probability distributions which are widely used and to recall the definition of probability and apply the techniques to | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent events. | | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent events. | | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent events. | | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and | Illustration | Test |
| | events, Theorems based on independent events, Problems based on independent events. | | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related | Illustration | Test |
| - | events, Theorems based on independent events, Problems based on independent events. | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions | Illustration | Test |
| 5 | Baye's | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand | Illustration | Test |
| 5 | Baye's theorem and | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of | Illustration Lecture with | Test |
| 5 | Baye's theorem and Problems | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random | Illustration Lecture with Illustration | Test |
| 5 | Baye's theorem and Problems based on independent events, Problems based on independent events. | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their | Illustration Lecture with Illustration | Test |
| 5 | Baye's theorem and Problems based on independent events, Problems based on independent events. | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their types and related | Illustration Lecture with Illustration | Test |
| 5 | Baye's theorem Baye's theorem | 2 | probability distributions which are widely used and to recall the definition of probability and apply the techniques to prove the properties of probability and related distributions To understand the definition of random variables, their types and related concepts | Illustration Lecture with Illustration | Test |

| Variables, Distribution function, Discrete, continuous- random variabledefinition of probability and set functions, to differentiate between probability and conditional probability and conditional probability and conditional probability and compute according to the requirement, and to understand the definition of random variablesGroup DiscussionQuiz and Test2Problems based on discrete random variable2To recall the definition of random variables, their types and related conceptsLecture with IllustrationTest3Problems based on discrete random variable2To detect the different probability and set functionsLecture with IllustrationTest3Problems based on discrete random variable2To detect the different probability and set functionsLecture with IllustrationTest4Mathematical probability and on variable2To detect the different probability distributions which are widely usedConcept STest |
|--|
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| Image: Section of the section of th |
| Discrete, continuous- random variabledifferentiate between probability and conditional probability and conditional probability and conditional probability and compute according to the requirement, and the definition of random variables, their types and related conceptsDecember according to the requirement, and the definition of random variables, their types and related conceptsDecember according to the requirement, and the definition of random variables, their types and related conceptsLecture with Illustration2Problems based on discrete random variable2To recall the definition of probability and set functionsLecture with IllustrationTest3Problems based on continuous- random variable2To detect the different probability distributions which are widely usedLecture with IllustrationTest |
| Image: Continuous- random variableImage: Continuous- probability and conditional probability and compute according to the requirement, and to understand the definition of random variables, their types and related conceptsImage: Continuous- requirement, and to understand the definition of random variables, their types and related conceptsImage: Continuous- requirement, and to understand the definition of probability and set functionsImage: Continuous- requirement, and to understand the definition of probability and set functionsImage: Continuous- requirement, and to understand the definition of probability and set functionsImage: Continuous- rest3Problems based on continuous- random variable2To detect the different probability distributions which are widely usedLecture with IllustrationTest |
| continuouscontrolrandom variableprobability and conditional probability and compute according to the requirement, and to understand the definition of random variables, their types and related concepts |
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| ProblemProbability and compute according to the requirement, and to understand the definition of random variables, their types and related conceptsLecture with Illustration2Problems based on discrete random variable2To recall the definition of probability and set functionsLecture with Illustration3Problems based on continuous- random variable2To detect the different probability uth IllustrationTest3Problems based on discrete random variable2To detect the different probability uth IllustrationTest |
| 2Problems2To recall the definition of random variables, their types and related conceptsLecture with Illustration2Problems2To recall the definition of probability and set functionsLecture with Illustration3Problems2To detect the different probabilityLecture with Illustration3Problems variable2To detect the different probabilityLecture with Illustration4Mathematical wariable2To detect the distributions which are widely usedDefend Tort |
| 2Problems based on variable2To recall the definition of random variables, their types and related conceptsLecture with Illustration3Problems based on variable2To detect the different probability different probabilityLecture with Illustration3Problems variable2To detect the different with probabilityLecture with Illustration4Mathematical with2To detect the different with with probabilityLecture with Illustration |
| 2Problems2To recall the definition of random variables, their types and related conceptsLecture with Illustration2Problems2To recall the definition of probability and set functionsLecture with Illustration3Problems2To detect the different probabilityLecture with Illustration3Problems2To detect the different probabilityLecture with Illustration3Problems2To detect the different probabilityLecture with Illustration3Problems2To detect the different probabilityLecture with Ullustration4Methematical with2To detect the distributions which are widely usedDefined Trate |
| 2Problems based on random variable2To recall the definition of random variables, their types and related conceptsLecture with Illustration3Problems based on discrete random variable2To detect the different probability and set functionsLecture with Illustration3Problems based on continuous- random variable2To detect the different probability mith ifferent with illustrationLecture with Illustration4Mathematical with2To detect the different with wich usedLecture variable |
| 2Problems2To recall the definition of random variables, their types and related conceptsLecture2Problems2To recall the definition of probability and set functionsLecture3Problems2To detect the different probabilityLecture3Problems2To detect the different withLecture with Illustration3Problems2To detect the different with uth probabilityLecture with Illustration3Problems2To detect the different with uth istributions which are widely usedLecture with |
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| 2Problems based on discrete random variable2To recall the definition of probability and set functionsLecture with IllustrationTest3Problems based on continuous- random variable2To detect the different probabilityLecture with IllustrationTest3Problems based on variable2To detect the different probabilityLecture with IllustrationTest |
| 2Problems based on discrete random variable2To recall the definition of probability and set functionsLecture with IllustrationTest3Problems variable2To detect the different probability different probability distributionsLecture with IllustrationTest3Problems based on variable2To detect the different probability distributions which are widely usedLecture with TestTest |
| 2Problems2To recall the definition of probability and set functionsLecture with IllustrationTest3Problems2To detect the different probabilityLecture with IllustrationTest3Problems2To detect the different probabilityLecture with IllustrationTest4Mathematical2To detect the different with with IllustrationCommon distributions |
| 2Problems based on discrete random variable2To recall the definition of probability and set functionsLecture with IllustrationTest3Problems based on continuous- random variable2To detect the different probability different probability distributionsLecture with IllustrationTest |
| based on discrete random variabledefinition of probability and set functionswith Illustration3Problems based on continuous- random variable2To detect the different probabilityLecture with Illustration3Problems based on continuous- random variable2To detect the different probabilityLecture with Illustration |
| discrete random variableprobability and set functionsIllustration3Problems2To detect the different probabilityLecture with3Problems2To detect the different probabilityLecture withacontinuous- random variableprobability which are widely usedIllustration |
| random variableset functionsrandom set functions3Problems2To detect the different probabilityLecture withcontinuous- random variableProblems24Mathematical Problems2To detect the different withLecture with |
| variable To detect the Lecture Test 3 Problems 2 To detect the Lecture Test based on ontinuous- probability Illustration Test random distributions which are widely used Optimend Test |
| 3 Problems 2 To detect the different with Lecture Test based on continuous-random variable Probability Illustration Illustration 4 Mathematical 2 To detect the different with Optimized |
| based on different with continuous- random distributions variable which are widely used Optimum 4 Text |
| continuous- random variable probability distributions which are widely used Illustration |
| random variable A Mathematical A Mathematical |
| variable which are widely used |
| widely used |
| |
| 4 Mathematical 2 Test the validity Group Quiz and Test |
| expectation of a given data Discussion |
| III Moment Generating Function 1 Moment 2 Decell the Lecture Oviz and Test |
| I Moment 5 Recall the Lecture Quiz and Test |
| Generating definition of With PP1 European Probability and Illustration |
| Pulction, probability and inustration |
| average av |
| Problems definition of |
| hased on random |
| Moment variables their |
| Generating types and related |
| Function concepts and to |
| Properties of apply the |
| Moment techniques to |
| Generating prove the |
| Function properties of |

| | | | probability and | | |
|---|--|---|---|---------------------------------|------------|
| | | | related | | |
| 2 | | 2 | distributions | 9 | |
| 2 | Cumulant generating function, properties and Problems based on Cumulantgener ating Function | 3 | To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related distributions | Group Discussion | Short Test |
| 3 | Characteristic function, properties, Problemsbased on Characteristic function and Poisson distribution | 3 | To recall the definition of probability and set functions, to detect the different probability distributions which are widely used and to apply the techniques to prove the properties of probability and related distributions | Lecture with Illustration | Test |
| 4 | Theorems based on Poisson distribution, Problems based on Poisson distribution, Mode,Moment Generating Functionof Poisson distribution | 3 | To recall the definition of probability and set functions and to apply the techniques to prove the properties of probability and related distributions and to understand the definition of random variables, their | Group Discussion | Short Test |

| | | | | types and related | | |
|----|----------|---------------|---|-------------------|----------------------------|------------|
| | | | | concepts | | |
| | 5 | Theorem | 2 | To apply the | Lastura | Test |
| | 5 | head on | 3 | to apply the | Lecture | Test |
| | | Dased on | | techniques to | With Tiles at weat is a | |
| | | Mode,Moment | | prove the | Inustration | |
| | | Generating | | properties of | | |
| | | Function of | | probability and | | |
| | | Poisson | | related | | |
| | | distribution, | | distributions and | | |
| | | fitting of | | to detect the | | |
| | | Poisson | | different | | |
| | | distribution | | probability | | |
| | | and problems | | distributions | | |
| | | based on this | | which are | | |
| | | | | widely used | | |
| IV | Binomial | Distribution | | ſ | [| |
| | 1 | Introduction- | 3 | To recall the | Group | Short Test |
| | | Definition, | | definition of | Discussion | |
| | | Moments of | | probability and | | |
| | | binomial | | set functions | | |
| | | Distribution | | and to | | |
| | | | | understand the | | |
| | | | | definition of | | |
| | | | | random | | |
| | | | | variables, their | | |
| | | | | types and related | | |
| | | | | concepts | | |
| | 2 | Central | 3 | To understand | Lecture | Test |
| | | moments, | | the definition of | with | |
| | | Theorems | | random | Illustration | |
| | | based on | | variables, their | | |
| | | Central | | types and related | | |
| | | moments | | concepts and | | |
| | | | | recall the | | |
| | | | | definition of | | |
| | | | | probability and | | |
| | | | | set functions | | |
| | | | | and to | | |
| | 3 | Mode of | 3 | To recall the | Group | Short Test |
| | | binomial | | definition of | Discussion | |
| | | distribution, | | probability and | | |
| | | Problems | | set functions and | | |
| | | based on Mode | | to apply the | | |
| | | of binomial | | techniques to | | |
| | | distribution | | prove the | | |
| | | | | properties of | | |

