

BSc. MATHEMATICS

**PROGRAMME AND
COURSE OUTCOMES**

BSc. Mathematics

Programme Outcomes

PO1	Acquires knowledge in functional areas of Mathematics and apply in all the fields of learning
PO2	Equips the student with skills to analyse problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
PO3	Employs mathematical ideas encompassing logical reasoning, analytical, numerical ability, theoretical skills to model real-world problems and solve them
PO4	Develops critical thinking, creative thinking, self-confidence for eventual success in career
PO5	Analyse, interpret solutions and to enhance their Entrepreneurial skills, Managerial skill and leadership
PO6	Recognizes the need for lifelong learning and demonstrate the ability to explore some mathematical content independently
PO7	To prepare the students to communicate mathematical ideas effectively and develop their ability to collaborate both intellectually and creatively in diverse contexts
PO8	Imbibes effective scientific and/or technical communication in both oral and writing
PO9	Continues to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences

Course Outcomes

Semester 1

COURSE TYPE	LANGUAGE COURSE I
COURSE NAME	LANGUAGE SKILLS
COURSE CODE	EN111.1
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Master the language for personal and professional growth.
CO2	Acquire basic language skills through interactive classroom sessions.
CO3	Connect language with literature.

COURSE TYPE	ADDITIONAL LANGUAGE I
COURSE NAME	MALAYALAM POETRY
COURSE CODE	ML 1111.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Gaining an awareness of the historical development of Malayalam poetry.
CO2	The poetic taste and interest in poetry is developed.
CO3	A finer understanding of poetic elements emerges.
CO4	Ability to critically analyse poems.
CO5	Comparatively defining writing poems.
CO6	Preparing a poetry review.

COURSE TYPE	LANGUAGE COURSE I
COURSE NAME	HINDI KAHANI SAHITYA
COURSE CODE	HN 1111.1
CREDIT	3
HOURS	4

COURSE OUTCOMES	
CO1	Recollect the main works of the representative story writers
CO2	Understand the craft of the different story writers
CO3	Analyse and evaluate the works of the story writers they studied
CO4	Understand how the resource language is used as a medium in creative writing

COURSE TYPE	LANGUAGE COURSE I
COURSE NAME	GRAMMAR, COMMUNICATION, POETRY, HISTORY OF SYRIAC LITERATURE
COURSE CODE	SR 1111.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	To communicate effectively
CO2	Understand the craft of constructing conversations
CO3	Articulation and expression of ideas
CO4	Understand and assimilate ideas in a text

COURSE TYPE	FOUNDATION COURSE I
COURSE NAME	WRITINGS ON CONTEMPORARY ISSUES
COURSE CODE	EN1121
CREDIT	2
HOURS	4
COURSE OUTCOMES	
CO1	Sensitize students to the major issues in the society and the world.
CO2	Introduce and provide varied perspectives on contemporary issues.
CO3	Encourage critical and analytical skill.

COURSE TYPE	CORE COURSE I
COURSE NAME	METHODS OF MATHEMATICS
COURSE CODE	MM 1141
CREDIT	4
HOURS	4
COURSE OUTCOMES	

CO1	Define maxima, minima, critical points and points of inflection.
CO2	Apply the concept of differentiation in real life situation
CO3	Explain logic and various proof techniques
CO4	Illustrate decomposition of an integer into prime factors

COURSE TYPE	I COMPLEMENTARY COURSE I
COURSE NAME	DESCRIPTIVE STATISTICS AND BIVARIATE ANALYSIS
COURSE CODE	ST 1131.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Explains the concepts of statistical survey, sampling, census and various sampling methods like SRS, systematic sampling, stratified sampling
CO2	Design questionnaire and carry out surveys
CO3	Collect and present raw data using frequency tables as well as appropriate graphs
CO4	Summarize data using various measures of central tendency, dispersion, skewness and kurtosis
CO5	Explain the concepts of scatter diagram, correlation and calculate the correlation between two variables
CO6	Explain the concepts of regression, fit various regression equations to give data sets and predict values of response variables

COURSE TYPE	II COMPLEMENTARY COURSE I
COURSE NAME	MECHANICS AND PROPERTIES OF MATTER
COURSE CODE	PY 113.1
CREDIT	2
HOURS	4
COURSE OUTCOMES	
CO1	Recognizes the dynamics of rigid bodies of different shapes and their applications.
CO2	Understands the basics of simple harmonic motion and mechanical waves and their applications.

