**Semester** : II **Major Core II**
**Name of the Course** : **Classical Algebra and 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.

| CO | 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 | Ap |
| CO - 4 | develop the skill of evaluation of double and triple integrals over different regions | PSO - 3 | Ap |
| 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 |

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

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

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| | | irrational roots occur in pairs<br>Relations between roots and coefficients of equations | | | | |
| | 3 | Forming the equation whose roots are functions of roots of the given equation<br>Forming the equation whose roots are in A.P<br>Forming the equation whose roots are in G.P.<br>Forming the equation whose roots are in H.P | 4 | To understand theFormation of the equation whose roots are in A.P,GP,HP | Lecture with Illustration | Slip Test |
| | 4 | Symmetric functions of the roots<br>Sum of $r^{th}$ powers of the roots<br>Newton's theorem on the sum of the powers of the roots.<br>Problems based on Newton's theorem | 4 | To understandNewton's theorem on the sum of the powers of the roots | Discussion with Illustration | Quiz and Test |
| **II** | **Transformation of Equations** | | | | | |
| | 1 | Transform an equation into another whose roots are the roots of the given equation with signs changed<br>Transform an equation into another whose roots are m times the roots of the given equation<br>Reciprocal equations<br>Standard form of reciprocal equations | 4 | To identify the Reciprocal equations<br>Standard form of reciprocal equations | Lecture with Eamples | Evaluation through discussions. |
| | 2 | Any reciprocal equation can be reduced to a Standard reciprocal equation<br>Solving different types of reciprocal equations<br>Increasing or | 4 | To solve different types of reciprocal equations | Lecture | Evaluation through appreciative inquiry |

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

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

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| | | Fourier series over an interval of length $2\pi$<br>Deduction of sum of series from Fourier series expansion<br>Introduction of half range Fourier series expansion | | series expansion and half range Fourier series expansion | with Illustration | Assessment test |
| | 3 | Development of half range sine series over an interval of length $\pi$<br>Development of half range cosine series over an interval of length $\pi$<br>Deduction of sum of series from half range Fourier series expansion | 3 | To calculate Problems based on half range sine,cosine series over an interval of length $\pi$ | Lecture with Illustration | Slip Test |
| | 4 | Development of Fourier series over an arbitrary interval<br>Development of half range sine series over an arbitrary interval<br>Development of half range cosine series over an arbitrary interval | 4 | To differentiatehalf range sine series over an arbitrary interval And half range cosine series over an arbitrary interval | Lecture with Illustration | Home Assignment |

**Course Instructor: Dr.L.Jesmalar** **HoD:Dr. V. M. Arul Flower Mary**

**Course Instructor: Ms. V. Princy Kala** **HoD(SF): Mrs. J. Anne Mary Leema**

**& Ms. V.G. Michael Florance**

**Semester : II** **Allied II**
**Name 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.

| CO | 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 | Ap |
| CO - 3 | use computational tools to solve problems and applications of partial differential equations of first order. | PSO - 2 | Ap |
| 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 | Ap |

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

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

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| | | tangent line and normal plane for the intersection of two surfaces, Angle between two surfaces | | | | |
| | 4 | Divergence of vectors and its properties, Curl of vectors and its properties, Solenoidal and irrotational vectors | 4 | To study in detail divergence, curl, solenoidal and irrotational vectors | Lecture, Jigsaw | Quiz |
| **II** | **Vector Integration** | | | | | |
| | 1 | Definition of line integrals and work done by a force, Parametric equation of curves | 3 | To practice the computation of line integrals | Lecture, problem | Slip test |
| | 2 | Evaluation of line integrals over curves in a plane, Evaluation of line integrals over curves in a surface | 5 | To evaluate line integrals over different surface | Inquiry based | Assignment |
| | 3 | Computation of work done by a force, Projection of a surface over a plane | 3 | To compute work done and understand projection | Lecture, inductive method | Formative Assessment Test |
| | 4 | Definition of surface integrals, Evaluation of surface integrals over a plane | 4 | To practice the computation of surface integrals | Group Discussion | Seminar |
| **III** | **Linear Differential equations** | | | | | |
| | 1 | Introduction of Linear Differential equations with constant coefficients, Formation of auxillary equation and finding the complementary function | 4 | To study the basics of linear differential equations and to find the complementary function by using an appropriate method | Lecture, Debate | Multiple choice questions |