| | | | | probability and | | |
|---|----------|-----------------|---|---------------------------------------|--------------|---------------|
| | | | | probability and | | |
| | | | | related | | |
| | | | | distributions | . | — |
| | 4 | Fitting of | 3 | To detect the | Lecture | Test |
| | | binomial | | different | with | |
| | | distribution, | | probability | Illustration | |
| | | examples, | | distributions | | |
| | | Problems | | which are | | |
| | | based on | | widely used and | | |
| | | fitting of | | to apply the | | |
| | | binomial | | techniques to | | |
| | | distribution | | prove the | | |
| | | | | properties of | | |
| | | | | probability and | | |
| | | | | related | | |
| | | | | distributions | | |
| V | Normal D | Distribution | | | | |
| | 1 | Definition, | 3 | To recall the | Lecture | Test |
| | | Moment | | definition of | with | |
| | | Generating | | probability and | Illustration | |
| | | Functionabout | | set functions and | | |
| | | origin of | | to apply the | | |
| | | normal | | techniques to | | |
| | | distribution, | | prove the | | |
| | | Mean and | | properties of | | |
| | | variance | | probability and | | |
| | | | | related | | |
| | | | | distributions | | |
| | 2 | Standard | 3 | To recall the | Lecture | |
| | | normal variate, | | definition of | with | Ouiz and Test |
| | | mode, Median. | | probability and | Illustration | |
| | | Moment | | set functions and | | |
| | | Generating | | to understand | | |
| | | Functionabout | | the definition of | | |
| | | mean of | | random | | |
| | | normal | | variables, their | | |
| | | distribution. | | types and related | | |
| | | Theorems | | concepts | | |
| | | basedon mean | | · · · · · · · · · · · · · · · · · · · | | |
| | | of normal | | | | |
| | | distribution | | | | |
| | 3 | Problems | 3 | To recall the | Lecture | Formative |
| | - | basedon | ÷ | definition of | with | Assessment |
| | | meanof normal | | probability and | Illustration | Test |
| | | distribution | | set functions and | | |
| | | Area property | | to understand | | |
| | | - non property | | | 1 | |
| | of normal | | the definition of | | |
|---|---------------|---|-------------------|--------------|------|
| | distribution, | | random | | |
| | Problems | | variables, their | | |
| | basedon area | | types and related | | |
| | of normal | | concepts and to | | |
| | distribution | | apply the | | |
| | | | techniques to | | |
| | | | prove the | | |
| | | | properties of | | |
| | | | probability and | | |
| | | | related | | |
| | | | distributions | | |
| 4 | Quartile | 3 | To recall the | Lecture | Test |
| | deviation for | | definition of | with | |
| | the normal | | probability and | Illustration | |
| | distribution, | | to detect the | | |
| | fitting of | | different | | |
| | normal | | probability | | |
| | distribution, | | distributions | | |
| | Problems | | which are | | |
| | basedon | | widely used and | | |
| | Fitting of | | to apply the | | |
| | normal | | techniques to | | |
| | distribution | | prove the | | |
| | | | properties of | | |
| | | | probability and | | |
| | | | related | | |
| | | | distributions | | |

Course Instructor: Sr. S. AntinMary Course Instructor: Ms. V. Princy Kala HoD: Dr. V. M. Arul Flower Mary HoD(SF): Mrs. J. Anne Mary Leema

| Semester | : IV |
|--------------------|--------------------|
| Name of the Course | : Groups and Rings |
| Subject code | : MC2041 |

| No. of hours per week | Credit | Total No. of hours | Marks |
|-----------------------|--------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives: 1.To introduce the concepts of Group theory and Ring theory

3. To gain more knowledge essential for higher studies in Abstract Algebra4.

| CO | Upon completion of this course the students will be able to: | PSO addressed | CL |
|---------------|--|------------------|----|
| CO – 1 | recall the definitions of groups ,rings, functions and also examples of groups and rings | PSO - 1 | R |
| CO – 2 | explain the properties of groups, rings and different types of groups and rings | PSO - 1 | U |
| CO – 3 | develop proofs of results on Permutation groups ,Cyclic groups, Quotient group, Subgroups, subrings , quotient rings | PSO - 5 | С |
| CO – 4 | examine the properties of Ideals-Maximal and Prime ideals-Cosets-order of an element | PSO - 5 | Е |
| CO – 5 | test the homomorphic and isomorphic properties of groups and rings | PSO - 4 | An |
| <u>CO</u> – 6 | develop the concepts of ordered integral domains and Unique Factorisation Domains | PSO - 5 | E |

Total contact hours: 90 (Including lectures, seminar and tests)

| Unit | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/ | | |
|------|---------|---------------------|---------|-------------------------|--------------|--------------|--|--|
| | | | hours | | | evaluation | | |
| Ι | Group | Groups. | | | | | | |
| | 1. | Definition and | 4 | To understand the | Lecture | Evaluation | | |
| | | examples on | | definition of groups | with | through test | | |
| | | Groups | | | Illustration | | | |
| | 2. | Definition and | 3 | To understand the | Lecture | Q&A | | |
| | | examples on | | definition permutation | | | | |
| | | Permutation Groups | | groups | | | | |
| | 3. | Definition of cycle | 3 | To understand the | Lecture | Open | | |
| | | and theorem based | | definition of cycle and | with | Book | | |
| | | on cycles | | theorem based on cycles | Illustration | Assignment | | |
| | 4. | Theorems on even | 2 | To understand and apply | Lecture | Quiz | | |
| | | and odd | | this theorem in various | with | | | |
| | | permutations | | problems | Illustration | | | |

| | 5. | Definition | 3 | To understand the | Lecture | Group |
|-----|----------|-----------------------|-----------|--------------------------|--------------|------------|
| | | examples, theorems | | definition and theorems | with | Discussion |
| | | and problems of sub | | of sub groups | Illustration | |
| | | groups | | | | |
| | 6. | Theorems on cyclic | 2 | To learn the concepts of | Lecture | Q&A |
| | | groups and | | cyclic groups | with | |
| | | problems based on | | | Illustration | |
| | | cyclic groups | | | | |
| II | Order of | f an element and Norr | nal Sub G | roups | · | |
| | 1. | Definition and | 2 | To understand the | Lecture | Test |
| | | Theorems on order | | definition and theorems | with | |
| | | of an Element | | on order of an Element | Illustration | |
| | 2. | Problems on order | 2 | To apply the concept of | Lecture | Open book |
| | | of an element | | order of an element in | | assignment |
| | | | | problems | | |
| | 3. | Definition of | 3 | To understand the | Lecture | Q&A |
| | | Cosets and | | definition of cosets and | | |
| | | problems on cosets | | problems on cosets | | |
| | 4. | Lagrange's | 3 | To learn Lagrange's | Lecture | Formative |
| | | Theorem, Euler's | | Theorem, Euler's | | Assessment |
| | | Theorem, Fermats | | Theorem, Fermats | | Test |
| | | theorem | | theorem | | |
| | 5. | Normal subgroups - | 2 | To know the definition | Group | Q&A |
| | | Definition and | | of Normal subgroups | Discussion | |
| | | Examples | | | | |
| | 6. | Problems and | 2 | To apply the Normal | Lecture | Slip Test |
| | | theorems on | | subgroups concept in | with | |
| | | Normal Subgroups | | problems | Illustration | |
| III | Isomorp | hism | | 1 | 1 | |
| | 1. | Definition, | 4 | To understand the | Lecture | Quiz |
| | | theorems and | | definition and theorems | with | |
| | | Examples of | | based on Isomorphism | Illustration | |
| | | Isomorphism | | | | |
| | 2. | Cayley's Theorem | 3 | To learn the | Lecture | SipTest |
| | | and Theorem on | | Cayley'stheorem and | | |
| | | Automorphism and | | understand the concept | | |
| | | generators | | of Automorphism and | | |
| | | | | generators | | |
| | 3. | Definition of | 2 | To learn the definition | Lecture | Test |
| | | Homomorphism | | of Homomorphism and | | |
| | | and Examples | | Examples | | |
| | 4. | Fundamental | 3 | To study the | Lecture | Q&A |
| | | Theorem of | | Fundamental Theorem | | |
| | | Homomorphism | | of Homomorphism | | |
| | 5. | Problems on Kernel | 3 | To apply Kernel concept | Group | Brain |
| | | | | in problems | Discussion | Storming |

| IV | Rings | | | | | |
|----|---------|--|---|---|------------------------------------|---------------------------------|
| | 1. | Definition, Elementary properties and examples of Rings | 3 | To learn the definition of rings | Lecture with Illustration | Quiz |
| | 2. | Problems based on Isomorphism of Rings | 3 | To get the idea of Isomorphism of Rings | Lecture and group discussion | Test |
| | 3. | Types of Rings and Theorems | 2 | To identify the Types of Rings | Lecture with Illustration | Test |
| | 4. | Examples of Skewfieldsamd Theorems based on Skewfields | 2 | To apply Skewfields idea in problems | Lecture with Illustration | Formative Assessment Test |
| | 5. | Definition and Theorems on integral Domains | 1 | To know about integral Domains | Lecture with Illustration | Assignment |
| | 6. | Characteristic of a Ring | 1 | To interpret the Characteristic of a Ring | Lecture with Illustration | Quiz and Test |
| V | Sub Rin | gs | | | | |
| | 1. | Definition and Examples of Sub Rings | 2 | To get the knowledge of subrings | Lecture with Illustration | Test |
| | 2. | Problems and Theorems on Sub Rings | 1 | To develop the proof technique and solve problems. | Lecture with Illustration | Q&A |
| | 3. | Definition, Theorems and Examples on ideals | 3 | To utilize the concept of ideals in examples | Lecture with Illustration | Open Book Assignment |
| | 4. | Ordered integral Domains | 3 | To understand the Ordered integral Domains | Lecture with Illustration | Assignment |
| | 5. | Maximal and Prime Ideals | 2 | To know about Maximal and Prime Ideals | Lecture with Illustration | Quiz and Test |
| | 6. | Homomorphism of Rings | 2 | To learn the definition of Homomorphism of Rings | Lecture with Illustration | Assignment |
| | 7. | Unique factorisation Domain | 2 | To understand and analyze about Unique factorisation Domain | Lecture with Illustration | Quiz and Test |

Course Instructor(Aided): Dr.L.Jesmalar Course Instructor(SF): Ms.V. Princy Kala Leema

HOD :Dr. V. M. Arul Flower Mary HOD(SF) : Ms. J. Anne Mary

| Semester | : IV |
|--------------------|--------------------------------------|
| Name of the Course | : Analytical Geometry - 3 Dimensions |
| Subject code | : MC2042 |

| No. of hours per week | Credits | Total No. of hours | Marks | |
|-----------------------|---------|--------------------|-------|--|
| 5 | 5 | 75 | 100 | |

Major Core VI

Objectives:

To gain deeper knowledge in three dimensional Analytical Geometry.
 To develop creative thinking, innovation and synthesis of information

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|--|------------------|----|
| CO – 1 | recall the basic definitions and concepts of planes and lines | PSO - 1 | R |
| CO – 2 | demonstrate the Projection of the line joining two points, Cosines of the line joining two points and will be able to solve problems | PSO - 3 | Ар |
| CO – 3 | analyze the characteristics of a cone and the condition for a plane to touch the quadric cone | PSO - 2 | An |
| CO – 4 | draw three dimensional surfaces from the given information | PSO - 4 | An |
| CO – 5 | discuss the characteristics and properties of 3 - dimensional objects like sphere,cubeetc | PSO - 1 | U |
| CO – 6 | develop the skill in 3 - dimensional geometry to gain mastery in related courses | PSO - 6 | С |

