Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT101	Calculus I	(4,0,0)	4	6	Compulsory

Functions, limits and continuity. Derivatives. Rules of differentiation. Higher order derivatives. Chain rule. Related rates. Rolle's and the mean value theorem. Critical Points. Asymptotes. Curve sketching. Integrals. Fundamental Theorem. Techniques of integration. Definite integrals. Application to geometry and science. Indeterminate forms. L'Hospital's Rule.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT102	Calculus II	(4,0,0)	4	6	Compulsory

Sequences and Infinite Series; The integral test, comparison test, geometric series, ratio test, alternating series. Power series, Taylor series. Parametric equations and Polar coordinates. Functions of several variables, limits, continuity, partial derivatives, chain rule, extreme of functions of several variables. Multiple integrals: Double integrals, Area, volume, double integral in polar coordinates, surface area, triple integrals, spherical and cylindrical coordinates.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT103	Mathematics I	(3,0,0)	3	4	Compulsory

Functions, limits and continuity. Derivatives. Mean value theorem. Sketching graphs. Definite integrals, infinite integrals (antiderivatives). Logarithmic, exponential, trigonometric and inverse trigonometric functions and their derivatives. L'Hospital's rule. Techniques of integration. Applications of the definite integral, improper integrals.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT104	Mathematics II	(3,0,0)	3	4	Compulsory

Plane and polar co-ordinates, area in polar co-ordinates, arc length of curves. Limit, continuity and differentiability of function of several variables, extreme values, method of Lagrange multipliers. Double integral, triple integral with applications. Line integrals, Green's theorem. Sequences, infinite series, power series, Taylor's series. Complex numbers

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT112	Linear Algebra	(3,0,0)	3	5	Compulsory

System of linear equations: elementary row operations, echelon forms, Gaussian elimination method. Matrices: elementary matrices, invertible matrices. Determinants: adjoint and inverse matrices, Crammer's rule. Vector spaces: linear independents, basis, dimension. Linear mapping. Inner product spaces: Gram-Schmit ortogonalization. Eigenvalues and eigenvectors, Cayley-Hamilton theorem, diagonalization

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT151	Mathematics	(3,0,0)	3	4	Compulsory

Definition of mathematics, its relationship with other sciences, Sets and operations in sets, Establishing a number system, natural numbers, Numbers with different bases, integers, Divisibility rules, 'LCM' and 'EBOB' concepts and applications, Ratio, proportion, compound proportion concepts and applications, Real numbers, exponents and radical multiplicities, Cartesian product, correlation, equivalence and ordering relations, Functions, Graphical representation of functions, Discrete covers and chains, data collection, summarizing data, graphical representation, Measures of central tendency (mean, peak, median) , measures of distribution (range, absolute deviation, standard deviation).

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT201	Differential Equations	(4,0,0)	4	6	Compulsory

Ordinary and partial differential equations. Explicit solutions, Implicit Solution. First-order differential equations, separable, homogenous differential equations, exact differential equations. Ordinary linear differential equations. Bernoulli differential equations. Cauchy-differential equations. High-order ordinary differential equations. Introduction to Laplace transforms. Introduction to series method for solving differential equations

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT312	Probability and Statistical Methods	(3,0,0)	3	5	Compulsory

Definition of probability. Sample space and events. Permutations and combinations. Conditional probability and Bayers theorem. Random variables. Discrete and continuous distrubutions. Moment generating function. Expectation, variance, covariance and correlation. Condition densities and regression and transformation of variables. Descriptive statistics.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MAT281	Statistics	(3,0,0)	3	6	Compulsory

Frequency distributions and Graphing Frequency Distributions, Measures of Central Tendency, Measures of Dispersion and Skewness, Basic Concepts and Rules of Probability, Probability Distributions: Binomial, Poisson, Normal, and Chir-Square Distributions, Sampling Concepts, Sampling Distributions.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH101	Calculus I	(4,0,0)	4	6	Compulsory

Functions, limits and continuity. Derivatives. Rules of differentiation. Higher order derivatives. Chain rule. Related rates. Rolle's and the mean value theorem. Critical Points. Asymptotes. Curve sketching. Integrals. Fundamental Theorem. Techniques of integration. Definite integrals. Application to geometry and science. Indeterminate forms. L'Hospital's Rule.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH102	Calculus II	(4,0,0)	4	6	Compulsory

Sequences and Infinite Series; The integral test, comparison test, geometric series, ratio test, alternating series. Power series, Taylor series. Parametric equations and Polar coordinates. Functions of several variables, limits, continuity, partial derivatives, chain rule, extreme of functions of several variables. Multiple integrals: Double integrals, Area, volume, double integral in polar coordinates, surface area, triple integrals, spherical and cylindrical coordinates.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH112	Linear Algebra	(3,0,0)	3	5	Compulsory

System of linear equations: elementary row operations, echelon forms, Gaussian elimination method. Matrices: elementary matrices, invertible matrices. Determinants: adjoint and inverse matrices, Crammer's rule. Vector spaces: linear independents, basis, dimension. Linear mapping. Inner product spaces: Gram-Schmit ortogonalization. Eigenvalues and eigenvectors, Cayley-Hamilton theorem, diagonalization

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH201	Differential Equations	(4,0,0)	4	6	Compulsory

Ordinary and partial differential equations. Explicit solutions, Implicit Solution. First-order differential equations, separable, homogenous differential equations, exact differential equations. Ordinary linear differential equations. Bernoulli differential equations. Cauchy-differential equations. High-order ordinary

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course

differential equations. Introduction to Laplace transforms. Introduction to series method for solving differential equations

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH301	Numerical Analysis for Engineers	(3,0,0)	3	5	Compulsory

Approximations and errors. Accuracy and precision. Finite divided difference and numerical differentiation. Roots of equations, bracketing methods and open methods, systems of nonlinear equations. Systems of linear algebraic equations. Curve fitting, interpolation. Numerical integration. Ordinary differential equations.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH312	Probability and Statistical Methods	(3,0,0)	3	5	Compulsory

Definition of probability. Sample space and events. Permutations and combinations. Conditional probability and Bayers theorem. Random variables. Discrete and continuous distrubutions. Moment generating function. Expectation, variance, covariance and correlation. Condition densities and regression and transformation of variables. Descriptive statistics.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH171	Mathematics for Economics and Business I	(3,0,0)	3	6	Compulsory

Equations and inequalities and their applications, functions and graphs, lines, parabolas and systems and their applications, exponential and logarithmic functions, mathematics of finance.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH172	Mathematics for Economics and Business II	(3,0,0)	3	6	Compulsory

Matrices, Matrix Algebra, and Special Types of Matrices, Transpose of a Matrix, Determinant, and Inverse, Systems of Linear Equations, Crammer's Rule, and Row Echelon Form, Functions, Limits, and Continuity,

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course

Solving Problems, Derivative and Chain Rule, Product Rule, and Quotient Rule, Applications, Integration, Applications, Solving Problems.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH281	Statistics I	(3,0,0)	3	6	Compulsory

Frequency distributions and their graphs, measures of central tendency, measures of dispersion and skewness, basic concepts and rules of probability, probability distributions: Binomial, poisson, normal, and Chi-Square distributions, sampling concepts, sampling distributions.

Course Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
MTH282	Statistics II	(3,0,0)	3	6	Compulsory

Summary of discrete distributions, summary of continuous distributions, descriptive statistics, point estimation, interval estimation and the control limit theory, inferences in the mean and variance of a distribution, inferences on proportions, comparing two means and two variances, simple linear regression.