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| | 2 | Finding the particular integral for $e^{ax,}$ Finding the particular integral for cos ax, sin ax | 4 | To find the particular integral of a differential equation by using an appropriate method | Lecture with Illustration | Test |
| | 3 | Finding the particular integral for $e^{ax}f(x)$, Finding the particular integral for $x^nf(x)$ | 3 | To find the particular integral of a differential equation by using an appropriate method | Lab | Slip test |
| | 4 | Introduction of homogeneous linear equations, Conversion of homogeneous linear equations into linear differential equations with constant coefficients | 4 | To study few methods to convert the homogeneous linear equations into differential equations | Group Discussion | Formative Assessment Test |
| **IV** | **Partial Differential equations** | | | | | |
| | 1 | Introduction of Partial differential equations, Formation of Partial differential equations by eliminating the unknown constants, | 3 | To understand the basics and the formation of partial differential equations | Lecture with Illustration | Quiz |
| | 2 | Formation of Partial differential equations by eliminating the arbitrary functions, Methods of solving Partial differential equations | 3 | To study the methods of formation and the solution of partial differential equations | Lecture and small groups | Test |
| | 3 | Standard form of Lagrange's equation, General solution of Lagrange's equation | 3 | To study about Lagrange's equation and the methods to find its solutions | Discussion | Test |
| | 4 | Solving Lagrange's equation by method | 3 | To use computational tool to solve problems | Lecture and | Brain storming |

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

**Course Instructor: Dr. K. Jeya Daisy** **HoD:Dr. V. M. Arul Flower Mary**

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

**Semester** **II**
**Name 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**

| CO | 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 | Ap |
| CO - 2 | calculate the area and compare the objects on the basis of their size and area. | PSO - 1 | Ap |
| 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 | Ap |

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

| Unit | Section | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|---|---|---|---|---|---|---|
| **I** | **Problems 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** | **Problems 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 |

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| | | $l$metres, $l$ + $b$metres | | cover $l$ metres, $l$ + $b$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** | **Compound 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** | **Logarithms** | | | | | |
| | 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. | 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.Mahizha** **HoD: Dr. V. M. Arul Flower Mary**
**Course Instructor: Dr.C.Jenila** **HoD(SF): Mrs. J. Anne Mary Leema**

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|---|---|---|---|---|---|---|
| | | distribution, Area property of normal distribution, Problems based on area of normal distribution | | functions and to understand the definition of random variables, their types and related concepts and to apply the techniques to prove the properties of probability and related distributions | **Major Core V** | Test |
| | 4 | Quartile deviation for the normal distribution, Fitting of normal distribution, Problems based on Fitting of normal distribution | 3 | To recall the definition of probability and to detect the different probability distributions which are widely used and to apply the techniques to prove the properties of | Lecture with Illustration | Test |

Course Instructor (Aided): Ms.Jancy Vini HOD(Aided) :Dr. V. M. Arul Flower Mary Course Instructor(S.F): Ms. V. Mara Narghese HOD(S.F) :Ms. Anne Mary Leema

**Semester : IV**
**Name of the Course : Groups and Rings**
**Subject code : MC1741**

**Teaching Plan**

| Unit | Modules | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|---|---|---|---|---|---|---|
| **I** | **Groups.** | | | | | |
| | 1. | Definition and examples on Groups | 4 | To understand the definition of groups | Lecture with Illustration | Evaluation through test |
| | 2. | Definition and examples on Permutation Groups | 3 | To understand the definition permutation groups | Lecture | Q&A |
| | 3. | Definition of cycle and theorem based on cycles | 3 | To understand the definition of cycle and theorem | Lecture with | Open Book Assignment |
| | 4. | Theorems on even and odd permutations | 2 | To understand and apply this theorem in various problems | Lecture with Illustration | Quiz |
| | 5. | Definition examples, theorems and problems of sub | 3 | To understand the definition and theorems of sub groups | Lecture with Illustration | Group Discussion |
| | 6. | Theorems on cyclic groups and problems based on cyclic groups | 2 | To learn the concepts of cyclic groups | Lecture with Illustration | Q&A |
| **II** | **Order of an element and Normal Sub Groups** | | | | | |
| | 1. | Definition and Theorems on order of an | 2 | To understand the definition and theorems on order of | Lecture with Illustration | Test |
| | 2. | Problems on order of an element | 2 | To apply the concept of order of an element in problems | Lecture | Open book assignment |