Total contact hours: 75 (Including lectures, assignments and tests)

| Unit | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/ | |
|------|-----------------------------|-----------------------|---------|--------------------------|--------------|-------------|--|
| | | | hours | | | evaluation | |
| Ι | Direction cosines of a line | | | | | | |
| | 1. | Introduction and | 2 | To understand the | Lecture | Test | |
| | | definition of | | concept of distance | | | |
| | | distance between | | between points and | | | |
| | | points and angle | | angle between two lines | | | |
| | | between two lines. | | | | | |
| | 2. | Definition and | 3 | To understand the | Lecture | Group | |
| | | problems related to | | projection on a line and | with | Discussion | |
| | | Projection on a line, | | direction cosines of a | illustration | | |
| | | Direction cosines of | | line | s | | |
| | | a line | | | | | |
| | 3. | Definition of | 3 | To analyze the | Lecture | Test | |

| | | direction ratios and | | equations of two skew | | |
|-----|------|----------------------|---|----------------------------|--------------|------------|
| | | projection of the | | lines in a simplified | | |
| | | nine joining two | | IOTIII | | |
| | 4 | Definition and | 2 | Acquire the knowledge | Lecture | Test |
| | т. | Theorems related to | 2 | about direction cosines | Lecture | 1050 |
| | | direction cosines of | | of the line joining the | | |
| | | the line joining the | | points | | |
| | | points | | P • · · · · · · | | |
| | 5. | Definition and | 2 | To practice various | Lecture | Group |
| | | problems based on | | problems related to | with group | discussion |
| | | conditions for | | conditions for | discussion | |
| | | perpendicularity | | perpendicularity and | | |
| | | and parallelism. | | parallelism. | | |
| | | | | | | |
| 11 | L. | The Plane | | | | |
| | 1. | Definition and | 3 | To understand the | Lecture | Test |
| | | problems based on | | concepts Equation of a | | |
| | | Equation of a plane | | plane in different forms | | |
| | | in different forms | | | | |
| | | ,Intercept form, | | | | |
| | | normal form | | | _ | |
| | 2. | Definition and | 3 | To understand the | Lecture | Q&A |
| | | problems related to | | definition of the ratio in | | |
| | | Angle between the | | which the plane divides | | |
| | | planes, The ratio in | | the line joining the | | |
| | | which the plane | | points | | |
| | | divides the line | | | | |
| | 2 | Definition and | 2 | To prostico various | Lastura | Formativa |
| | 5. | problems on a plane | 5 | roplams related to | Lecture | Assassment |
| | | through the line of | | plane through the line of | | Test |
| | | intersection of two | | intersection of two | | 1051 |
| | | given planes | | given planes | | |
| | 4. | Problems based on | 3 | Acquire the knowledge | Lecture | Test |
| | | length of | | about the planes | with | |
| | | perpendicular, | | bisecting the angle | illustration | |
| | | Planes bisecting the | | between two planes. | s | |
| | | angle between two | | | | |
| | | planes. | | | | |
| III | | he Straight Line | | | | |
| | | | | | - | |
| | 1. | Definition and | 3 | To understand the | Lecture | Quiz |
| 1 | | methods of finding | | methods of finding | | |

| | | equation of a line in | | equation of a line in | | |
|-----|---------|-----------------------|---|-------------------------|--------------|------------|
| | | different forms | | different forms | | |
| | 2. | Problems based on | 3 | To compare the plane | Lecture | Test |
| | | the plane and the | | and the straight line | with | |
| | | straight line | | | illustration | |
| | 3. | Definition and | 3 | To Know the concept of | Lecture | Brain |
| | | problems Angle | | Angle between the lines | with group | storming |
| | | between the lines, | | | discussion | |
| | | image of a line | | | | |
| | 4. | Problems based on | 3 | Acquire the knowledge | Lecture | Assignment |
| | | Co-planarity of two | | about Co-planarity of | with ppt | |
| | | lines | | two lines | | |
| IV | The Sph | ere | | | 1 | 1 |
| | 1. | Introduction and | 3 | To understand the | Lecture | Quiz |
| | | Illustrations based | | sphere in its general | | |
| | | on equation of the | | form | | |
| | | sphere in its general | | | | |
| | | form | | | | |
| | 2. | Theorem and | 2 | To determine thecentre | Lecture | Test |
| | | problems on | | and radius of a sphere | | |
| | | determination of | | | | |
| | | the centre and | | | | |
| | | radius of a sphere | - | | - | |
| | 3. | The length of the | 2 | To know about the | Lecture | Slip Test |
| | | tangent from the | | length of the tangent | with | |
| | | point to the sphere | | from the point to the | illustration | |
| | 4 | D 11 1 1 1 | 2 | sphere | T (| A . |
| | 4. | Problems related to | 3 | To practice various | Lecture | Assignment |
| | | by a plana | | Section of onhore by a | | |
| | | by a plane | | plane | | |
| | 5 | Definition of | 2 | Acquire the knowledge | Locturo | Formativa |
| | 5. | Intersection of two | 2 | about Intersection of | Lecture | Assessment |
| | | spheres and tangent | | two spheres and tangent | illustration | Test |
| | | nlane | | nlane | mustration | 1050 |
| IV | Т | The Cone | | plane. | | |
| 1 1 | _ | | | | | |
| | 1. | Definitions and | 2 | To understand about | Lecture | Test |
| | | problems in the | | equation of a surface | with | |
| | | equation of a | | - | illustration | |
| | | surface and Cone | | | | |
| | 2. | Problems related to | 4 | To practice various | Lecture | Slip Test |
| | | the intersection of a | | problems related to the | | _ |
| | | straight line and a | | tangent plane and | | |
| | | quadric cone | | normal | | |
| | | andTangent plane | | | | |

| | and normal | | | | |
|----|---|---|--|---------|------------|
| 3. | Problems related to thecondition for a plane to touch the quadric cone and the angle between the lines in which a plane cuts the cone | 3 | Acquire the knowledge aboutthe condition for a plane to touch the quadric cone | Lecture | Assignment |
| 4. | Problems related to the condition that the cone has three mutually perpendicular generators. | 3 | To know about the condition that the cone has three mutually perpendicular generators. | Lecture | Quiz |

Course Instructor(Aided)::Dr.J.Befija Minnie Course Instructor(S.F):Dr. S. Kavitha HOD:Dr. V. M. Arul Flower Mary HOD(S.F) :Ms. J.Anne Mary Leema

SEMESTER IV

Name of the Course : Applied Statistics (Allied)

Course Code : MA2041

| No. of hours per week | Credit | Total No. of hours | Marks | |
|-----------------------|--------|--------------------|-------|--|
| 5 | 5 | 75 | 100 | |

Objectives: 1.To acquire the knowledge of correlation theory and testing hypothesis.

2. To solve research and application oriented problems.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|--|------------------|----|
| CO – 1 | identify and demonstrate appropriate sampling processes | PSO –2 | Ар |
| CO – 2 | recall the methods of classifying and analyzing data relative to single variable | PSO –4 | R |
| CO - 3 | describe the χ^2 distribution in statistics | PSO –3 | U |
| CO - 4 | distinguish between the practical purposes of a large and a small sample | PSO –1 | An |
| CO - 5 | understand that correlation coefficient is independent of the change of origin and scale | PSO –5 | U |

Total contact hours: 75 (Including lectures, assignments and tests)

| Uni | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/ |
|-----|----------|---|---------|---|----------|-------------|
| t | | | hours | | | evaluation |
| Ι | Correlat | ion | | | | |
| | 1 | Definitions and examples of correlation, Properties of correlation coefficient, Problems based on correlation | 5 | To Recall the definitions of correlation, Properties of correlation coefficient | Lecture | Quiz |
| | 2 | Definition of Rank correlation and proving Spearman's formula, Calculating Rank | 3 | To analyzeRank correlation and to solve the problems. | Lecture | Assignment |

| | | correlation coefficient for the given data | | | | |
|-----|---------|--|---|--|-------------------------------------|-------------------------|
| | 3 | Definition and results based on regression, Problems on regression | 2 | To solve the problems on regression | Lecture | Test |
| | 4 | Equation of regression lines | 1 | Apply regression lines in real life problems | Lecture with group discussion | Test |
| | 5 | Angle between the regression lines. | 1 | To Learn the Angle between the regression lines. | Lecture | Assignment |
| II | Test of | significance | | | | |
| | 1 | Introduction on test of significance, Sampling and its types, Definition on Sampling distribution and examples, Standard error for some sampling distributions | 3 | To solve problems related to test of significance | Lecture with group discussion | Test |
| | 2 | Testing of hypothesis and errors in testing of hypothesis, critical values for different levels of significance, Procedure for testing of a statistical hypothesis | 3 | To testing of hypothesis | Lecture | Quiz |
| | 3 | Explanation and Problems of test of significance for single proportions | 3 | To solve problems related to single proportions | Lecture | Formative Assessment |
| | 4 | Probable limits, Test of significance for difference of proportions | 2 | To solve problems related to Probable limits | Lecture | Test |
| | 5 | Problems on test of significance for difference of proportions | 1 | To solve problems related to difference proportions | Lecture with group discussion | Test |
| III | Test of | significance for means | | | | |
| | 1 | Test of significance for single mean if the standard deviation is | 4 | To Learn some methods to solve the Problems based on | Lecture | Test |

| | | known, Problems based | | confidence limits for | | |
|----|-----------|----------------------------|------|--------------------------|------------|------------|
| | | on confidence limits for | | population mean and | | |
| | | population mean, | | Problems based on test | | |
| | | Problems based on test | | of significance of | | |
| | | of significance of | | means. | | |
| | | means. | | | | |
| | 2 | Problems based on test | 2 | To Learn some | Lecture | Test |
| | | of significance for | | methods to solve the | | |
| | | difference of sample | | problems of test of | | |
| | | means, Test of | | significance for | | |
| | | significance for single | | difference of sample | | |
| | | standard deviation | | means and single | | |
| | | | | standard deviation | | |
| | 3 | Test of significance for | 2 | To learn normal | Lecture | Test |
| | | equality of standard | | population | | |
| | | deviations of a normal | | | | |
| | | population. | | | | |
| | 4 | Problems based on test | 2 | To test the significance | Lecture | Test |
| | | of significance for | | for standard deviation | | |
| | | standard deviation | | | | |
| | 5 | Problems based on test | 3 | To test the significance | Lecture | Test |
| | | of significance for | | for correlation | | |
| | | correlation coefficient | | coefficient | | |
| IV | Test of s | significance for small sam | ples | | | |
| | 1 | Distinguish large and | 3 | To test the significance | Lecture | Quiz |
| | | small samples, Test of | | based on t-distribution, | with group | |
| | | significance based on t- | | and the difference | discussion | |
| | | distribution, Test for the | | between the mean of a | | |
| | | difference between the | | sample and that of a | | |
| | | mean of a sample and | | population. | | |
| | | that of a population. | | 1 1 | | |
| | 2 | Test for the difference | 2 | To solve problems | Lecture | Assignment |
| | | between the means of | | related Confidence | | U U |
| | | two samples, | | limits | | |
| | | Confidence limits for | | | | |
| | | population mean | | | | |
| | 3 | Problems based on | 2 | To learn the test of | Lecture | Assignment |
| | | confidence limits for | | significance based on | | U |
| | | population mean, Test | | F-test | | |
| | | of significance based on | | | | |
| | | F-test | | | | |
| | 4 | Problems on test of | 2 | To solve problems on | Lecture | Formative |
| | | significance based on | | test of significance | | Assessment |
| 1 | 1 | E to at | | based on E test | 1 | 1 |

| | 5 | Test of significance of an observed sample correlation, Problems on test of significance of an observed sample correlation. | 2 | To solve problems related to observed sample correlation. | Lecture | Assignment |
|---|----------|--|---|---|---------|-------------------------|
| V | Test bas | ed on χ^2 -distribution | L | | | |
| | 1 | Introduction on test based on χ^2 - distribution , χ^2 –test for population variance | 3 | To Solve the problems related to χ^2 –test for population variance | Lecture | Quiz |
| | 2 | χ^2 -test to test the goodness of fit | 2 | To test the goodness of fit for χ^2 –test. | Lecture | Test |
| | 3 | Result on χ^2 –test to test the goodness of fit. | 2 | To learn the Result on χ^2 -test to test the goodness of fit. | Lecture | Formative Assessment |
| | 4 | Fit a Poisson distribution for the given data and to test the goodness of fit. | 3 | Toanalyze a Poisson distribution. | Lecture | Test |
| | 5 | Theorem based on the test for independence of attributes, Yate's Correction. | 2 | To solve the Problems based on independence of attributes. | Lecture | Assignment |

Course Instructor (Aided): S. Antin Mary

HOD(Aided):Dr. V. M. Arul Flower

MaryCourse Instructor(S.F): Dr. C. Jenila

HOD(S.F) :Ms. J.Anne Mary Leema

Semester V Major Core VII- Linear Algebra Course Code: MC2051

| No. of hours per week | Credits | Total No. of hours | Marks |
|--------------------------|---------|--------------------|-------|
| 6 | 5 | 90 | 100 |

