Semester : II

Name of the Course : Classical Algebra and Integral Calculus

Course code : MC1721

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

Course Outcomes

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 – 1	U
CO - 3	choose appropriate method for transformation of equations	PSO – 1	Ap
CO - 4	develop the skill of evaluation of double and triple integrals ove different regions	PSO – 1	Ap
CO - 5	identify Beta, Gamma functions and utilize them for the evaluation of definite integrals	PSO – 1	Ap, E
CO - 6	develop the Fourier series expansion in any interval and apply the same for solving technical and physical problems	PSO – 1	Ap, Ar

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, Fundamental theorem of Algebra, Problems based on reminder theorem, Problems based on Fundamental theorem of Algebra	4	Explain the primary concepts of Fundamental theorem of Algebra, Problems based on reminder theorem	Lecture with Illustration	Evaluation through appreciative inquiry
	2	In an equation with real coefficients, imaginary roots occur in pairs, In an equation with rational coefficients, irrational roots occur in pairs, Relations between roots and coefficients of equations	3	To distinguish between imaginary roots occur in pairs and irrational roots occur in pairs	Lecture	Evaluation through quizzes and discussions
	3	Forming the equation whose roots are functions of roots of the given equation, Forming the equation whose roots are in A.P, Forming the equation whose roots are in G.P, Forming the equation whose roots are in H.P	4	To understand the Formation of the equation whose roots are in A.P,GP,HP	Lecture with Illustration	Slip Test
	4	Symmetric functions of the roots, Sum of rth powers of the roots, Newton's theorem on thesum of the powers of the roots, Problems based on Newton's theorem	4	To understand Newton'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	4	To identify the Reciprocal equations Standard form of	Lecture with Examples	Evaluation through discussions

		roots are the roots of the given equation with signs changed, Transform an equation into another whose roots are m times the roots of the given equation, Reciprocal equations Standard form of reciprocal equations		reciprocal equations		
	2	Any reciprocal equation can be reduced to a Standard reciprocal equation Solving different types of reciprocal equations, Increasing or decreasing the roots of a given equation by a given quantity	4	To solve different types of reciprocal equations	Lecture	Evaluation through appreciative inquiry
	3	Removal of terms Descarte's rule of signs, Descarte's rule of signs for negative roots, Problems related to Descarte's rule of signs	4	To calculate problems related to Descarte's rule of signs	Lecture with Illustration	Formative Assessment Test
	4	Rolle's theorem, Problems related to Rolle's theorem.	3	To calculate problems related to Rolle's theorem	Group Discussion	Slip Test
III		**Double Integrals**				
	1	Introduction about integration and Double integrals, Evaluation of double integrals with constant limits in cartesian co-ordinates, 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, Evaluation of double integrals with	4	Calculate the integrals over a specified region bounded by straight lines	Lecture with Illustration	Evaluation through appreciative inquiry

		variable limits in polar co-ordinates, Evaluation of double integrals over a specified region bounded by straight lines				
	3	Evaluation of double integrals over a specified region bounded by different curves, working rule for changing the order of integration, Problems on changing the order of integration	4	To apply the double integrals over a specified region bounded by different curves	Lecture	Formative Assessment Test
	4	Introduction about triple integrals, Evaluation of double integrals with constant limits, 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, Properties of Gammafunction Properties of Beta function, 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, Evaluation of integrals using properties of Gamma function, 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, Finding the value of standard definite integrals in terms of Beta and Gamma functions	4	To know about properties of Beta function	Lecture with Illustration	Formative Assessment Test

	4	Duplication formula, Deductions using Duplication formula	2	To understand Duplication formula	Lecturewith Illustration	Slip Test
V		**Fourier Series**				
	1	Definition and basic properties of odd and even functions, Introduction of Fourier series expansion Computation of Fourier coefficients	4	Explain the basic properties of odd and even functions	Lecture	Evaluation through discussions
	2	Development of Fourier series over an interval of length 2π, Deduction of sum of series from Fourier series expansion Introduction of half range Fourier series expansion	4	To understand Fourier series expansion and half range Fourier series expansion	Lecture with Illustration	Formative Assessment Test
	3	Development of half range sine series over an interval of length π, Development of half range cosine series over an interval of length π, Deduction of sum of series from half range Fourier seriesexpansion	3	To calculate Problems based on half range sine, cosine series over an interval of length π	Lecture with Illustration	Slip Test
	4	Development of Fourier series over an arbitrary interval, Development of half range sine series over an arbitrary interval, Development of half range cosine series over an arbitrary interval	4	To differentiate half range sine series over an arbitrary interval and half range cosine series over an arbitrary interval	Lecture with Illustration	Home Assignment