CO3	Understands the concepts of moduli of elasticity and applications
CO4	Explains the properties of fluids such as surface tension and viscosity and their applications with examples.

Semester 2

COURSE TYPE	LANGUAGE COURSE III
COURSE NAME	ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT
COURSE CODE	EN1121.1
CREDIT	5
HOURS	5
COURSE OUTCOMES	
CO1	Engage with a wide range of issues in environmental studies and disaster management.
CO2	Acquire values for environmental protection and conservation.
CO3	Recognise the ecological basis for regional and global environmental issues
CO4	Manage natural disasters and other emergency situations
CO5	Develop a critical vocabulary related to environmental studies and disaster management.

COURSE TYPE	LANGUAGE COURSE IV
COURSE NAME	ENGLISH GRAMMAR USAGE AND WRITING
COURSE CODE	EN1212.1
CREDIT	4
HOURS	4
COURSE OUTCOMES	
CO1	Acquire good understanding of modern English grammar.
CO2	Write grammatically and idiomatically correct language.
CO3	Improve verbal communication skill.
CO4	Minimize mother tongue influence.

COURSE TYPE	LANGUAGE COURSE V
SEMESTER	II
COURSE NAME	LITERATURE OF PROSE
COURSE CODE	ML 1211.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Enables general awareness of major literary forms in Malayalam prose.

CO2	Researching and analysing the evolution of prose forms.
CO3	The imaginative ability to analyse texts is developed.
CO4	Comparatively observes the writing style of the writers.
CO5	Critical studies are prepared by analysing the content, language, socio-political perspective and aesthetic level of the writings.

COURSE TYPE	LANGUAGE COURSE V
COURSE NAME	KATHETAR HIDI GADYA VIDHAAYEIN
COURSE CODE	HN 1211.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Recollect the main works of the prescribed writers
CO2	Understand the forms of various prose writing in Hindi
CO3	Analyses & evaluate the prose forms prescribed, with respect to the craft and the relevance

COURSE TYPE	LANGUAGE COURSE V
COURSE NAME	GRAMMAR, COMMUNICATION, POETRY, HISTORY OF SYRIAC LITERATURE
COURSE CODE	SR 1211.1
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	To enrich vocabulary and conversational articulation
CO2	Understand the forms of various genres of writings in Syriac
CO3	Analyse and evaluate the of history of Syriac literature

COURSE TYPE	FOUNDATION COURSE II
COURSE NAME	Foundations of Mathematics
COURSE CODE	MM 1221
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Describes the integration of a function and learn its physical

	interpretation through various examples
CO2	Demonstrates various applications of integration
CO3	Computes tangent lines to polar curves, arc length and area
CO4	Sketches conic sections such as parabola, ellipse and Hyperbola
CO5	Distinguishes the cylindrical and spherical coordinate systems

COURSE TYPE	I COMPLEMENTARY COURSE II
COURSE NAME	PROBABILITY AND RANDOM VARIABLES
COURSE CODE	ST 1231.1
CREDIT	2
HOURS	4
COURSE OUTCOMES	
CO1	Distinguishes between random and non-random experiments
CO2	Evaluate the probabilities of events using classical, statistical and axiomatic approaches
CO3	Identify independent events, calculate conditional probability and application of Bayes theorem
CO4	Distinguish between discrete and continuous random variables with its probability distributions
CO5	Assess the independence of random variables
CO6	Calculate mgf and characteristic function

COURSE TYPE	II COMPLEMENTARY COURSE II
COURSE NAME	THERMAL PHYSICS AND STATISTICAL MECHANICS
COURSE CODE	PY 1231.1
CREDIT	2
HOURS	4
COURSE OUTCOMES	
CO1	Distinguish the various process of heat transmission
CO2	Recognize the different thermodynamic processes
CO3	Recognize the difference of petrol and diesel engines
CO4	Obtain the concept of entropy and apply it to physical situations
CO5	Identify different statistical distribution

Semester 3

COURSE TYPE	LANGUAGE COURSE VI
COURSE NAME	ENGLISH FOR CAREER
COURSE CODE	EN1311.1
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Introduce students to the language skills required for appearing in career oriented competitive examinations.
CO2	Develop cognitive, logical, verbal and analytical skills necessary to succeed in competitive examinations.
CO3	Provide the pattern of questions based on common models of competitive tests.
CO4	Help students to prepare for and appear in competitive examinations.