Objectives:

1. To introduce the algebraic system of Vector Spaces, inner product spaces.

2. To use the related study in various physical applications.

| | | Course Outcomes | |
|------|---|-----------------|----|
| СО | upon completion of this course, | PSO addressed | CL |
| | the students will be able to: | | |
| CO-1 | recall and define Groups, Fields, and their properties | PSO - 1 | R |

| CO-2 | cite examples of vector spaces, subspaces, and linear transformations | PSO - 1 | U |
|------|--|---------|----|
| CO-3 | determine the concepts of linear independence, linear dependence, basis, and the dimension of vector spaces | PSO - 1 | U |
| CO-4 | correlate rank and nullity, Linear transformation, and matrix of a Linear transformation | PSO - 2 | Ар |
| CO-5 | examine whether a given space is an inner product space and the orthonormality of sets | PSO - 3 | Ар |

Total contact hours: 90 (Including lectures, assignments, quizzes, and tests)

| Unit | Section | Topics | Lecture hours | Learning outcome | Pedagogy | Assessment/ Evaluation |
|------|----------|-------------------------------------|------------------|--|-------------------------|------------------------------------|
| Ι | Vector s | paces | | | | |
| | 1. | Vector spaces - Definition | 4 | To understand Vector spaces and their Definition | Lecture Illustration | Evaluation through slip test |
| | 2. | Vector spaces - Examples | 4 | To give examples of vector spaces on different fields. | Lecture Illustration | quiz, test |
| | 3. | Subspaces | 5 | To prove many theorems related to subspaces and derive some examples. | Lecture Illustration | Evaluation through slip test |
| | 4. | Linear transformation. | 5 | To determine linear transformations and study their properties and types. | Lecture Illustration | Class test |
| II | The span | n of a Set | | Γ | | |
| | 1 | Span of a Set | 3 | To understand about Span of a Set | Lecture Illustration | Home Assignment |
| | 2 | Linear Independence | 4 | To identify the Linear Independence and dependence of a set | Lecture Illustration | Evaluation through slip test |
| | 3 | Basis and Dimension | 3 | To calculate the Basis and Dimension of a given set | Lecture Illustration | Formative Assessment |
| | 4 | Rank and Nullity | 4 | To find the rank and nullity of a given set | Lecture Illustration | Online Quiz, Test |
| | 5 | Matrixof a Linear Transformation | 4 | To calculate the Matrixof a Linear Transformation | Lecture Illustration | Home Assignment |
| III | Cayley-I | Hamilton Theorem | | | | |

| | 1 | Characteristic Equation | 4 | To understand basic concepts ofCharacteristic Equation | Lecture Illustration | Slip Test |
|----|----------|--|--|---|-------------------------|-----------------------------------|
| | 2 | Cayley-Hamilton Theorem | 5 | To analyze the Cayley-Hamilton Theorem for matrix | Lecture Illustration | Online quiz |
| | 3 | Eigenvalues and Eigen vectors | ad Eigen 5 To determine the Eigen values and Eigenvectors of the matrix | | Lecture Illustration | Online Assignment |
| | 4 | Properties of Eigenvalues. | 4 | To study the Properties of Eigenvalues. | Lecture Illustration | SlipTest |
| IV | Inner P | roduct Spaces | | <u> </u> | | |
| | 1 | Inner Product Spaces - Definition | 4 | To understand the definition of inner product space | Lecture Illustration | Slip Test |
| | 2 | Inner Product Spaces - examples | 4 | To verify examples of Inner Product Spaces | Lecture Illustration | Home Assignment |
| | 3 | Orthogonality | 5 | To study theorthogonalitycondit ion and related theorems | Lecture Illustration | quiz |
| | 4 | Orthogonal complement | 5 | To study the Orthogonal complement and related theorems | Lecture Illustration | Formative Test, Online Quiz |
| V | Bilinear | forms | | | | |
| | 1 | Bilinear forms | 3 | To understand the Bilinear forms | Lecture Illustration | Class Test |
| | 2 | Quadratic forms | 3 | To understand the Quadratic forms | Lecture Illustration | Formative assessment |
| | 3 | Reduction of a quadratic form to the diagonal form | 3 | To derive the Reduction of a quadratic form to the diagonal form | Lecture Illustration | Online Quiz |
| | 4 | Partially ordered set- Lattices | 3 | To learn the Partially ordered set-Lattices | Lecture Illustration | Online Assignment |
| | 5 | Distributive Lattices- Modular Lattices- | 3 | To find the distributive Lattices- Modular Lattices | LectureIllustr | Class test |

| 6 | Boolean Algebra. | 3 | To learn the Boolean | Lecture | Slip test |
|---|------------------|---|----------------------|--------------|-----------|
| | | | Algebra | Illustration | |

| Course Instructor: Ms. J.C. Mahizha | HoD: Dr.T. Sheeba Helen |
|---------------------------------------|-------------------------|
| Course Instructor: Ms.Anne Mary Leema | HoD(SF): Dr.S.Kavitha |

Semester: VName of the Course:Real Analysis IICourseCode: MC2052

Major Core VIII

| No. of hours per | Credit | Total No. of | Mar | |
|------------------|--------|--------------|-----|--|
| week | | hours | ks | |
| 6 | 5 | 90 | 100 | |

Objectives: 1. To introduce Metric Spaces and the concepts of completeness, continuity, connectedness and compactness

2. To use these concepts in higher studies.

| СО | Upon completion of this course the students will be able to: | PSO addressed | CL |
|--------|--|------------------|----|
| CO - 1 | understand the concepts of completeness, continuity and discontinuity of metric spaces | PSO - 1 | U |
| CO - 2 | apply the metric space theorems to real life situations | PSO - 4 | Ap |
| CO - 3 | distinguish between continuous functions and uniform continuous functions | PSO - 5 | An |
| CO - 4 | use basic concepts in the development of real analysis results | PSO - 1 | C |
| CO - 5 | Understand the concepts of metric space, connectedness and compactness of metric spaces | PSO - 3 | U |
| CO- 6 | Develop the ability to reflect on problems that are quite significant in the field of analysis | PSO -2 | Ap |

| Unit | Section | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|------|---------|---|------------------|--|---------------------------------|--|
| Ι | 1 | Metric Space, definition and examples | 3 | Explain the primary concepts of Metric Space | Lecture with Illustration | Evaluation through appreciative inquiry |

| | 2 | Bounded sets, Open ball, Open sets | 3 | To understand the conceptsBounded sets, Open ball and Open sets | Lecture with PPT | Evaluation through quizzes and discussions. |
|----|---|---|---|--|-------------------------------------|--|
| | 3 | Subspace, Interior of a set, Closed sets | 3 | To understand about Subspace, Interior of a set and Closed sets | Lecture with Illustration | Slip Test |
| | 4 | Closure,Limit point, Dense sets. | 3 | To understandabout Closure, Limit point and Dense sets | Discussion with Illustration | Quiz and Test |
| II | 1 | Complete metric space | 3 | To know about complete Metric space | Lecture with PPT | Evaluation through discussions. |
| | 2 | Cantor's intersection theorem - Baire's Category theorem | 3 | To know about Cantor's intersection theorem andBaire's Category theorem | Lecture | Evaluation through appreciative inquiry |
| | 3 | Contraction mapping- Definition and examples- Contraction mapping theorem | 3 | To learn the concept Contraction mapping | Lecture | Formative Assessment Test |
| Ш | 1 | Continuity of functions | 3 | To explain the concept Continuity of functions | Lecture with Illustration | Evaluation through appreciative inquiry |
| | 2 | Composition of continuous functions, Equivalent conditions for continuity | 4 | To study the concepts Composition of continuous functions | Lecture with PPT | Evaluation through quizzes and discussions |
| | 3 | Homeomorphism, Uniform continuity | 3 | To understand the concepts Homeomorphism and Uniform continuity | Lecture with Illustration | Slip Test |
| | 4 | Discontinuous functions on R | 3 | To understand the concept Discontinuous functions | Discussion with Illustration | Quiz and Test |
| IV | 1 | Connectedness, Definition and examples | 3 | To study about Connectedness | Lecture with PPT Illustration | Evaluation through discussions |
| | 2 | Connected subsets of R | 3 | To learn the conceptConnected subsets | Lecture with Illustration | Evaluation through appreciative inquiry |
| | 3 | Connectedness and | 3 | To understandthe | Lecture | Formative |

| | | continuity | | relation between | | Assessment |
|---|---|----------------------|---|----------------------|--------------|--------------|
| | | | | Connectedness and | | Test |
| | | | | Continuity | | |
| | 4 | Intermediate value | 2 | To study about the | Group | Slip Test |
| | | theorem | | Intermediate value | Discussion | |
| | | | | theorem | | |
| V | 1 | | 3 | Explain the primary | Lecture | Evaluation |
| | | Compactness, | | concepts of | with PPT | through |
| | | Compact space | | Compactness | Illustration | discussions. |
| | 2 | Compact subsets of | 3 | To understand the | Lecture | Evaluation |
| | | R | | concept Compact | and group | through |
| | | | | subsets of R. | discussion | Assignment |
| | 3 | Equivalent | 3 | To study about | Lecture | Formative |
| | | Characterization for | | Equivalent | with | Assessment |
| | | Compactness | | Characterization for | Illustration | Test |
| | | | | Compactness | | |
| | 4 | Compactness and | 4 | To understand the | Lecture | Slip Test |
| | | continuity | | relation between | with | |
| | | | | Compactness and | Illustration | |
| | | | | Continuity | | |

Course Instructor: Dr. J.Befija Minnie Course Instructor S.F: Ms. Monisha

HoD:Dr. T.Sheeba Helen HoD:Dr. S.Kavitha

Name of the Course : Graph Theory

Subject code : MC2055

| No. of hours per week | Credits | Total No. of hours | Marks | |
|-----------------------|---------|--------------------|-------|--|
| 5 | 4 | 75 | 100 | |

Objectives:

- 1. To introduce graphs and the concepts of connectedness, matchings, planarity and domination.
- 2. To apply these concepts in research.