Course Instructor

Dr. K. Jeya Daisy

Head of the Department

Dr. V. M. Arul Flower Mary

Semester : II

Name of the Course :Vector Calculus and Differential Equations(for Physics and Chemistry)

Course code : MA1721

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 inPhysical Science

Course Outcomes

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 – 8	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	Brain Storming
	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 tangent line and normal plane for the intersection of two surfaces, Angle between two surfaces	4	To understand the tangent plane and normal line and its various functions	Lecture, Small Groups	Test
	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	3	To compute work done and understand	Lecture, Inductive	Formative Assessment

		work done by a force, Projection of a surface over a plane		projection	method	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
	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 $x^n f(x)$	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	3	To study the methods of formation and the solution of partial differential equations	Lecture and small groups	Test

		arbitrary functions, Methods of solving Partial differential equations				
	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 of grouping	3	To use computational tool to solve problems and applications of partial differential equation of first order	Lecture and applications of partial differential equation of first order	Brain Storming
	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 LaplaceTransform	Lecture and Debate	Test
	2	Computation of Laplace Transform of standard functions, Problems on LaplaceTransform	3	To solve problems on Laplace Transform	Lecture with Illustration	Formative Assessment Test
	3	Definition of Inverse LaplaceTransform, Properties of Inverse LaplaceTransform	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 Instructors

Sr. S. Antin Mary

Ms. J. C. Mahizha

Head of the Department

Dr. V. M. Arul Flower Mary

Semester	: II
Name of the Course	: Quantitative Aptitude - II (NME)
Course code	: MNM172

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

Objective:

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

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO - 1	find the average of numbers and solve some real life problems	PSO – 4	U, Ap
CO - 2	frame equations and solve problems involving ratios and fractions	PSO – 3	Ap
CO - 3	apply law of indices sand surds to find missing numbers in an expression	PSO – 4	Ap
CO - 4	compare surds and ratio	PSO – 8	An
CO - 5	learn ratio and proportion and practice duplication and triplication of rations	PSO – 6	U, Ap
CO - 6	employ the problems related to ages and apply the same to real life situations	PSO – 4	Ap

Total contact hours: 60 (Including lectures, assignments and tests)

Unit	Section	Topics	Lecture Hours	Learning Outcomes	Pedagogy	Assessment/ Evaluation
I		**Average**				
	1	Average: Formula and Problems related to Average of prime, natural and consecutive even and odd integers	3	To find the average of different kinds of numbers	Lecture	Test
	2	Speed: Formula and Problems related to distance and speed	3	To solve problems related to distance and speed	Lecture	Test
	3	Real life problems related to average and speed	3	To apply average in real life problems	Group Discussion	Quiz
II		**Problems on Numbers**				
	1	Framing and solving equations involving unknown numbers	2	To frame and solve equations	Lecture	Test
	2	Framing and solving equations involving sum average and squares	2	To frame and solve equations involving sum average and squares	Group Discussion	Quiz
	3	Problems involving ratios and fractions	2	To solve problems involving ratios and fractions	Lecture	Formative Assessment Test
	4	Problems involving interchanging the digits of a number, reciprocal of a number	3	To apply the concept in real life problems	Lecture	Test
III		**Problems on Ages**				
	1	Problems based on the difference between the ages of two persons	2	To employ the problems related to ages and apply the same to real life situations	Lecture	Test
	2	Problems based on the ages of father and son	2	To employ the problems related to ages and apply the same to real life situations	Lecture	Test

	3	Comparison on ages of two persons	2	To analyze the problems related to comparison of ages	Group Discussion	Quiz
	4	Problems based on the Ratio of ages	3	To find the ratio of ages	Lecture	Formative Assessment Test
IV		**Surds and Indices**				
	1	Surds and Indices: Formula & direct problems	2	To solve problems related to Surds and Indices	Lecture	Test
	2	Finding largest surds and application of laws of indices and surds	3	To apply law of indicesand surds to find missing numbers in an expression	Lecture	Test
	3	Comparison of surds	2	To compare surds and ratio	Group Discussion	Quiz
	4	Finding surds in larger expressions	2	To find surds in larger expressions	Lecture	Test
V		**Ratio and Proportion**				
	1	Formulae for ratio and proportion and problems based on Fourth, third and mean proportional	3	To learn ratio and proportion and practice duplication and triplication of ratios	Lecture	Quiz
	2	Problems based on comparison of ratios and compounded ratios	2	To compare ratios and compounded ratios	Lecture	Formative Assessment Test
	3	Problems based on proportion	2	To solve problems related to proportion	Lecture	Assignment
	4	Problems based on Variation	2	To solve problems related to variation	Lecture	Assignment