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| | 3. | Definition of Cosets and problems on cosets | 3 | To understand the definition of cosets and problems | Lecture | Q&A |
| | 4. | Lagrange's Theorem, Euler's Theorem, Fermats theorem | 3 | To learn Lagrange's Theorem, Euler's Theorem, Fermats | Lecture | Formative Assessment Test |
| | 5. | Normal subgroups - Definition and Examples | 2 | To know the definition of Normal subgroups | Group Discussion | Q&A |
| | 6. | Problems and theorems on Normal Subgroups | 2 | To apply the Normal subgroups concept in problems | Lecture with Illustration | Slip Test |
| **III** | **Isomorphism** | | | | | |
| | 1. | Definition, theorems and Examples of Isomorphism | 4 | To understand the definition and theorems based on | Lecture with Illustration | Quiz |

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| | 2. | Cayley's Theorem and Theorem on Automorphism and generators | 3 | To learn the Cayley's theorem and understand the concept of Automorphism and | Lecture | SipTest |
| | 3. | Definition of Homomorphism | 2 | To learn the definition of Homomorphism and Examples | Lecture | Test |
| | 4. | Fundamental Theorem of Homomorphism | 3 | To study the Fundamental Theorem | Lecture | Q&A |
| | 5. | Problems on Kernel | 3 | To apply Kernel concept in problems | Group Discussion | Brain Storming |
| **IV** | **Rings** | | | | | |
| | 1. | Definition, Elementary properties and examples of Rings | 3 | To learn the definition of rings | Lecture with | Quiz |
| | 2. | Problems based on Isomorphism of Rings | 3 | To get the idea of Isomorphism of Rings | Lecture and group | Test |
| | 3. | Types of Rings and Theorems | 2 | To identify the Types of Rings | Lecture with Illustration | Test |
| | 4. | Examples of Skew fields and Theorems based on Skew fields | 2 | To apply Skew fields ideain problems | Lecture with | Formative Assessment Test |
| | 5. | Definition and Theorems on integral Domains | 1 | To know aboutintegral Domains | Lecture with | Assignment |
| | 6. | Characteristic of a Ring | 1 | To interpret the Characteristic of a Ring | Lecture with Illustration | Quiz and Test |
| **V** | **Sub Rings** | | | | | |
| | 1. | Definition and Examples of Sub Rings | 2 | To get the knowledge of sub rings | 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 | Open Book Assignment |
| | 4. | Ordered integral Domains | 3 | To understand the Ordered integral | 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 | Lecture | Assignment |

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| | | | | Homomorphism of Rings | with | |
| | 7. | Unique factorization Domain | 2 | To understand and analyze about Unique factorization | Lecture with Illustration | Quiz and Test |

Course Instructor(Aided): Dr. K. Jeya Daisy Flower Mary
Course Instructor(S.F): Ms. R.N. Rajalekshmi

HOD(Aided) :Dr. V. M. Arul
HOD(S.F) :Ms. J. Anne Mary Leema

**Major Core VI**

**Semester** : **IV**
**Name of the Course** : **Analytical Geometry – 3 Dimensions**
**Subject code** : **MC1742**

**Teaching Plan**

| Unit | Modules | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|---|---|---|---|---|---|---|
| **I** | **Direction cosines of a line** | | | | | |
| | 1. | Introduction and definition of distance between points and angle between two lines. | 2 | To understand the concept of distance between points and angle | Lecture | Test |
| | 2. | Definition and problems related to Projection on a line, Direction cosines of a | 3 | To understand the projection on a line and direction cosines of a line | Lecture with illustrations | Group Discussion |
| | 3. | Definition of direction ratios and projection of the line joining two points. | 3 | To analyze the equations of two skew lines in a simplified form | Lecture | Test |
| | 4. | Definition and Theorems related to direction cosines of the line joining the | 2 | Acquire the knowledge about direction cosines of the line joining the | Lecture | Test |
| | 5. | Definition and problems based on conditions for perpendicularity and parallelism. | 2 | To practice various problems related to conditions for | Lecture with group discussion | Group discussion |
| **II** | **The Plane** | | | | | |
| | 1. | Definition and problems based on Equation of a plane in different forms,Intercept form | 3 | To understand the concepts Equation of a plane in different forms | Lecture | Test |
| | 2. | Definition and problems related to Angle between the planes ,The ratio in which the plane | 3 | To understand the definition of the ratio in which the plane divides the line joining the points | Lecture | Q&A |
| | 3. | Definition and problems on a plane | 3 | To practice various problems | Lecture | Formative Assessment |