| СО | Upon completion of this course the students | PSO | CL |
|--------|---|-----------|----|
| | will be able to: | addressed | |
| CO - 1 | understand the basic definitions to write the proofs of simple theorems | PSO - 1 | U |
| CO - 2 | employ the definitions to write the proofs of simple theorems | PSO - 2 | Ар |
| CO - 3 | relate real life situations with mathematical graphs | PSO - 3 | Ap |

| CO - 4 | develop the ability to solve problems in graph theory | PSO - 4 | An |
|--------|---|---------|----|
| CO - 5 | analyze real life problems using graph theory both quantitatively and qualitatively | PSO - 4 | An |

| Unit | Section | Topics | Lecture | Learning | Pedagogy | Assessment/evaluation |
|------|------------|---------------------|-------------|---------------------------|-----------------------|---------------------------|
| | | | hours | outcomes | | |
| Ι | Pictoria | I Representation – | Isomorphisr | n and degrees - cy | cles in a graph | - connected graphs - cut |
| | vertices | and cut edges | | | | |
| | 1. | Trail and Path- | 3 | To apply the | Lecture with | Evaluation through test |
| | | Examples, Cycles | | results in real | Illustration | |
| | | in graphs – | | life cycle | | |
| | | definitions and | | | | |
| | | theorems, | | | | |
| | | Theorems on | | | | |
| | | limit points and | | | | |
| | | examples, | | | | |
| | | Theorems on | | | | |
| | | connected graph | | | | |
| | 2. | Theorems on | 3 | To distinguish | Lecture with | Slip test |
| | | cycles in graph, | | the theorems | Illustration | |
| | | complement | | and their | | |
| | | graphs – | | application | | |
| | | definition and | | | | |
| | | theorems, | | | | |
| | | Digraph | | | | |
| | 3. | Definitions and | 3 | To identify the | Lecture with | Brain Storming and Test |
| | | Theorems on cut | | cut vertices and | Examples | |
| | | vertices and cut | | edges | | |
| | | edges | | | D : . | |
| | 4. | Trivial and non- | 3 | To construct the | Discussion | Quiz and Test |
| | | Trivial Graphs – | | graphs | With | |
| | | definitions and | | | Illustration | |
| TT | | theorems | | TT 114 • | 1 33 7 • 1 4 1 | |
| 11 | Eulerian g | graphs - Fleury's a | ligorithm - | Hamiltonian grap | hs - Weighted | graphs - Chinese Post-man |
| | Problem - | Travening Sales-ma | an Problem | Dipartite graphs - | I rees. | Test |
| | 1. | definitions and | 5 | Closed wells | DDT | Test |
| | | theorems | | Closed walk. | ILI I | |
| | | Theorems related | | | | |
| | | to Eulerien trail | | | | |
| | | using digraph | | | | |
| | 2 | Floury's | 2 | To construct o | Locture with | Test |
| | ۷. | Algorithm to | 2 | Fulerian Trail | illustration | Test |
| | | Algorithm to | | | mustration | |
| | | Eulorion troil | | | | |
| | 2 | Luierian train | 2 | To identify the | Locturo | Assassment Test |
| | J. | Graphs | 2 | difference in | | |
| | | definitions and | | cycle and nath | | |
| | | theorems | | cycle and pain | | |
| 1 | 1 | LICOLOHIS, | 1 | | 1 | 1 |

| | | Hamiltonian cycle | | | | |
|-----|------------|-----------------------|--------------|----------------------------------|-----------------|------------------------------|
| | | and path | | | | |
| | 4. | Problem basedon | 3 | To construct a | Group | Test |
| | | weightedgraphs - | | road map. | Discussion | |
| | | Chinese Post-man | | 1 | | |
| | | Problem - | | | | |
| | | Travelling Sales- | | | | |
| | | man Problem | | | | |
| | | Ripartite graphs | | | | |
| | 5 | Bipartite graphs | 2 | To calculate a | Lecture with | Test |
| | 5. | Definition and | 2 | unique path | illustration | 1051 |
| | | Theorems | | unique path. | mustration | |
| | | Theorems on | | | | |
| | | | | | | |
| TTT | DI | trees. | | | | |
| 111 | Planar gra | aphs - Euler formul | a - Platonic | solids - Dual of a | plane graph - | |
| | Character | rization of planar gr | aphs - Colo | urings - Vertex co | blouring - Edge | colouring - An algorithm for |
| | vertex col | ouring. | | | | |
| | | | | | | |
| | 1. | Definition and | 3 | To understand | Lecture with | Quiz |
| | | examples related | | the concept in | PPT . | |
| | | to planar graphs, | | Eulerian and | Illustration | |
| | | Euler's formula | | planar graph | | |
| | | for planar graphs | | | | |
| | | and related | | | | |
| | | corollary | | | | |
| | 2. | Definition and | 3 | To apply the | Lecture with | Test |
| | | theorems related | | ancient | Illustration | |
| | | to Platonic solids, | | concerned with | | |
| | | Dual of a plane | | polyhedra. | | |
| | | graph, Definition | | | | |
| | | and theorem | | | | |
| | | related to | | | | |
| | | characterization | | | | |
| | | of planar graph | | | | |
| | 3. | Definition and | 4 | To identify | Lecture with | Assignment |
| | | theorems on | | alternating | examples | |
| | | colouring, | | colours to the | | |
| | | Theorem related | | graphs | | |
| | | to maximum | | | | |
| | | colourings of a | | | | |
| | | graph,triangle | | | | |
| | | free graph in | | | | |
| | | colouring | | | | |
| | 4. | Definition and | 2 | To identify the | Group | Formative Assessment Test |
| | | theorems related | | colouring and | Discussion | |
| | | to edge colouring. | | solve the | | |
| | | An algorithm for | | problems | | |
| | | vertex colouring | | - | | |
| | | of a graph | | | | |
| IV | Directed | Graphs - Connecti | vity in digr | raphs - Strong o | rientation of p | raphs – Euleriandigraphs - |
| - • | | | ~~ | ~~~~ ~~~ ~~~ ~~~ ~~~ ~~~~~~~~~~~ | | |

| | Tourname | ent. | | | | |
|---|----------------------|---|-----------------------------|---|-------------------------------------|-------------------------------|
| | 1. | Introduction, Definitions related to directed graph | 3 | To understand the concept about directed graph | Lecture with PPT Illustration | Brain Storming |
| | 2. | Strongly connected graph – definition and theorems | 3 | To understand the concept of strong, unilateral, weakly connected graph. | Lecture and group discussion | Test |
| | 3. | Definition and Theorems related to Strong orientation of graphs | 2 | To understandabout orientation graph. | Lecture with Illustration | Quiz and Test |
| | 4. | Eulerian Digraph- definition and theorems, Tournaments | 4 | To understand the in degree and out degree to solve the problems. | Lecture with Illustration | Test |
| V | Dominati Upper Bo | ing Sets, Relationsl unds and Lower Bo | nip between unds for the | Domination Num | ts and domina ber. | iting sets, Irredundant sets, |
| | 1. | Introduction and definition related to Dominating Sets with theorems, | 2 | To understand solve real life problems in dominating Sets | Lecture with PPT Illustration | Test |
| | 2. | Definition and theorems relate to Independent Sets and Irredundant sets | 3 | To understand relate to independent and irredundant sets and problems related to it. | Lecture with Illustration | Assessment test |
| | 3. | Definition Examples and theorems related to Bounds-Upper Bound | 4 | To understand the isolated vertices in graphs | Lecture with PPT Illustration | Slip test |
| | 4. | Theorems related | 3 | To understand the concept | Lecture with PPT | Quiz |

| to Lower Bounds | about | Illustration | |
|-----------------|----------------|--------------|--|
| | Domination and | | |
| | connected | | |
| | graph. | | |

Course Instructor (Aided): Sr. S. Antin MaryHoD(Aided)Course Instructor (S.F): Dr. G. JovitVinishMelmaHoD(S.F)

HoD(Aided): Dr. T. Sheeba Helen HoD(S.F) : Dr. S. Kavitha

Semester V Major Core IX- Computer Oriented Numerical Methods Course Code: MC2053

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 6 | 4 | 90 | 100 |

Objectives:

- **1.** To provide suitable and effective numerical methods, for computing approximate numerical values of certain raw data.
 - 2. To lay foundation of programming techniques to solve mathematical problems.

| СО | Upon completion will be able to: | of | this | course | the | students | PSO addressed | CL |
|--------|-------------------------------------|------------|-----------|------------------|-------------|--------------|---------------|----|
| | | | | | | | | |
| CO - 1 | understand the elementary prog | gramming | g langua | ge and its strue | cture | | PSO - 4 | U |
| CO - 2 | develop computer programmes | for the se | olution o | of various num | nerical pro | oblems | PSO - 5 | С |
| | | | | | - | | | |
| CO - 3 | apply numerical methods to ob | tain appro | oximate | solutions to m | athemation | cal problems | PSO - 3 | Ар |
| CO - 4 | employ different methods of co | onstructin | ig a poly | nomial using | various m | ethods | PSO - 2 | А |
| CO - 5 | compare the rate of convergence | e of diffe | erent nu | imerical formu | la | | PSO - 4 | An |
| CO - 6 | distinguish the advantages and | disadvan | tages of | various nume | rical meth | nods | PSO - 4 | An |

Course Outcomes

Total contact hours: 90 (Including lectures, assignments and tests)

| Uni t | Sectio n | Topics | Lect ure hour | Learning outcomes | Pedagogy | Assessment/eval uation |
|----------|-------------|---|---------------------|---|------------------------------|--|
| Ι | Basis | structure of C programs | 5 | | | |
| | 1 | Basis structure of C programs, C Tokens and Keywords | 3 | To understand the structure of a C program and identify C Tokens and Keywords | Lecture with Illustration | Evaluation through Brainstorming |
| | 2 | Identifiers, Constants, Variables and Data Types, Operations and Expressions | | To identify Identifiers, Constants, Variables and Data Types, Operations and Expressions | Lecture with Illustration | Slip Test |
| | 3 | Arithmetic Operators, Relational Operators, | 3 | To understand the syntax of various operators and apply | Lecture with illustration | Evaluation through role play |

| | | Logical Operators, | | in programmes | | |
|-----|----------|-------------------------------------|-----|-----------------------------|---------------|-----------------|
| | | Assignment Operators, | | | | |
| | | Increment and | | | | |
| | | Decrement Operators | | | | |
| | 4 | Conditional Operators | 3 | To understand the syntax of | Lecture with | Open book test |
| | | Bitwise Operators and | 5 | various operators and apply | Illustration | open book test |
| | | Special Operators | | in programmes | mustration | |
| | 5 | Managing Input and | 2 | To understand the Input | Elinnad alaga | Ouiz and Test |
| | 5 | Managing input and | 3 | To understand the Input | ripped class | Quiz and Test |
| | | Output Operations | | and Output Operations | | |
| | | Formatted Input and | | | | |
| | | Formatted Output | | | | |
| Ι | Decisio | n making and Branching | | | | |
| | 1 | Decision making and | 3 | To differentiatedecision | Blended | Evaluation |
| | | Branching and Decision | | making and branching | class | through |
| | | making with IF | | | | Assignment |
| | | maxing with h | | | | e |
| | | statement | | | | |
| | 2 | Simple IF statement | 3 | To understand Simple IF | Lecture with | Evaluation |
| | | The IF Else | | statement The IF Else | Illustration | through |
| | | statements and Nesting | | statements and Nesting of | | appreciative |
| | | of IF Else statements. | | IF Else statements. | | inquiry |
| | 3 | The GOTO statement, | 3 | To express GOTO statement | Lecture with | Slip test |
| | | Decision making and | | in programmes | Small | 1 |
| | | Looping | | I O II III | programms | |
| | 4 | The WHILE Statement | 3 | To express WHILE | Lecture with | Formative |
| | | and The DO Statement | 5 | Statement and DO | Small | Assessment Test |
| | | and The DO Statement | | Statement in programmes | programms | |
| | 5 | The EOP Statement | 3 | To express COTO statement | Lecture with | Formative |
| | 5 | The FOR Statement. | 5 | in programmes | Small | Accompant Test |
| | | | | in programmes | Sillali | Assessment Test |
| | C - l-+i | | 1 1 | | programms | |
| 111 | | is of algebraic and transcer | | | T ('1 | |
| | 1 | Solutions of algebraic | 3 | To understand the solutions | Lecture with | Evaluation |
| | | and transcendental | | of algebraic and | Illustration | through open |
| | | equations. Iteration | | transcendental equations | | seminar |
| | | method and Newton | | and to solve problems for | | |
| | | Raphson method | | the same | | |
| | 2 | programs in C for | 3 | To construct the programs | Laboratoy | Evaluation |
| | | Newton Raphson | | in C for Newton Raphson | method | through the |
| | | method | | method | | output of the |
| | | | | | | program |
| | 3 | Interpolation - | 3 | To understand interpolation | Lecture with | Slip Test |
| | | Newton's Interpolation | | and to solve problems using | Illustration | 1 |
| | | formulae | | Newton's Interpolation | | |
| | | | | formulae | | |
| | Δ | programs in C for | 3 | To construct programs in C | Laboratov | Evaluation |
| | | Newton's Forward | 5 | for Newton's Forward | method | through the |
| | | Interpolation | | Internolation and Declaword | memou | output of the |
| | | and Declaword | | Interpolation formula | | program |
| | | anudaukwaru Intomolotion formula | | interpolation fornula | | program |
| | ~ | interpolation fomula | 2 | | T / 1.1 | |
| | 5 | Lagrange's | 3 | 10 solve problems using | Lecture with | Evaluation |