Course Instructor   **Head of the Department**

Dr. J. Befija Minnie   **Dr. V. M. Arul Flower Mary**

Semester   : IV

Name of the Course   : Groups and Rings

Course code   : MC1741

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

Objectives:

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

   2. To gain more knowledge essential for higher studies in Abstract Algebra

Course Outcomes

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, sub rings , quotient rings	PSO - 5	C
CO - 4	examine the properties of Ideals, Maximal and Prime ideals, Cosets, order of an element	PSO - 8	E
CO - 5	test the homomorphic and isomorphic properties of groups and rings	PSO - 4	An
CO - 6	develop the concepts of ordered integral domains and Unique Factorization Domains	PSO - 5	E
CO - 7	apply the theory of Groups and Rings and solve problems	PSO - 8	Ap

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

Unit	Section	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 based on cycles	Lecture with Illustration	Open Book Assignment
	4	Theorems on even and odd permutations	2	To understand and applythis theorem in various problems	Lecture with Illustration	Quiz
	5	Definition examples, theoremsand problems of sub groups	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 ofcyclic groups	Lecture with Illustration	Q&A
II		Order of an Element and Normal Sub Groups				
	1	Definition and Theorems on order of an Element	2	To understand the definition and theorems on order of an element	Lecture with Illustration	Test
	2	Problems on order of an element	2	To apply the concept oforder of an element in problems	Lecture	Open book Assignment
	3	Definition of Cosets and problems on cosets	3	To understand the definition of cosets and problems on cosets	Lecture	Q&A
	4	Lagrange's Theorem, Euler's Theorem, Fermats theorem	3	To learn Lagrange's Theorem, Euler's Theorem, Fermats theorem	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	Lecturewith Illustration	Slip Test
III				**Isomorphism**		
	1	Definition, theorems and Examples of Isomorphism	4	To understand the definition and theorems based on Isomorphism	Lecture with Illustration	Quiz
	2	Cayley's Theorem and Theorem on Automorphism and generators	3	To learn the Cayley's theorem and understand the concept of Automorphism and generators	Lecture	SipTest
	3	Definition of Homomorphism and Examples	2	To learn the definition of Homomorphism and Examples	Lecture	Test
	4	Fundamental Theorem of Homomorphism	3	To study the Fundamental Theorem of Homomorphism	Lecture	Q&A
	5	Problems on Kernel	3	To apply Kernel conceptin problems	Group Discussion	Brain 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 Skew fields and Theorems based on Skew fields	2	To apply Skew fields 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 Rings**		

	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 andTest
	6	Homomorphism of Rings	2	To learn the definition of Homomorphism of Rings	Lecture with Illustration	Assignment
	7	Unique factorization Domain	2	To understand and analyze about Unique factorization Domain	Lecture with Illustration	Quiz andTest

Course Instructor **Head of the Department**

Dr. L. Jesmalar **Dr. V. M. Arul Flower Mary**

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

No. of Hours per Week	Credits	Total No. of Hours	Marks
5	4	75	100

Objectives:

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

Course Outcomes

CO	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	Ap
CO - 3	calculate the distance between points, lines and planes and the angles between lines and planes	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, cube etc.,	PSO – 1	U
CO - 6	develop the skill in 3 - dimensional geometry to gain mastery in related courses	PSO – 6	C

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

Unit	Section	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 between two lines	Lecture	Test
	2	Definition and problems related to Projection on a line, Direction cosines of a line	3	To understand the projection on a line anddirection 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 points	2	Acquire the knowledge about direction cosines of the line joining the points	Lecture	Test
	5	Definition and problems based on conditions for perpendicularity and parallelism	2	To practice various problems related to conditions for perpendicularity and parallelism	Lecture with Group Discussion	Group Discussion
II		**The Plane**				
	1	Definition and problems based on Equation of a plane in different forms, Intercept form, Nnormal form	3	To understand the concepts Equation of a plane in different forms	Lecture	Test
	2	Definition and problems related to angle between theplanes,The ratio in which the plane divides the line joining the points	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 through the line of intersection of two given planes	3	To practice various problems related to plane through the line of intersection of two given planes	Lecture	Formative Assessment 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 two planes	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 different forms	Lecture	Quiz
	2	Problems based on the plane and the straight line	3	To compare the plane and the straight line	Lecture with Illustration	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 Discussion	Brain Storming
	4	Problems based on Co-planarity of two lines	3	Acquire the knowledge about co-planarity of two lines	Lecture with PPT	Assignment
IV			**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	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 tangent from the point to the sphere	2	To know about the length of the tangent from the point to the sphere	Lecture with Illustration	Slip Test
	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 Illustration	Formative Assessment Test
V			**The Cone**		