COURSE TYPE	LANGUAGE COURSE VII
COURSE NAME	LANGUAGE AWARENESS AND CREATIVITY
COURSE CODE	ML 1311.1
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Understanding the usage patterns of Malayalam language.
CO2	Acquiring the skill to use language correctly.
CO3	Gaining proficiency in elementary grammar lessons and self-assessment.
CO4	Gaining practical training in translation and conducting and evaluating translation essays.
CO5	Gaining insight into the creative lives of writers and observing them comparatively.
CO6	Creating new compositions.

COURSE TYPE	LANGUAGE COURSE VII
COURSE NAME	HINDI KAVITA SAAHITYA
COURSE CODE	HN 1311.1
CREDIT	4
HOURS	5

COURSE OUTCOMES	
CO1	Appreciates ancient and modern Hindi poems.
CO2	Critically evaluates the contribution of Ancient and modern poets to the development of Hindi poetry
CO3	Elucidates key lines of poetry with reference to context.

COURSE TYPE	LANGUAGE COURSE VII
COURSE NAME	GRAMMAR, COMMUNICATION, PROSE, HISTORY OF SYRIAC PEOPLE IN INDIA
COURSE CODE	SR 1311.1
CREDIT	3
HOURS	5
COURSE OUTCOMES	
CO1	To develop LSRW skills.
CO2	Critically evaluate the aesthetics of literature
CO3	Understands how past influences the present

COURSE TYPE	CORE COURSE II
COURSE NAME	Elementary Number Theory and Calculus – I
COURSE CODE	MM 1341
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Explain the concept of congruence
CO2	Analyse linear system of congruence equations
CO3	Define the concept of limit, continuity, derivative of vector valued functions
CO4	Illustrate various applications of multivariable calculus

COURSE TYPE	I COMPLEMENTARY COURSE III
COURSE NAME	Statistical Distributions
COURSE CODE	ST 1331.1
CREDIT	3
HOURS	5
COURSE OUTCOMES	
CO1	Define various discrete and continuous standard distributions and explain their theoretical properties

CO2	Solve numerical problems associated with discrete and continuous standard distributions
CO3	Fit binomial, Poisson and normal distributions to data sets and calculate theoretical frequencies
CO4	Explain the laws of large numbers and apply them to solve numerical problems
CO5	Define sampling distributions (normal, Chi-square, Students t and F) and solve numerical problems

COURSE TYPE	II COMPLEMENTARY COURSE III
COURSE NAME	OPTICS MAGNETISM AND ELECTRICITY
COURSE CODE	PY 1331.1
CREDIT	3
HOURS	5
COURSE OUTCOMES	
CO1	Differentiate the optical phenomena - interference and diffraction
CO2	Explain the principle behind the experiments -Newton's rings, air wedge and diffraction grating
CO3	Understand the working and application of laser in the field of Fiber Optics
CO4	Distinguish different magnetic materials
CO5	Attain knowledge about the theory of magnetism
CO6	Explain the production of ac and its characteristics and also about ac circuits

Semester 4

COURSE TYPE	LANGUAGE COURSE VIII
COURSE NAME	READINGS IN LITERATURE
COURSE CODE	EN 141.11
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Familiarize with various forms of travel writing.
CO2	Able to effectively produce content using them.
CO3	Acquire language proficiency for professional opportunities and academic settings related to Travel and Tourism.

COURSE TYPE	LANGUAGE COURSE IX
COURSE NAME	LITERATURE OF VISUAL ARTS
COURSE CODE	ML 1411.1
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Discovers and describes the richness and diversity of Kerala's visual arts.
CO2	Examining the evolution from composition to practice.
CO3	Kathakali, OttanTullal, Drama and Cinema art forms and the literary works based on them are evaluated together.
CO4	Critically enjoying the visual arts.
CO5	Writing Plays and Screen plays.
CO6	Leads the creative expression of arts such as acting, screen play writing, Play writing

COURSE TYPE	LANGUAGE COURSE IX
COURSE NAME	HINDI KAVITA SAAHITYA
COURSE CODE	HN 1411.1
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Appreciate and evaluate one act plays with respect to craft and subject.
CO2	Understand the correct usages in Hindi and write grammatically correct sentences in Hindi.