| | | Interpolation formula | | Lagrange's Interpolation | Illustration | through open |
|----|--------|--|---------|--|-------------------------------------|---|
| | | | | formula | | seminar |
| IV | Numeri | cal differentiation and integ | gration | | | |
| | 1 | Numerical differentiation, derivatives using Newton's forward difference | 3 | To understand Numerical differentiation and to solve problems using Newton's forward difference | Lecture with PPT Illustration | Evaluation through discussions. |
| | 2 | Newton's backward difference formula | 3 | To obtain approximate solutions for problems using Newton's backward difference formula | Flipped Class | Evaluation through appreciative inquiry |
| | 3 | Numerical integration, Newton cote's quadrature formula | 3 | To understand Numerical integration and to develop Newton cote's quadrature formula | Lecture with Illustration | Formative Assessment Test |
| | 4 | Trapezoidal rule | 3 | To obtain approximate solutions for problems using Trapezoidal rule | Problem Solving | Slip Test |
| | 5 | Programs in C for Trapezoidal rule | 3 | To develop programsin C for Trapezoidal rule | Laboratoy method | Evaluation through the output of the program |
| V | Numeri | ical integration | | | | |
| | 1 | Simpson's (1/3) rd rule | 3 | To find approximate solutions for problems using Simpson's (1/3) rd rule | Problem Solving | Evaluation through exercise problem solving |
| | 2 | Programs in C for Simpson's one - third rule | 3 | To develop programsin C for Simpson's one - third rule | Laboratoy method | Evaluation through the output of the program |
| | 3 | Simpson's (3/8) th rule | 3 | To find approximate solutions for problems using Simpson's (3/8) th rule | Flipped class | Formative Assessment Test |
| | 4 | Numerical solution of differential equation | 3 | To understandnumericalsolutio n of differential equation | Blended class | Slip Test |
| | 5 | Taylor's series method and Picard's method. | 3 | To differentiate Taylor's series method and Picard's method and solve problems | Problem Solving | Formative Assessment Test |

Course Instructor: Dr. S.Sujitha Course Instructor: Ms. Princykala HoD:Dr. T.Sheeba Helen HoD(SF): Dr.S.Kavitha

Major Core X- Complex Analysis Course Code: MC2061

| No. of hours per week | Credits | Total No. of hours | Marks | |
|-----------------------|---------|--------------------|-------|--|
| 6 | 5 | 90 | 100 | |

Objectives: 1. To introduce the basic concepts of differentiation and integration of Complex functions.

2. To apply the related concepts in higher studies.

| CO | Upon completion of this course the students | PSO | CL |
|--------|---|-----------|----|
| | will be able to: | addressed | |
| CO - 1 | understand the geometric representation of mappings | PSO - 1 | U |
| CO - 2 | use differentiation rules to compute derivatives and express complex- differentiable functions as power series | PSO - 4 | E |
| CO - 3 | compute line integrals by using Cauchy's integral theorem and formula | PSO - 3 | E |
| CO - 4 | identify the isolated singularities of a function and determine whether they are removable, poles or essential | PSO – 1 | U |
| CO - 5 | evaluate definite integrals by using residues theorem | PSO – 5 | C |

| Unit | Module | Topics | Lecture | Learningoutcomes | Pedagogy | Assessment/ |
|------|--------|---------------------|---------|--------------------------|----------|-------------|
| | | | hours | | | evaluation |
| Ι | 1 | Differentiability – | 3 | To analyse the basic | Lecture | Assignment |
| | | definitions and | | properties of | | |
| | | theorems | | differentiability | | |
| | 2 | Cauchy Riemann | 7 | To get necessary & | Lecture | Formative |
| | | equations – | | sufficient condition for | | Assessment |
| | | theorems and | | differentiability | | |
| | | examples, | | | | |
| | | Alternate forms of | | | | |
| | | C.R equations – | | | | |
| | | theorems and | | | | |

| | | problems | | | | |
|---|---|--------------------------|----------|------------------------------|--------------|-------------|
| | | * | | | | |
| | | | | | | |
| | | | | | | |
| | 3 | Analytic | 5 | To discuss some properties | Lecture | Test |
| | | functions- | | of an analytic function | | |
| | | definition | | | | |
| | | and | | | | |
| | | problems | | | | |
| | 4 | Harmonic | 7 | To find an analytic | Lecture | Assignment |
| | | functions – | | functions | with group | C |
| | | definitions. | | | discussion | |
| | | theorems and | | | | |
| | | problems | | | | |
| Π | 1 | Bilinear | 7 | To determine the image of | Lecture with | Ouiz |
| | 1 | transformations – | 7 | given region under hilinear | PPT | Quit |
| | | elementary | | transformation | | |
| | | transformation and | | | | |
| | | cross ratio | | | | |
| | 2 | Closs fatto | 2 | To obtain fixed naints | Drohlere | Assistant |
| | Z | Fixed Points of | Z | 10 obtain fixed points | solving | Assignment |
| | | Binnear | | under varies binnear | solving | |
| | | I ransformation | | transformation | | |
| | 3 | Mapping by | 3 | To explain the properties of | Lecture with | Slip Test |
| | | Elementary | | elementary functions | PPT | I III |
| | | Functions- $w =$ | | | | |
| | | $z^{2}, w = z^{n}, w =$ | | | | |
| | | $e^{z}.w =$ | | | | |
| | | $\sin z \cdot w =$ | | | | |
| | | $\cos z$, $w = \cosh z$ | | | | |
| ш | 1 | Definite integral – | 4 | To evaluate definite | Lecture | Assignment |
| | 1 | definitions | • | integral | Lecture | rissignment |
| | | theorems and | | | | |
| | | examples | | | | |
| | 2 | Cauchy's | 5 | To prove Cauchy's | Lecture | Test |
| | 2 | theorem | 5 | theorems | Lecture | 1051 |
| | | definition and | | meorems | | |
| | | | | | | |
| | 2 | c 1 | F | | Tradi 14 | Tra at |
| | 5 | Cauchy's | 5 | I o evaluate integrals | Lecture with | rest |
| | | integral | | | group | |
| | | tormula – | | | discussion | |
| | | theorems and | | | | |
| | | problems | | | | |

| IV | 1 | Taylor's series- Taylor's theorem and problems | 5 | To expand the given function as Taylor's series | Lecture | Assignment |
|----|---|---|---|---|-------------------------------------|-------------------------|
| | 2 | Laurent's Series – Laurent's theorem and problems | 5 | To expand the given function as Laurent's series | Lecture | Formative Assessment |
| | 3 | Zeros of analytic functions – definition and problems | 3 | To determine the zeros of an analytic functions | Lecture with group discussion | Assignment |
| | 4 | Singularities – definitions and examples | 1 | To find the singularity of a given function | Lecture with group discussion | Slip Test |
| V | 1 | Residues – definition, lemmas and problems | 5 | To find the residue of a given function | Lecture | Test |
| | 2 | Cauchy's residue theorem – theorems and examples | 3 | To applyCauchy's residue theorem by evaluating the integrals. | Discussion | Test |
| | 3 | Evaluation of definite integrals – method and problems | 5 | To evaluate the definite integrals by using the given method. | Lecture | Formative Assessment |

Course Instructor (Aided): Dr. M. K. Angel Jebitha Course Instructor (S.F): Ms. V. Princy Kala HoD(Aided): Dr. T. Sheeba Helen HoD(S.F): Dr. S. Kavitha

Name of the Course : Mechanics Subject code : MC2062

| No. of hours per week | Credits | Total No. of hours | Marks | |
|-----------------------|---------|--------------------|-------|--|
| 6 | 5 | 90 | 100 | |

Objectives:

- 3. To visualize the application of Mathematics in Physical Sciences.
- 4. To develop the capacity to predict the effects of force and motion.

| СО | Upon completion of this course the students | PSO | CL |
|----|---|-----------|----|
| | will be able to: | addressed | |

| CO - 1 | calculate the reactions necessary to ensure static | PSO - 2 | U |
|--------|---|---------|----|
| | equilibrium | | |
| CO - 2 | apply the principles of static equilibrium to particles and | PSO - 4 | Ар |
| | rigid bodies | | |
| CO - 3 | understand the ways of distributing loads | PSO - 5 | C |
| CO - 4 | identify internal forces and moments of a rigid body | PSO - 3 | Ар |
| CO - 5 | apply the basic principles of projectiles into real world | PSO - 2 | Ар |
| | problems | | |
| CO - 6 | classify the laws of friction | PSO - 4 | An |

| Unit | Section | Topics | Lecture | Learning outcomes | Pedagogy | Assessment/evaluation |
|------|---------|------------------------------|-------------|-----------------------|--------------|-------------------------|
| | | | hours | | | |
| Ι | Force | s acting at a point, Paralle | l forces an | d moments | | |
| | 5. | Forces Acting at a Point: | 4 | To apply the | Lecture | Evaluation through test |
| | | Resultant and | | principles of static | with PPT | |
| | | Components - Sample | | equilibrium to | Illustration | |
| | | cases of finding the | | particles and rigid | | |
| | | resultant -Analytical | | bodies. | | |
| | | expression for the | | | | |
| | | resultant of two forces | | | | |
| | | acting at a point – | | | | |
| | | Triangle forces – | | | | |
| | | Perperndicular | | | | |
| | | Triangular forces – | | | | |
| | | Converse of the | | | | |
| | | Trigangle of Forces- The | | | | |
| | | Polygon of Forces, | | | | |
| | | Lami's Theorem, | | | | |
| | | Problems based on | | | | |
| | | Lami's Theorem | | | | |
| | 6. | Resultant of two like | 3 | To distinguish the | Lecture | Evaluation through test |
| | | parallel forces, two | | like and unlike | with | |
| | | unlike and unequal | | parallel forces and | Illustration | |
| | | parallel forces, Resultant | | determine their | | |
| | | of number of parallel | | resultant and apply | | |
| | | forces, equilibrium of | | those principles to | | |
| | | three coplanar parallel | | particles and rigid | | |
| | | forces | | bodies. | | |
| | 7. | Moment of a force, | 4 | To understand the | Lecture | Test |
| | | Geometrical | | theorems of moments. | with | |
| | | representation, Varignon's | | | Illustration | |
| | | theorem of moments | | | | |
| | 8. | Generalised theorem of | 4 | To Calculate the | Discussion | Quiz and Test |
| | | moments, Problems | | algebraic sum of the | with | |
| | | based onVarignon's | | moments of the forces | Illustration | |