	1	Definitions and problems in the equation of a surface and Cone	2	To understand about equation of a surface	Lecture with Illustration	Test
	2	Problems related to the intersection of a straight line and a quadric cone and Tangent plane and normal	4	To practice various problems related to the tangent plane and normal	Lecture	Slip Test
	3	Problems related to the condition 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 about the 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   **Head of the Department**

Ms. J. C. Mahizha   **Dr. V. M. Arul Flower Mary**

Semester : IV

Name of the Course : Applied Statistics (Allied)

Course code : MA1741

No. of Hours per Week	Credits	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

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO - 1	identify and demonstrate appropriate sampling processes	PSO – 8	An
CO - 2	recall the methods of classifying and analyzing data relative to single variable	PSO – 1	R
CO - 3	describe the χ^2 distribution in statistics	PSO – 7	U
CO - 4	distinguish between the practical purposes of a large and a small sample	PSO – 8	An
CO - 5	understand that correlation coefficient is independent of the change of origin and scale	PSO – 4	U

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

Unit	Section	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 analyse 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 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 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 of means	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 standard deviation	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 coefficient	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 population	3	To test the significance based on t-distribution, and the difference between the mean of a sample and that of a population	Lecture with Group Discussion	Quiz
	2	Test for the difference between the means of two samples,	2	To solve problems related Confidence limits	Lecture	Assignment

		Confidence limits for population mean				
	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 F-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 χ^2-distribution					
	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 offit 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 testthe 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

Ms. A. Jancy Vini

Head of the Department

Dr. V. M. Arul Flower Mary

Semester	: VI		
Name of the Course	: Complex Analysis		
Course code	: MC1761		

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

Course Outcomes

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

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

Unit	Section	Topics	Lecture hours	Learning Outcomes	Pedagogy	Assessment/ evaluation
I		**Complex Number**				
	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 Sraight 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		**Differentiability**				
	1	Differentiability – definitions and theorems	3	To analyze basic properties of differentiability	Lecture	Assignment
	2	Cauchy Riemann equations – theorems and examples, Alternate forms of C.R equations theorems and problems	7	To get necessary and sufficient condition for differentiability	Lecture	Formative Assessment
	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		**Cauchy's Integral Formula**				

	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	**Taylor's and Laurent's Series**					
	1	Taylor's series- Taylor's theorem and problems	5	To expand given function as Taylor's series	Lecture with Group Discussion	Assignment
	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	**Cauchy Residues**					
	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 apply Cauchy'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

Dr. M. K. Angel Jebitha

Head of the Department

Dr. V. M. Arul Flower Mary

Semester   : VI
Name of the Course : Mechanics
Course code   : MC1762

No. of Hours per Week	Credits	Total No. of Hours	Marks
6	5	90	100

Objectives:

1. To study the application of Mathematics in Physical Sciences
2. To solve related problems

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO -1	calculate the reactions necessary to ensure static equilibrium	PSO - 2	U
CO - 2	apply the principles of static equilibrium to particles and rigid bodies	PSO - 4	Ap
CO - 3	understand the ways of distributing loads	PSO - 7	U
CO - 4	identify internal forces and moments of a rigid body	PSO - 6	U
CO - 5	apply the basic principles of projectiles into real world problems	PSO - 2	Ap
CO - 6	classify the laws of friction	PSO - 4	An
CO - 7	describe energy methods for particles and systems of particles	PSO - 1	U
CO - 8	understand the general principles of dynamics	PSO - 7	U
CO - 9	differentiate the various frictional forces	PSO - 2	An