CO3	Define parts of speech and identify the parts of speech in a given sentence.
CO4	Translate simple passages from English to Hindi.

COURSE TYPE	LANGUAGE COURSE IX
COURSE NAME	GRAMMAR, COMMUNICATION, PROSE, HISTORY OF SYRIAC PEOPLE IN INDIA
COURSE CODE	SR 1411.1
CREDIT	3
HOURS	5
COURSE OUTCOMES	
CO1	Enhance integral development through effective communication
CO2	Understand the correct usages in Syriac and write grammatically correct sentences.
CO3	Develop imagination by comprehending the aesthetics of literature.
CO4	To apply historical knowledge in solving present problems

COURSE TYPE	CORE COURSE IV
COURSE NAME	ELEMENTARY NUMBER THEORY AND CALCULUS – II
COURSE CODE	MM 1441
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Define the concepts of Matrix operations their algebraic properties, System of linear operations and their Matrix representation, Gauss- Jordan Elimination
CO2	Describe the concepts of Multiple integrals
CO3	Apply double and triple integrals to solve real life problems
CO4	Describe the concepts potential functions, line integrals and surface integrals

COURSE TYPE	I COMPLEMENTARY COURSE IV
COURSE NAME	Statistical Inference
COURSE CODE	ST 1431.1
CREDIT	3
HOURS	5

COURSE OUTCOMES	
CO1	Analyse a sample to draw valid inferences about the parameters of a statistical population
CO2	Explain the properties of estimators and solve numerical problems for the point and interval estimation of the parameters.
CO3	Explain the concept of testing statistical hypothesis
CO4	Identify two types of errors, compute level of significance and power of test
CO5	Conduct tests for hypothesis about the population mean and proportion using large samples
CO6	Conduct test for hypothesis about the homogeneity and independence using Chi-square statistic. Carry out and interpret ANOVA

COURSE TYPE	II COMPLEMENTARY COURSE IV
COURSE NAME	MODERN PHYSICS AND ELECTRONICS
COURSE CODE	PY 1431.1
CREDIT	3
HOURS	5
COURSE OUTCOMES	
CO1	Recognize different atomic models
CO2	Identify radioactive process and its applications
CO3	Understand the concepts Quantum Mechanics, Planck's hypothesis and applications
CO4	Obtain the theoretical concept of working of various electronic circuits
CO5	Obtain the knowledge about basics of Digital electronics and its applications

COURSE TYPE	I COMPLEMENTARY COURSE V
COURSE NAME	Practical Using R
COURSE CODE	ST 1432.1
CREDIT	4
HOURS	5
COURSE OUTCOME	
CO1	Use R built in functions to solve numerical problems associated with topics covered in various semesters

Semester 5

COURSE TYPE	CORE COURSE VI
COURSE NAME	REAL ANALYSIS I
COURSE CODE	MM 1541
CREDIT	4
HOURS	5
COURSE OUTCOMES	
CO1	Understands the fundamental properties of Real Numbers that corroborate the formal development of Real Analysis
CO2	Demonstrates and understand the theory of real sequences and series
CO3	Ability to check the convergence or divergence of different sequences and series
CO4	Understands and performs simple proofs
CO5	understands the concepts related to limit of functions

COURSE TYPE	CORE COURSE V
COURSE NAME	COMPLEX ANALYSIS I
COURSE CODE	MM 1542
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Understands the algebraic operations of complex numbers, complex functions
CO2	Understands the limits, continuity and differentiability of complex functions
CO3	Analyses analytic function and other elementary functions
CO4	Applies contour integration, Cauchy's theorem and Cauchy's integral formula

COURSE TYPE	CORE COURSE VI
COURSE NAME	ABSTRACT ALGEBRA- GROUP THEORY
COURSE CODE	MM 1543
CREDIT	4
HOURS	5
COURSE OUTCOMES	

CO1	Applies algebraic way of thinking
CO2	Examines abstractly about algebraic structures
CO3	Analyses a given structure in detail
CO4	Compares structures