| | 1 | .1 6 | | C · · 1 1 1 | | |
|-----|----------|----------------------------|---|------------------------|--------------|----------------------|
| | | theorem of moments, | | of a rigid body. | | |
| | | Generalised theorem of | | | | |
| | | moments | | | | |
| Π | Couples | , Coplanar Forces | | | 1 - | |
| | 6. | Couples – Equilibrium of | 4 | To identify couples | Lecture | Test |
| | | two couples – | | and coplanar forces | with PPT | |
| | | Representation of a | | and find their | | |
| | | couple by a vector – | | resultant. | | |
| | | Resultant of coplanar | | | | |
| | | couples – Resultant of | | | | |
| | | couple and a force – | | | | |
| | | Problems based on | | | | |
| | | Couples, Introduction | | | | |
| | | and reduction of any | | | | |
| | | number of coplanar | | | | |
| | 7 | forces, Analytical proof. | 2 | T () 1 | T (| т. (|
| | 1. | Conditions for forces to | 3 | To construct a couple | Lecture | Test |
| | | reduce a single force or | | or a single force from | | |
| | | base point & Equation to | | foreas | | |
| | | the line of action of the | | lorces. | | |
| | | resultant | | | | |
| | 8 | Problems based on | 2 | To identify the | Lecture | Formative Assessment |
| | 0. | reduction of number of | 2 | conlanar forces and | Lecture | Test |
| | | coplanar forces | | find their resultant | | 1050 |
| | 9 | Problems based on forces | 3 | To construct a couple | Group | Test |
| | | to reduce a single force | U | or a single force from | Discussion | 1050 |
| | | or couple | | the given coplanar | 210000000 | |
| | | or contro | | forces and solve | | |
| | | | | problems. | | |
| | 10. | Problems based on | 3 | To calculate the | Group | Test |
| | | Equation to the line of | | algebraic sum of the | Discussion | |
| | | action of the resultant | | moments of the forces | | |
| | | | | of a rigid body. | | |
| III | Friction | | | | | |
| | 5. | Introduction, Statical, | 4 | To classify the laws | Lecture | Quiz |
| | | Dynamical, Limiting | | of friction and | with PPT | |
| | | friction and Laws of | | analyze the problems | Illustration | |
| | | friction, Coefficient of | | involving frictional | | |
| | | friction, Angle of | | forces. | | |
| | | friction, Cone of friction | | | _ | |
| | 6. | Equilibrium of a particle | 3 | To understand the | Lecture | Test |
| | | on a rough inclined | | principles of friction | with | |
| | | plane, Equilibrium of a | | to particles and rigid | Illustration | |
| | | body on a rough inclined | | bodies. | | |
| | | plane under a force | | | | |
| | | parallel to the plane, | | | | |
| | | Equilibrium of a body on | | | | |
| | | a rough inclined plane | | | | |
| 1 | | under any force. | | | | |

| | 7. Problems based on 4 Coefficient of friction, angle of friction | | 4 | To apply the principles of friction to particles and rigid bodies. | Lecture | Test |
|----|---|--|--------|--|-------------------------------------|------------------------------|
| | 8. | Problems based on Equilibrium of a particle on a rough inclined plane and equilibrium of a body on a rough inclined plane under a force parallel to the plane | 4 | To identify the principles and solve problems. | Group Discussion | Formative Assessment Test |
| IV | Projecti | les | | | | |
| | 5. | Introduction, Definitions, fundamental principles, Path of a projectile, Characteristics of the motion of a projectile | 3 | To understand the motion of projectile in various directions. | Lecture with PPT Illustration | Quiz |
| | 6. | Path of a projectile at a certain height above the ground, Problems based on Path of a projectile, Problems based on Characteristics of the motion of a projectile | 4 | To understand the path of a projectile in various directions and apply the principles into real world problems. | Lecture and group discussion | Test |
| | 7. | Maximum horizontal range, Two possible directions of projection, Problems based on maximum horizontal range and Two possible directions of projection | 4 | To understand the range and various directions of projectile and apply the principles into real world problems. | Lecture with Illustration | Test |
| | 8. | Velocity of the projectile, Velocity of the projectile falling freely from the directrix, Problems based on Velocity of the projectile | 4 | To understand the velocity of a projectile and apply the principles into real world problems. | Lecture with Illustration | Test |
| V | Motion | under the action of central | forces | | • | |
| | 5. | Motion under the action of central forces – Introduction– Velocity and Acceleration in Polar Coordinates | 4 | To understand velocity and acceleration in polar coordinates and solve real life problems. | Lecture with PPT Illustration | Test |
| | 6. | Equation of Motion in Polar Coordinates – Note on the equiangular spiral | 4 | To understand Motion in Polar Coordinates and practice problems related to it | Lecture with Illustration | Formative Assessment test |

| | Motion under a central force. | | | | |
|----|---|---|---|-------------------------------------|-----------------|
| 7. | Differential Equation of central orbits – Perpendicular from the pole on the tangent – Pedal equation of the central orbit – Pedal equation of some of the well-known curves – | 4 | To calculate Pedal equation of some of the well-known curves. | Lecture with Illustration | Assignment |
| 8. | Velocities in a central orbit – Two – fold problems in central orbits. | 3 | To understand the two types of problems that arise in connection with central orbits. | Lecture with PPT Illustration | Assignment&Quiz |

Course Instructor (Aided): Dr. V. Sujin Flower Course Instructor (S.F): Dr. S. Kavitha

HoD(Aided): Dr. T. Sheeba Helen HoD(S.F): Dr. S. Kavitha

Semester VI Major Core XII- Number Theory Course Code: MC2063

| No. of hours per week | Credits | Total No. of hours | Marks |
|-----------------------|---------|--------------------|-------|
| 5 | 4 | 75 | 100 |

Objectives: 1. To introduce the fundamental principles and concepts in Number Theory.

2. To apply these principles in other branches of Mathematics.

| СО | Upon will be abl | completion e to: | of | this | cou | rse | the | students | PSO addressed | CL |
|--------|----------------------|---------------------|---------------|--------------|--------------|------------|----------|-----------|------------------|----|
| CO - 1 | express the | concepts and | results of di | visibility o | f integers e | ffectively | 7 | | PSO - 1 | U |
| CO - 2 | construct statements | mathematical | proofs of | theorems | and find | counter | examples | for false | PSO - 2 | Ap |

| CO - 3 | collect and use numerical data to form conjectures about the integers | PSO - 5 | Ap |
|--------|---|---------|----|
| CO - 4 | understand the logic and methods behind the major proofs in Number Theory | PSO - 4 | An |
| CO - 5 | solve challenging problems related to Chinese remainder theorem effectively | PSO - 3 | Е |
| CO - 6 | build up the basic theory of the integers from a list of axioms | PSO - 1 | U |

Total contact hours: 75 (Including lectures, assignments and tests)

| ni | Section | Topics | Lectu | Learning outcomes | Pedagogy | Assessment/ev | | |
|----|---------|------------------------------|-------|-----------------------------|---------------|------------------|--|--|
| | | | re | | | aluation | | |
| r | Divisih | ility Theory in the Integen | hours | | | | | |
| | | onity Theory in the integers | 2 | To understand the primery | Looturo with | Evolution | | |
| | 1 | Preliminaries – | 3 | concepts of Numbers | Illustration | through | | |
| | | Numbers, integers, | | integers Divisors and their | mustration | appreciative | | |
| | | Divisors and Divisibility | | origin and Divisibility | | inquiry | | |
| | | Theory in the integers | | Theory in the Integers | | inqui y | | |
| | 2 | The Division Algorithm | 3 | To identify the divisors, | Lecture with | Evaluation | | |
| | | theorem and its | | quotient and the way of | illustration | through quizzes | | |
| | | applications | | expressions | | and discussions. | | |
| | | | | | | | | |
| | 3 | The greatest common | 3 | To understand GCD and | Lecture with | Slip Test | | |
| | | divisor and least | | LCM of numbers and the | Illustration | | | |
| | | common multiple | | relation between them | | 0.1.1.7 | | |
| | 4 | Euclid's lemma and | 3 | To express Euclid's lemma | Problem | Quiz and Test | | |
| | | Euclidean Algorithm. | | and Euclidean Algorithm | solving | | | |
| | Dionhor | ting Equation | | and solve problems | | | | |
| | 1 | | 3 | To know about linear | Lecture with | Evaluation | | |
| | 1 | The Diophantine | 5 | equations with two or more | illustration | through | | |
| | | Equation $ax + by = c$ | | unknowns | | discussions. | | |
| | 2 | Primes and their | 3 | To understand about | Problem | Evaluation | | |
| | | Distribution. | | Primes and their | solving | through | | |
| | | | | Distribution. | | appreciative | | |
| | | | | | | inquiry | | |
| | 3 | The fundamental | 3 | To express every number | Lecture | Formative | | |
| | | theorem of arithmetic | | as a product of primes | | Assessment | | |
| | 4 | | 2 | | | Test | | |
| | 4 | The Sieve of | 3 | To understand the Sieve of | Group | Formative | | |
| | | Eratostnenes | | Eratostnenes | Discussion | Assessment | | |
| r | Theory | f Congruoncos | | | | Test | | |
| | 1 | | 3 | To explain the primary | Lecture with | Evaluation | | |
| | 1 | Theory of Congruences | 5 | concepts of congruences | Illustration | through | | |
| | | | | | | appreciative | | |
| | | | | | | inquiry | | |
| | 2 | | 3 | To understand the basic | Flipped Class | Evaluation | | |
| | | Basic properties of | | properties of congruence | | through auizzes | | |

| | | congruence | | | | and discussions. |
|---|---------|--------------------------------|---|---|------------------------------|---------------------------------|
| | 3 | Linear congruences and | 3 | To construct Chinese remainder theorem | Lecture with Illustration | Slip Test |
| | | the Chinese remainder theorem. | | | | |
| | 4 | Problems based on | 3 | To solve problems related | Discussion | Quiz and Test |
| | | Chinese remainder | | to Chinese remainder | with | |
| | | theorem. | | theorem | Illustration | |
| 7 | Pseudop | rimes | | r | 1 | 1 |
| | 1 | Fermat's Little theorem | 2 | To construct Fermat's Little Theorem and | Lecture with PPT | Evaluation through |
| | | and Pseudoprimes | | pseudoprimes | Illustration | discussions. |
| | 2 | | 3 | To identify absolute | Flipped Class | Evaluation |
| | | Absolute pseudoprimes | | pseudo primes | | through appreciative |
| | 2 | | 2 | To construct Wilson's | Locturo with | Formativa |
| | 3 | Wilsons theorem | 5 | Theorem | Illustration | Assessment |
| | 4 | | 2 | | 0 | |
| | 4 | Quadratia Construance | 3 | To understand quadratic | Group | Slip Test |
| | Number | Theoretic Expetience. | | congruence. | Discussion | |
| | Number | Theoretic Functions | 2 | To understand the primary | Lastura with | Evoluction |
| | 1 | Number Theoretic | 3 | rounderstand the primary | Illustration | through |
| | | Functions | | Theoretic Functions | mustration | discussions |
| | 2 | | 3 | To find the sum of divisors | Lecture and | Evaluation |
| | 2 | The sum and number of divisors | 5 | and number of divisors | group discussion | through Assignment |
| | 3 | The Mobius Inversion formula. | 3 | To construct Mobius Inversion formula | Flipped class | Formative Assessment Test |
| | 4 | The greatest integer | 3 | To construct the greatest integer function | Lecture with Illustration | Slip Test |
| | | function. | | | | |

Course Instructor: Dr. S.Sujitha Course Instructor: Ms. Y.A. Shiny

HoD:Dr. T.Sheeba Helen HoD(SF): Dr.S.Kavitha

Semester - VI

Name of the Course: Major Core XIII- Linear Programming Subject code: MC 2064

| No. of hours per week | Credit | Total No. of hours | Marks |
|-----------------------|--------|--------------------|-------|
| 5 | 5 | 75 | 100 |

Objectives: 1.Tosolve reallife problems with the use of LPP problems.

2.To learn optimization techniques.