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

Unit	Section	Topics	Lecture hours	Learning Outcomes	Pedagogy	Assessment/ Evaluation
I		**Forces Acting at a Point and Parallel Forces and Moments**				
	1	Lami's Theorem, Problems based on Lami's Theorem	3	To apply the principles of static equilibrium to particles and rigid bodies	Lecture with PPT Illustration	Evaluation through test
	2	Resultant of two like parallel forces, two unlike and unequal parallel forces, Resultant of number of parallel forces, equilibrium of three coplanar parallel forces	4	To distinguish the like and unlike parallel forces and determine their resultant and apply those principles to particles and rigid bodies	Lecture with Illustration	Evaluation through test
	3	Moment of a force, Geometrical representation, Varignon's theorem of moments	4	To understand the theorems of moments	Lecture with Illustration	Test
	4	Generalised theorem of moments, Problems based on Varignon's theorem of moments	4	To Calculate the algebraic sum of the moments of the forces of a rigid body	Discussion with Illustration	Quiz and Test
II		**Coplanar Forces**				
	1	Introduction and reduction of any number of coplanar forces, Analytical proof	3	To identify the coplanar forces and find their resultant	Lecture with PPT	Test
	2	Conditions for forces to reduce a single force or couple, Change of the base point & Equation to the line of action of the resultant	3	To construct a couple or a single force from the given coplanar forces	Lecture	Test
	3	Problems based on reduction of number of coplanar forces	3	To identify the coplanar forces and find their resultant	Lecture	Formative Assessment Test
	4	Problems based on forces to reduce a single force or couple	3	To construct a couple or a single force from the given coplanar forces and solve	Group Discussion	Test

			problems		
	5	Problems based on Equation to the line of action of the resultant	3	To calculate the algebraic sum of the moments of the forces of a rigid body	Group Discussion	Test

III	**Friction**					
	1	Introduction, Statical, Dynamical, Limiting friction and Laws of friction, Coefficient of friction, Angle of friction, Cone of friction	4	To classify the laws of friction and analyze the problems involving frictional forces	Lecture with PPT Illustration	Quiz
	2	Equilibrium of a particle on a rough inclined plane, Equilibrium of a body on a rough inclined plane under a force parallel to the plane, Equilibrium of a body on a rough inclined plane under any force	3	To understand the principles of friction onto particles and rigid bodies	Lecture with Illustration	Test
	3	Problems based on Coefficient of friction, angle of friction	4	To apply the principles of friction to particles and rigid bodies	Lecture	Test
	4	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	**Projectiles**					
	1	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
	2	Path of a projectile at a certain height above the ground, Problems based on Path of a projectile, Problems based on Characteristics	4	To understand the path of a projectile in various directions and apply the principles into real world problems	Lecture and Group Discussion	Test

		of the motion of a projectile			
	3	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
	4	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		**Simple Harmonic Motion**			
	1	Introduction of simple harmonic motion, Simple harmonic motion in a straight line and general solution of S.H.M	4	To identify simple harmonic motion and practice various parameters in nature	Lecture with PPT Illustration	Test
	2	Geometrical representation of a S.H.M, Change of origin and problems based on S.H.M in a straight line	4	To understand simple harmonic motion and practice problems related to it	Lecture with Illustration	Formative Assessment Test
	3	Problems based on Simple harmonic motion, S.H.M on a curve	4	To calculate S.H.M on a curve	Lecture with Illustration	Assignment
	4	Simple pendulum, Period of oscillation of a pendulum, Equivalent simple pendulum, Seconds pendulum	2	To differentiate simple pendulum, Equivalent simple pendulum, Seconds pendulum and find the period of pendulum	Lecture with PPT Illustration	Assignment
	5	Problems based on equivalent simple pendulum, Seconds pendulum	1	To apply the principles of S.H.M to particles and rigid bodies	Lecture with Illustration	Quiz and Test

Course Instructor   **Head of the Department**

Dr. S. Sujitha   **Dr. V. M. Arul Flower Mary**

Semester	: IV
Name of the Course	: Number Theory
Course code	: MC1763

No. of Hours per Week	Credits	Total No. of Hours	Marks
5	5	75	100

Objectives:

1. To introduce the fundamental principles and concepts in Number Theory
2. To apply these principles in other branches of Mathematics

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO - 1	express the concepts and results of divisibility of integers effectively	PSO - 1	U
CO - 2	construct mathematical proofs of theorems and find counter examples for false statements	PSO - 6	C
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 - 7	U
CO - 5	solve challenging problems related to Chinese remainder theorem effectively	PSO - 3	E
CO - 6	build up the basic theory of the integers from a list of axioms	PSO - 1	U
CO – 7	explore some current research problems in number theory	PSO - 2	C
CO – 8	apply Fermat's theorem and Wilsons theorem effectively	PSO - 8	Ap
CO – 9	use mathematical induction and other types of proof writing techniques	PSO - 1	Ap
CO- 10	understand and utilize mathematical functions and empirical principles and processes	PSO - 7	U