COURSE TYPE	CORE COURSE VII
COURSE NAME	DIFFERENTIAL EQUATIONS
COURSE CODE	MM 1544
CREDIT	3
HOURS	3
COURSE OUTCOMES	
CO1	Solves linear first order ordinary differential equations
CO2	Solves homogeneous and non homogeneous linear differential equations with constant coefficients

COURSE TYPE	CORE COURSE VIII
COURSE NAME	MATHEMATICS SOFTWARE – LATEX & SAGEMATH
COURSE CODE	MM 1545
CREDIT	4
HOURS	4
COURSE OUTCOME	
CO1	Knows the basics of typesetting an article for a scientific publication
CO2	Typeset mathematical expressions in a LATEX document
CO3	Understands the basics of making a slideshow presentation using Beamer

COURSE TYPE	OPEN COURSE
COURSE NAME	BUSINESS MATHEMATICS
COURSE CODE	MM 1551.2
CREDIT	2
HOURS	3
COURSE OUTCOME	
CO1	Develops ability to solve problems related to simple and compound interest which would help the students while appearing for competitive examinations

CO2	Develops the skill to mathematically formulate the problems of business and economics and solving them using the techniques of calculus
CO3	Gets introduced to the concepts of index numbers and its use in business and economics
CO4	Gets aware of the significance of time series analysis in various realms of economics and business
	Develops ability to solve problems related to simple and compound interest which would help the students while appearing for competitive examinations

COURSE TYPE	PROJECT/DISSERTATION
COURSE NAME	PROJECT/DISSERTATION
COURSE CODE	MM 1646
CREDIT	4
HOURS	1
COURSE OUTCOMES	
CO1	Gains knowledge on a topic of choice.
CO2	Research and analyse the content or matter.
CO3	Assimilate and present the matter in specific model.

Semester 6

COURSE TYPE	CORE COURSE IX
COURSE NAME	REAL ANALYSIS II
COURSE CODE	MM 1641
CREDIT	4
HOURS	5
COURSE OUTCOME	
CO1	Understands the concepts of continuity, differentiability and integrability, more rigorously
CO2	Understands the fundamental properties of continuous functions on intervals
CO3	Understands the basic theory of derivatives
CO4	Gets an exposure to the theory behind the integration

COURSE TYPE	CORE COURSE X
COURSE NAME	COMPLEX ANALYSIS II
COURSE CODE	MM 1642
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Understand Sequence, Series and power series representation of complex functions
CO2	Understand singular points, zeroes and residue of complex functions
CO3	Apply Taylor's series, Laurent series and Residue theorem
CO4	Understand conformal mapping, Linear fractional transformation and cross- ratio

COURSE TYPE	CORE COURSE XI
COURSE NAME	ABSTRACT ALGEBRA - RING THEORY
COURSE CODE	MM 1643
CREDIT	3
HOURS	4
COURSE OUTCOMES	
CO1	Construct substructures

CO2	Understands and proves fundamental results and solve algebraic problems using appropriate techniques
CO3	Demonstrates insight into abstract algebra with focus on algebraic theories
CO4	Develops new structures based on given structures

COURSE TYPE	CORE COURSE XII
COURSE NAME	CORE COURSE 6
COURSE CODE	INTEGRAL EQUATIONS
CREDIT	MM 1644
HOURS	4
COURSE OUTCOME	
CO1	Categorises and solves different integral equations using various techniques
CO2	Enables to apply Laplace Transforms to various industry related and applied problems
CO3	Analyses the properties of certain functions using Fourier series
CO4	Analyses the nature of New Social Movements in Kerala and the underlying reasons for its emergence.

COURSE TYPE	ELECTIVE COURSE
COURSE NAME	GRAPH THEORY
COURSE CODE	MM 1661.1
CREDIT	2
HOURS	3
COURSE OUTCOMES	
CO1	To define and understand the fundamental concepts of graph theory
CO2	To apply the concepts and theorems that are treated in the course for problem solving and proofs
CO3	To write combinatorial proofs , including those using basic graph theory proof techniques such as minimal counter examples, double counting and mathematical induction

COURSE TYPE	PROJECT/DISSERTATION
COURSE NAME	PROJECT/DISSERTATION
COURSE CODE	PS 1645
CREDIT	3

HOURS	3
COURSE OUTCOMES	
CO1	To inculcate proficiency to identify appropriate research topics and presentation
CO2	Research and analyse the content or matter.
CO3	Assimilate and present the matter in specific model.