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| | | of intersection of two given planes | | plane through the line of intersection of two given planes | | Test |
| | 4. | Problems based on length of perpendicular , Planes bisecting the angle between two planes. | 3 | Acquire the knowledge about the planes bisecting the angle between | Lecture with illustrations | Test |
| **III** | | **The Straight Line** | | | | |
| | 1. | Definition and methods of finding equation of a line in different forms | 3 | To understand the methods of finding equation of a line in | Lecture | Quiz |
| | 2. | Problems based on the plane and the straight line | 3 | To compare the plane and the straight line | Lecture with | Test |
| | 3. | Definition and problems Angle between the lines image of a line | 3 | To Know the concept of Angle between the lines | Lecture with group | Brain storming |
| | 4. | Problems based on CoP planarity of two lines | 3 | Acquire the knowledge about Co-planarity of two | Lecture with ppt | Assignment |
| **IV** | **Shortest distance between two lines** | | | | | |
| | 1. | Introduction and definition of Shortest distance between two lines | 2 | To understand the Shortest distance between two lines | Lecture with illustration | Quiz |
| | 2. | Problems based on The equations of two skew lines in a simplified form | 4 | To analyze the equations of two skew lines in a simplified form | Lecture | Q&A |
| | 3. | Definitions and Problems based on Intersection of three planes | 3 | Acquire the knowledge about Intersection of three | Lecture | Slip Test |
| | 4. | Theorem and problems based on volume of a | 3 | To practice various problems related to volume | Lecture | Formative Assessment Test |
| **V** | | **The Sphere** | | | | |
| | 1. | Introduction and Illustrations based on equation of the sphere in its general form | 3 | To Understand the sphere in its general form | Lecture with | Quiz |
| | 2. | Theorem and problems on determination of the centre and radius of a sphere | 2 | To determine the centre and radius of a sphere | Lecture | Test |
| | 3. | The length of the | 2 | To know The length of the | Lecture | Slip Test |

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| | | tangent from the point to the sphere | | tangent from the point to the sphere | | |
| | 4. | Problems related to Section of sphere by a plane | 3 | To practice various problems related to Section of sphere by a plane | Lecture | Assignment |
| | 5. | Definition of Intersection of two spheres and tangent plane. | 2 | Acquire the knowledge about Intersection of two spheres and tangent plane. | Lecture with | Formative Assessment Test |

Course Instructor(Aided)::Dr.L.Jesmalar HOD(Aided):Dr. V. M. Arul Flower Mary
Course Course Instructor(S.F): Ms. V.G. Michael Florence HOD(S.F) :Ms. J.Anne Mary Leema

**Semester** : **IV** **Allied**
**Name of the Course Subject code** : **Applied Statistics : MA1741**

| Unit | Modules | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/evaluation |
|---|---|---|---|---|---|---|
| **I** | **Correlation** | | | | | |
| | 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 analyze Rank correlation and to solve the problems. | Lecture | Assignment |
| | 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 | 3 | To testing of hypothesis | Lecture | Quiz |

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| | | errors in testing of hypothesis, critical values for different levels of significance, Procedure for testing of | | | | |
| | 3 | Explanation and Problems of test of significance for single proportions | 3 | To solve problems related to single | 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 | Lecture with group | Test |
| **III** | **Test of significance for means** | | | | | |
| | 1 | Test of significance for single mean if the standard deviation is known, Problems based on confidence limits for population mean, Problems based on test of significance of means. | 4 | To Learn some methods to solve the Problems based on confidence limits for population mean and Problems based on test of significance | Lecture | Test |
| | 2 | Problems based on test of significance for difference of sample means, Test of significance for single standard deviation | 2 | To Learn some methods to solve the problems of test of significance for difference of sample means and single | Lecture | Test |
| | 3 | Test of significance for equality of standard deviations of a normal population. | 2 | To learn normal population | Lecture | Test |
| | 4 | Problems based on test of significance for standard deviation | 2 | To test the significance for standard deviation | Lecture | Test |
| | 5 | Problems based on test of significance for correlation coefficient | 3 | To test the significance for correlation | Lecture | Test |
| **IV** | **Test of significance for small samples** | | | | | |
| | 1 | Distinguish large and small samples, Test of significance based on t-distribution, Test for the difference between the mean of a sample and that of a | 3 | To test the significance based on t-distribution, and the difference between the mean of a sample and that of | Lecture with group | Quiz |
| | 2 | Test for the difference between | 2 | To solve problems | Lecture | Assignment |