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

Unit	Section	Topics	Lecture hours	Learning Outcomes	Pedagogy	Assessment/ evaluation
I			**Divisibility Theory in the Integers**			
	1	Divisibility Theory in the Integers	3	To recall the fundamentals of divisibility theory in integers	Lecture through Google Meet	Online Quiz, Test
	2	The Division Algorithm	3	To understand the concept of division algorithm	Lecture through Google Meet	Online Quiz, Test
	3	The greatest common divisor	3	Practice the g.c.d is the largest integer that goes into all supplied numbers without a remainder	Lecture through Google Meet	Online Quiz
	4	Relatively prime integers, Linear combination	3	To study a theorem characterizes relatively prime integers in terms of linear combinations	Lecture through Google Meet	Online Test
	5	Eculid's Lemma	3	To understand the use of Euclid's Lemma	Lecture through Google Meet	Online Assignment
	6	The Euclidean Algorithm	3	To understand the efficient method for computing the g.c.d of integers	Lecture through Google Meet	Online Assignment, Quiz
II			**Diophantine Equation**			
	1	The Diophantine Equation $ax + by = c$	3	To understand the simplest type of linear Diophantine equation $ax + by = c$	Lecture through Google Meet	Online Test
	2	The solution of Diophantine equation	4	To determine all solutions in the positive integers of the Diophantine equation	Lecture through Google Meet	Online Assignment
	3	Primes and their distribution	4	To study the properties of primes	Lecture through Google Meet	Formative Assessment Online
	4	The fundamental theorem of arithmetic	4	To identify the uniqueness of the fundamental theorem of arithmetic	Lecture through Google Meet	Online Quiz, Test

	5	The Sieve of Eratosthenes	3	To calculate all prime numbers up to any given limit	Lecture through Google Meet	Online Quiz, Assignment
III		**The Theory of Congruences**				
	1	The Theory of Congruences	3	To understand basic concepts of congruences	Lecture through Google Meet	Online Test
	2	Basic properties of congruences	4	To practice the basic properties of congruences	Lecture through Google Meet	Online Quiz, Test
	3	Linear congruences and the Chinese remainder theorem.	4	To determine the solutions of the system of linear congruences	Lecture through Google Meet	Online Test
	4	The Chinese Remainder Theorem	4	To anlayze the Chinese remainder theorem which gives a unique solution to simultaneous linear congruences with coprime moduli	Lecture through Google Meet	Online Test
	5	The problem posted by Sun – Tsu	3	To find the solution of the system of three congruences	Lecture through Google Meet and Discussion	Online Assignment
IV		**Pseudoprimes**				
	1	Fermat's Little theorem and Pseudoprimes	4	To learn the concept of Fermat's Little theorm and Pseudo primes	Lecture through Google Meet and Discussion	Online Test
	2	Fermat's theorem	3	To use Fermat's theorem as a tool in testing the primality of a given integer n	Lecture through Google Meet and Discussion	Online Assignment
	3	Absolute pseudo primes	3	To understand absolute pseudo primes	Lecture through Google Meet	Online Quiz
	4	Wilson's theorem	4	To prove the Wilson's theorem and apply the concepts to problems	Lecture through Google Meet and Discussion	Online Test, Assignment

	5	Quadratic Congruence	4	To determine the solutions of quadratic congruence	Lecture through Google Meet	Online Slip Test
V		**Number Theoretic Functions**				
	1	Number Theoretic Functions	4	To understand the importance of Number Theoretic Functions	Lecture through Google Meet	Online Test
	2	The sum and number of divisors	3	To calculate the sum and number of divisors of a positive integer	Lecture through Google Meet	Formative Assessment Test
	3	The Mobius Inversion function	3	To understand the nature of Mobius inversion function	Lecture through Google Meet and Discussion	Online Test
	4	The Mobius Inversion formula	4	To construct the greatest integer function	Lecture through Google Meet	Online Assignment
	5	The greatest integer function	4	To find the greatest integer function for an arbitrary real number	Lecture through Google Meet	Online Quiz

Course Instructor

Ms. J. C. Mahizha

                                Head of the Department

                                Dr. V. M. Arul Flower Mary

Semester : IV

Name of the Course : Operations Research

Course code : MC1764

No. of Hours per Week	Credits	Total No. of Hours	Marks
5	5	75	100

Objectives:

1. To formulate real life problems into mathematical problems
2. To solve life oriented and decision making problems by optimizing the objective function

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO - 1	understand the origin and development of Operations Research	PSO - 1	U
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 time in transportation problem , Travelling salesman problem, Assignment problem	PSO - 3	Ap
CO - 5	identify a problem in your locality, formulate it as an LPP and solve	PSO - 4	C

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

Unit	Section	Topics	Lecture hours	Learning Outcomes	Pedagogy	Assessment/ evaluation
I		**Formulation of LPP, Graphical Method**				
	1	Introduction, origin and development of Operations Research, Nature and feature of Operations Research, Applications of Operations Research	2	Explain the development and applications of Operations Research	Lecture with Examples	Evaluation through discussions
	2	Formulation of LPP	3	To formulate linear programming problems	Lecture	Evaluation through discussions
	3	Mathematical formulation of LPP, Solution of LPP	3	To write the standard form of LPP and to find solutions	Lecture with Illustration	Slip Test
	4	Graphical Method	3	To solve LPP in graphical method	Lecture with PPT	Quiz and Test
II		**Simplex, Big-M, Two Phase Methods**				
	1	Simplex Method	3	To solve LPP by simplex method	Lecture with PPT	Evaluation through Test
	2	Big-M Method. Algorithm for Big-M Method	3	To solve LPP by Big-M Method	Lecture with PPT	Evaluation through Test
	3	Two phase method - Phase I: Solving auxiliary LPP using Simplex method	3	To solve LPP by Two Phase method	Lecture with PPT	Formative Assessment Test
	4	Phase II: finding optimal basic feasible solution	3	To find basic feasible solution byTwo Phase method- Phase II	Group Discussion	Home Assignment
III		**Duality**				
	1	Duality in L.P.P, Primal, Formation of dual L.P.P	3	To learn aboutduality in LPP	Lecture	Evaluation through discussions
	2	Matrix form of primal and its dual, Fundamental theorem of duality	3	To give matrix form of primal and its dual	Lecture with Illustration	Evaluation through discussions

	3	Dual Simplex Method, Dual Simplex Algorithm	3	To solve LPP by dual simplex method	Lecture	Formative Assessment Test
	4	Degeneracy and cycling in L.P.P.	3	To explain about cycling in L.P.P.	Group Discussion	Slip Test
IV		**Transportation Problems**
	1	Mathematical formulation of Transportation Problems	3	To formulate transportation problem	Lecture with PPT Illustration	Evaluation through discussions
	2	Dual of a Transportation Problem, Solution of a Transportation Problem, North-West corner rule	3	To solve Transportation Problems by North-West corner rule	Lecture and Group Discussion	Evaluation through Assignment
	3	Row minima method, Column minima method, Least Cost Method	3	To solve Transportation Problems by Row minima method, Column minima method, Least cost method	Lecture with Illustration	Formative Assessment Test
	4	Vogel's Approximation Method	3	To solve Transportation Problems by Vogel Approximation Method	Lecture	Home Assignment
V		**Assignment Problems**
	1	Assignment Problems, Mathematical formulationn	3	To explain Assignment Problems	Lecture with PPT Illustration	Evaluation through discussions
	2	Solution to Assignment Problems	3	To solve Assignment problems	Lecture with Illustration	Formative Assessment Test
	3	Hungarian Algorithm for solving Assignment Problem	3	To solve Assignment Problems by Hungarian method	Lecture with Illustration	Slip Test
	4	Travelling Salesman Problem	3	To solve the Travelling Salesman Problems	Lecture	Home Assignment

Course Instructor　　　　　　　　　　　　　　　　**Head of the Department**

Dr. J. Befija Minnie　　　　　　　　　　　　　　　**Dr. V. M. Arul Flower Mary**

Semester : VI

Name of the Course : Astronomy

Course code : MC1765

No. of Hours per Week	Credits	Total No. of Hours	Marks
6	5	90	100

Objectives:

1. To introduce space science and to familiarize the important features of the planets, sun, moon and stellar universe
2. To predict lunar and solar eclipses and study the seasonal changes

Course Outcomes

CO	Upon completion of this course the students will be able to	PSO Addressed	CL
CO - 1	define the spherical trigonometry of the celestial sphere	PSO - 1	U
CO - 2	discuss the Kepler's laws	PSO - 1	U
CO - 3	calculate the maximum and minimum number of eclipses near a node in a year	PSO - 2	Ap
CO -4	interpret latitude and longitude and apply this to find the latitude and longitude of a particular place	PSO - 4	E
CO - 5	distinguish between geometric parallax and horizontal parallax	PSO - 4	An