•

| СО | Upon completion of this course the students | PSOs | CL |
|--------|---|-----------|----|
| | will be able to: | addressed | |
| CO - 1 | understand the origin and development of Operations | PSO - 1 | U |
| | Research | | |
| CO - 2 | explain what is an LPP | PSO - 1 | U |
| CO - 3 | define how to formulate an LPP with linear constraints | PSO - 1 | R |
| CO - 4 | maximize the profit, minimize the cost, minimize the | PSO - 3 | Ар |
| | time in transportation problem, Travelling salesman | | - |
| | problem, Assignment problem | | |
| CO - 5 | identify a problem in your locality, formulate it as an | PSO - 4 | С |
| | LPP and solve | | |

| Unit I | Section | Topics | Lectur | Learning | Pedagogy | Assessment/evalu |
|---------|---------|------------------------|---------|----------------------|--------------|--------------------|
| | | _ | e hours | Outcomes | | ation |
| | 1 | Formulation of LPP, | 3 | To write the | Lecture | Lecture and |
| | | Mathematical | | standard form of | with | discussions |
| | | Formulation of LPP, | | LPP and to find | examples | |
| | | Solution of LPP | | solutions | | |
| | 2 | Graphical method | 4 | To solve LPP in | Lecture | Lecture with |
| | | | | graphical method | | illustrations |
| | 3 | Algorithm for Simplex | 1 | To learn about | Lecture | Lecture |
| | | method | | Algorithm for | with | |
| | | | | Simplex method | Illustration | |
| | 4 | Simplex method | 3 | To solve LPP by | | Evaluation |
| | | problems | | simplex method | | |
| | 5 | Algorithm for Big-M | 4 | To solve LPP by | Discussion | Lecture and |
| | | Method, Big-M | | Big-M method | with | discussions |
| | | Method problems | | | Illustration | |
| Unit II | 1 | Two phase method - | 4 | To solve LPP by | Lecture | Lecture |
| | | Phase I : Solving | | Two Phase method | with PPT | |
| | | auxiliary LPP using | | | | |
| | | Simplex method | | | | |
| | 2 | Phase II : finding | 3 | To find basic | Lecture | Evaluation through |
| | | optimal basic feasible | | feasible solution by | with PPT | Test |
| | | solution | | Two Phase | | |
| | | | | method- Phase II | | |
| | 3 | Duality in L.P.P, | 3 | To learn about | Lecture | Lecture with |
| | | Primal, Formation of | | duality in LPP | | illustrations |
| | | dual L.P.P, Matrix | | | | |
| | | form of primal and its | | | | |
| | | dual, Fundamental | | | | |
| | | theorem of duality | | | | |
| | 4 | Dual Simplex | 3 | To solve LPP by | Group | Lecture and |
| | | Algorithm, Dual | | dual simplex | Discussion | problem solving |
| | | simplex problems | | method | | |
| | 5 | Degeneracyand | 2 | To learn about | Lecture | Evaluation through |
| | | cyclinginL.P.P. | | Degeneracyand | | discussions |
| | | | | cyclinginL.P.P. | | |
| Unit | 1 | Mathematical | 2 | To know about | Lecture | Lecture |
| III | | formulation of | | Transportation | with | |
| | | Transportation | | problems | Illustration | |
| | | Problems, Dual of a | | | | |
| | | Transportation Problem | | | | |
| | 2 | Solution of a | 2 | To solve | Lecture | Formative |
| | | Transportation | | Transportation | | Assessment Test |
| | | Problem, | | Problems by | | |
| | | North-West corner rule | | North-West corner | | |
| | | | | rule | | |
| | 3 | Row minima method, | 3 | To solve | Group | Slip Test |
| | | Column minima | | Transportation | Discussion | |
| | | method, Least Cost | | Problems by Row | | |
| | | Method | | minima method. | | |

| | | | | Column minima method, Least cost method | | |
|------------|---|---|---|--|-------------------------------------|----------------------------------|
| | 4 | Vogel'sApproximation Method | 3 | To solve Transportation Problems by Vogel Approximation Method | Lecture with PPT Illustration | Evaluation through discussions |
| | 5 | Degeneracy inTransportation Problems | 3 | To learn about Degeneracyin TP | Lecture and group discussion | Evaluation through Assignment |
| Unit IV | 1 | Assignment Problems, Mathematicalformulatio n, Solution to Assignment Problems | 2 | To learn the applications ofAssignment Problems and to Solve the Assignment Problems | Lecture with Illustration | Lecture |
| | 2 | Hungarian Algorithm for solving Assignment Problem | 3 | To Solve Assignment Problems by Hungarian method | Lecture | Home Assignment |
| | 3 | Travelling Salesman Problem | 2 | To Solve the Travelling Salesman Problems | Lecture with PPT Illustration | Evaluation through discussions |
| Unit V | 1 | Introduction to SequencingofJobs | 2 | To learn about Introduction to SequencingofJobs | Lecture with Illustration | Lecture with illustrations |
| | 2 | Processingnjobsintwom achines | 2 | To know about Processingnjobsint womachines | Lecture with Illustration | Slip Test |
| | 3 | Processingnjobsinmmac hines | 3 | To know about Processingnjobsin mmachines | Lecture | Home Assignment |
| | 4 | Processingtwo jobsinmmachines | 3 | To know about Processingtwo jobsinmmachines | Lecture | Home Assignment |

Elective II: (a) Astronomy Course Code: MC2065

| No. of hours per week | Credits | Total No. of hours | Marks | |
|-----------------------|---------|--------------------|-------|--|
| 6 | 4 | 90 | 100 | |

Objectives: 1. To introduce space science and to familiarize the important features of the planets, the sun, the moon, and the stellar universe.

2. To predict lunar and solar eclipses and study seasonal changes.

Course Outcome

| СО | Upon completion of this course the students | | CL |
|--------|--|-----------|----|
| | will be able to: | addressed | |
| CO – 1 | define the spherical trigonometry of the celestial sphere | PSO - 1 | U |
| CO – 2 | discuss Kepler's laws | PSO - 1 | U |
| CO – 3 | calculate the motion of two particles relative to the common | PSO - 2 | Ар |
| | mass Centre | | |
| CO – 4 | interpret latitude and longitude and apply this to find the | PSO - 4 | Е |
| | latitude and longitude of a particular place | | |
| CO – 5 | distinguish between Geometric Parallax and Horizontal | PSO - 4 | An |
| | Parallax | | |

Total contact hours: 90 (Including lectures, assignments, quiz, and tests)

| Unit | Section | Topics | Lecture hours | Learning outcome | Pedagogy | Assessment/ Evaluation |
|------|----------|---|------------------|--|-------------------------|------------------------------------|
| Ι | Celestia | sphere | | | | |
| | 7. | Spherical trigonometry (only the four formulae) - Celestial sphere | 4 | To understand the four formulae and related termsabout Celestial sphere. | Lecture Illustration | Evaluation through slip test |
| | 8. | Four systems of coordinates | 3 | To represent the different systems of co-ordinates in the same figure and conversion of co- ordinates and to find the relation between right ascension and longitude of the Sun. | Lecture Illustration | quiz, test |
| | 9. | Diurnal motion - Sidereal Time | 3 | To trace the changes in the coordinates of the sun in the course of year. To find the longitude of the Sun | Lecture Illustration | Evaluation through slip test |
| | | | | on any day and | | | |
|-----|-----------|--|---|--|-------------------------|------------------------------------|--|
| | | | | Latitude of a place. | | | |
| | 10. | Hour angle and Azimuth at rising | 3 | To understand the R.A and Declination of a body, Hour angle of a body at rising and setting and duration of day time Azimuth of a star | Lecture Illustration | Class test | |
| | 11. | Morning and Evening stars | 3 | To identify Morning stars, Evening stars | Lecture Illustration | Assignment | |
| | 12. | Circumpolar stars | 2 | To understand the Circumpolar stars and to find the condition that a star is circumpolar | Lecture Illustration | HomeAssign ment | |
| II | The Earth | | | | | | |
| | 1 | The Earth - Zones of the earth | 3 | To understand about different zones of the Earth | Lecture Illustration | Home Assignment | |
| | 2 | Perpetual Day and Perpetual night | 4 | To calculate the durations of day and night during the year at different stations | Lecture Illustration | Evaluation through slip test | |
| | 3 | Terrestrial latitude and longitude | 3 | To identify the Terrestrial latitude and longitude | LectureIllustr ation | Formative Assessment | |
| | 4 | Dip of Horizon | 4 | To construct problems based on dip of Horizon | Lecture Illustration | Online Quiz, Test | |
| | 5 | Twilight, Duration of Twilight, Twilight throughout the night, Shortest Twilight. | 4 | To calculate the duration of Shortest Twilight | LectureIllustr ation | Home Assignment | |
| III | Geocent | tric parallax | | | | | |
| | 1 | Geocentric parallax - Parallax - Effects of Geocentric parallax | 3 | To understand basic concepts ofParallaxand Geocentric parallax | Lecture Illustration | SlipTest | |
| | 2 | Changes in R.A and Declination of a body due to Geocentric Parallax | 4 | To analyze the Changes in R.A and Declination of a body due to Geocentric Parallax | Lecture Illustration | Online quiz | |
| | 3 | Angular diameter – Equatorial horizontal | 4 | To determine the Angular diameter and | Lecture Illustration | Online Assignment | |

| | | Parallax | | Equatorial horizontal Parallax | | |
|----|------------------|--|---|--|-------------------------|-----------------------------------|
| | 4 | Heliocentric Parallax – Effect of Heliocentric Parallax | 3 | To analysethe Heliocentric Parallax and Effect of Heliocentric Parallax | Lecture Illustration | SlipTest |
| | 5 | To find the effect of Parallax on the Longitude and Latitude of a Star - Parsec | 4 | To find the solution of the effect of Parallax on the Longitude and Latitude of a Star and Parsec | Lecture Illustration | Online Assignment |
| IV | Kepler's | s laws | | | | |
| | 1 | Kepler's laws - Eccentricity of Earth's orbit – | 3 | To understand the Kepler's laws and the Eccentricity of Earth's orbit | LectureIllustr ation | SlipTest |
| | 2 | Verification of Kepler's Laws (1) and (2) - Newton's deductions from Kepler's laws | 3 | To verify Kepler's Laws and understand Newton's deductions from Kepler's laws | Lecture Illustration | Home Assignment |
| | 3 | To derive Kepler's Third Law from Newton's law of Gravitation –To find the mass of a planet | 4 | To understand theKepler's third law which is derived from Newton's law of gravitation | Lecture Illustration | quiz |
| | 4 | To fix the position of a planet in its elliptic orbit – Geocentric and Heliocentric latitudes and longitudes | 4 | To study the position of a planet in its elliptic orbit, Geocentric and Heliocentric latitudes and longitudes | Lecture Illustration | Formative Test, Online Quiz |
| | 5 | To prove that the Heliocentric longitude of the Earth and Geocentric longitude of the Sun differ by 180° | 4 | To determine the solutions of Heliocentric longitude of the Earth and Geocentric longitude of the Sun differ by 180° | Lecture Illustration | Slip Test |
| V | Two Body Problem | | | | | |
| | 1 | Two Body Problem - Introduction – Newton's Fundamental equation of Motion | 4 | To understand the Two Body Problem and Newton's Fundamental equation of Motion | Lecture Illustration | ClassTest |
| | 2 | Motion of one particle | 3 | To calculate the | LectureIllustr | Formative |

| | relative to another | | Motion of one particle relative to another | ation | assessment |
|---|--|---|--|-----------------------------|----------------------|
| 3 | The motion of the common center of mass | 3 | To understand the motion of the common center of mass | LectureIllustr ation | Online Quiz |
| 4 | The motion of two particles relative to the common mass center | 4 | To learn the motion of two particles relative to the common mass center | LectureIllustr ation | Online Assignment |
| 5 | The motion of a planet with respect to the Sun | 4 | To find the motion of a planet with respect to the Sun | Lecture thro google meet | Class test |

Course Instructor: Ms. J.C.Mahizha Course Instructor: Ms. Monisha HOD:Dr.T. Sheeba Helen HOD:Dr. S.Kavitha