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|---|---|---|---|---|---|---|
| | | the means of two samples, Confidence limits for population mean | | related Confidence limits | | |
| | 3 | Problems based on confidence limits for population mean, Test of significance based on F-test | 2 | To learn the test of significance based on Fs test | Lecture | Assignment |
| | 4 | Problems on test of significance based on F-test. | 2 | To solve problems on test of significance based on F-test. | Lecture | Formative Assessment |
| | 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 based on $\chi^2$-distribution** | | | | | |
| | 1 | Introduction on test based on $^2\chi$ , distribution- $^2\chi$ $-$test for population | 3 | To Solve the problems related to $\chi^2$ $-$test for population | Lecture | Quiz |
| | 2 | $\chi^2$ $-$test to test the goodness of fit | 2 | To test the goodness of fit for $\chi^2$ $-$test. | Lecture | Test |
| | 3 | Result on $\chi^2$ $-$test to test the goodness of fit. | 2 | To learn the Result on $\chi^2$ $-$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 | To analyze 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): A. Jancy Vini Course Instructor(S.F): Dr. C. Jenila

HOD(Aided) :Dr. V. M. Arul Flower Mary
HOD(S.F) :Ms. J. Anne Mary Leema

# Teaching Plan (2019-2020)
# Semester - VI

**Name oftheCourse : Complex Analysis**
**Subjectcode : MC1761**

| No. of hours per week | Credit | 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 use these concepts in higher studies.

| CO | Upon completion of this course the students will be able to : | PSO addressed | CL |
|---|---|---|---|
| **CO- 1** | understand the geometric representation of complex numbers | 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-8 | E |

| Unit | Module | Topics | Lecture hours | Learning outcomes | Pedagogy | Assessment/ evaluation |
|---|---|---|---|---|---|---|
| **I** | 1 | Complex numbers – conjugation and modulus | 5 | To prove $\mathbb{C}$ is a field and some inequalities | Lecture | Assignment |
| | 2 | Geometrical representation of complex numbers and $n^{th}$ roots of complex numbers | 5 | To find magnitude, argument and $n^{th}$ roots of complex numbers | Lecture, Group discussion | Test |
| | 3 | Circles and straight lines – general equations and problems | 4 | To obtain necessary and sufficient condition for the concept inverse points and reflection points | Lecture | Quiz |
| | 4 | Regions in the complex plane - definitions and examples | 2 | To identify regions in $\mathbb{C}$ | Lecture with PPT | Assignment |
| | 5 | The extended complex plane - definition and problems | 2 | To determine the point on the sphere that represents the complex plane | Lecture | Test |
| **II** | 1 | Differentiability – definitions and theorems | 3 | To analyse basic properties of differentiability | Lecture | Assignment |
| | 2 | Cauchy Riemann equations – theorems and examples, Alternate forms of C.R equations – theorems and | 7 | To get necessary & sufficient condition for differentiability | Lecture | Formative Assessment |

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|---|---|---|---|---|---|---|
| | | problems | | | | |
| | 3 | Analytic functions – definition and problems | 5 | To discuss some properties of analytic function | Lecture | Test |
| | 4 | Harmonic functions – definitions, theorems and problems | 7 | To find analytic functions | Lecture with group discussion | Assignment |
| | 5 | Bilinear transformations – elementary transformation and cross ratio | 7 | To determine the image of given region under bilinear transformation | Lecture with PPT | Test |
| **III** | 1 | Definite integral – definitions, theorems and examples | 4 | To evaluate definite integral | Lecture | Assignment |
| | 2 | Cauchy's theorem – definition and theorems | 5 | To prove Cauchy's theorems | Lecture | Test |
| | 3 | Cauchy's integral formula – theorems and problems | 5 | To evaluate integrals | Lecture with group discussion | Test |
| **IV** | 1 | Taylor's series- | 5 | To expand given function as Taylor's series | Lecture | Assignment |

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

Course Instructor (Aided): Dr. M. K. Angel Jebitha Mary Course Instructor (S.F): Ms. V. Pincy Kala

HoD (Aided): Dr. V.M. Arul Flower
HoD (Aided): Ms. J. Anne Mary Leema