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

Unit	Section	Topics	Lecture Hours	Learning Outcomes	Pedagogy	Assessment/ Evaluation
I				**Celestial sphere**		
	1	Spherical trigonometry (only the four formulae), Introduction to Astronomy and definitions, Four systems of Celestial ordinates	3	To understand the definition of Astronomy and related terms	Lecture Illustration	Evaluation through slip test
	2	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	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 with Illustration	Evaluation through slip test
	3	The changes in the coordinates of the sun in the course of year. To find the longitude of the Sun on any day and Latitude of a place and related theorems	3	To trace the changes in the coordinates of the sun in the course of year. To find the longitude of the Sun on any day and Latitude of a place	Lecture with Illustration	Tesy
	4	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 at rising and to trace the changes in the Azimuth of a star in the course of a day	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 with Illustration	Quiz and Test
	5	Morning stars, Evening stars and circumpolar stars, to find the condition that a star is circumpolar	3	To identify morning stars, Evening stars and circumpolar stars and to find the condition that a star is circumpolar	Lecture with Illustration	Home Assignment and Test
II				**The Earth**		
	1	Introduction on the Zones of the earth	3	To understand about different zones of the Earth	Lecture	Slip Test

	2	Trace the variations in the durations of day and night during the year at different stations	4	To calculate the durations of day and night during the year at different stations	Lecture	Slip test
	3	Terrestrial latitude and longitude and phenomena depending on the change of latitudes and longitude	3	To identify the Terrestrial latitude and longitude	Lecture	Class Test
	4	Dip of Horizon and results	4	To construct problems based on dip of Horizon	Group Discussion	Slip Test
	5	Twilight, Duration of Twilight, Twilight throughout the night, Shortest Twilight.	4	To calculate the duration of Shortest Twilight	Group Discussion	Slip Test and Quiz
III	**Refraction**					
	1	Refraction, Laws of refraction and astronomical refraction	3	To classify the laws of refraction and astronomical refraction	Lecture with PPT Illustration	Quiz
	2	Tangent formula, Cassini's formula	3	To apply the tangent formula, Cassini's formula and calculate the amount of refraction	Lecture with Illustration	Test
	3	Refraction on Horizontal and Vertical arcs	3	To understand the refraction on horizontal and vertical arcs	Lecture	Test
	4	Parallax effect of geocentric parallax on right ascension and declination	3	To identify the parallax effect of geocentric parallax	Group Discussion	Formative Assessment Test
	5	Geocentric parallax and refraction	3	To identify the effects of geocentric parallax and refraction	Group Discussion	Slip Test
IV	**Kepler's Laws**					
	1	Kepler's laws -	3	To understand the Kepler's laws	Lecture Illustration	Quiz
	2	Eccentricity of Earth's orbit	3	To understand the Eccentricity of Earth's orbit	Lecture and Group Discussion	Slip Test

	3	Verification of Kepler's Laws	3	To verify Kepler's Laws and understand Newton's deductions from Kepler's laws	Lecture with Illustration	Test
	4	Newton's deductions from Kepler's Laws	3	To understand Newton's deductions from Kepler's laws	Lecture with Illustration	Test
	5	To derive Kepler's Third Law from Newton's law of Gravitation, To find the mass of a planet	3	To understand the Kepler's third law which is derived from Newton's law of gravitation	Lecture with Illustration	Test
V		**Eclipses**				
	1	Lunar Eclipse and Solar Eclipse	3	To identify lunar eclipse and solar eclipse	Lecture Illustration	Slip Test
	2	Condition for a Lunar Eclipse and Solar Eclipse	3	To understand the condition for a lunar eclipse and solar eclipse	Lecture with Illustration	Assignment
	3	Angular radius of the cross section of the shadow where the moon enters	3	To calculate the angular radius of the cross section of the shadow where the moon enters	Lecture with Illustration	Assignment
	4	Maximum and minimum number of eclipses near a node in a year	3	To calculate the maximum and minimum number of eclipses near a node in a year	Lecture with Illustration	Quiz and Test
	5	Duration of Lunar and Solar Eclipses	3	To understand the duration of Lunar and Solar Eclipses	Lecture with Illustration	Formative Assessment Test

Course Instructor   **Head of the Department**

Ms. T. Sheeba Helen   **Dr. V. M. Arul Flower Mary**