

DEPARTMENT OF MATHEMATICS (Postgraduate and Research)

MAHARAJA'S COLLEGE, ERNAKULAM

B.Sc. MATHEMATICS (CBCS)

PROGRAMME OUTCOMES

After successfully completing any three-year under graduate program, a student is expected to achieve the following attributes.

1. **Scientific temper and critical thinking.** Mind-set which enables one to follow a way of life that focuses upon the scientific method of understanding reality and the capability to think rationally and reflectively.
2. **Inclusiveness.** Constant exposure to and interaction with disparate social strata for an inclusive mind-set, ethical sensibility and greater social sensitivity and empathy.
3. **Democratic practice and secular outlook.** As envisioned by the Constitution of India.
4. **Sense of equality, equity and environment.** Ability to differentiate between pure equality, social equity and a heightened awareness of how humans dialectically interact with environment.
5. **Synergetic work culture.** Capacity to work in groups and the attitude to consider larger goals greater than personal ones.
6. **Emancipatory and transformative ideals.** Attainment of cherished ideals of education for the eventual empowerment of humanity.

PROGRAMME SPECIFIC OUTCOMES

On Successful completion of this course, students will

1. get the strong base of different areas of Mathematics and to apply those ideas in other disciplines and also in daily life to a certain extent.
2. develop an analytic mind and assists in better organization of ideas and accurate expression of thoughts.
3. be able to understand the world around them with mathematical models of natural phenomena, of human behaviour and of social systems.
4. be able to think critically.




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COURSE OUTCOME

Semester I

MATHEMATICS (CORE COURSE 1)

MAT1COR01-FOUNDATION OF MATHEMATICS

Learner is able to

- Introduce the fundamental ideas of limits
- Conceive the concept of equations and its roots
- To get an idea of complex numbers, hyperbolic functions and basic Number Theory

Semester II

MATHEMATICS (CORE COURSE 2)

MAT2COR02-ANALYTIC GEOMETRY AND MATRICES

Learner is able to

- Understand more ideas of conics
- Get an idea of rank of matrices , Characteristic roots and characteristic vectors

Semester III

MATHEMATICS (CORE COURSE 3)

MAT3COR03-CALCULUS

Learner is able to

- expand a function using Taylor's and Maclaurin's series.
- understand partial derivatives and its applications
- understand vector valued functions.
- calculate the area under a given curve, length of an arc of a curve when the equations are given in parametric and polar form.
- estimate the surface area and volume of solids.

Semester IV


MATHEMATICS (CORE COURSE 4)

MAT4COR04-INTEGRAL CALCULUS, THEORY OF NUMBERS AND FOURIER SERIES

Learner is able to

- apply Vector integration in physical problems
- explain the fundamental ideas of limits
- conceive the concept of equation and its roots.




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Semester V

MATHEMATICS (CORE COURSE 5)

MAT5COR 05-MATHEMATICAL ANALYSIS

- Understand and use Archimedean property and Completeness property of \mathbb{R} .
- Apply the concept of limit of sequences and convergence of infinite Series.
- Understand and apply the concept of limits of functions

MATHEMATICS (CORE COURSE 6)

MAT5COR06-DIFFERENTIAL EQUATIONS

- Analyse types of Differential equation
- Able to solve Differential equation using different methods

MATHEMATICS (CORE COURSE 7)

MAT5COR07-ABSTRACT ALGEBRA

- understand the concepts of groups.
- explains the concept cyclic group and isomorphism.
- explains the concept homomorphism and integral domain.

MATHEMATICS (CORE COURSE)

MAT5COR08- HUMAN RIGHTS AND MATHEMATICS FOR ENVIRONMENTAL STUDIES

- 1.Environmental Education encourages their own decisions about complex environmental issues by developing and enhancing critical and creative thinking skills. It helps to foster a new generation of informed consumers, workers, as well as policy or decision makers.
2. Develops the sense of awareness among the students about the environment and its various problems and to help the students in realizing the inter-relationship between man and environment for protecting the nature and natural resources.
- 3.Helps the students in acquiring the basic knowledge about environment.



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Semester VI

MATHEMATICS (CORE COURSE 9)

MAT6COR09-REAL ANALYSIS

- Identify continuous functions and uniform continuity.
- Apply Mean value theorem and Taylors theorem
- Understand the concept of Riemann integration and uniform convergence of sequence and series of functions.

MATHEMATICS (CORE COURSE 10)

MAT6COR10-COMPLEX ANALYSIS

- Conceive the concept of analytic functions and will be familiar with the elementary complex functions and their properties
- Familiarize theory and techniques of complex integration

MATHEMATICS (CORE COURSE 11)

MAT6COR11- TRANSFORMS AND SPECIAL FUNCTIONS

- Familiarize different type of transforms
- Able to solve equations using transform
- Familiarize some special functions

MATHEMATICS (CORE COURSE)

MAT6COR12-LINEAR ALGEBRA

- familiarize the concepts of basis and dimension of the Vector spaces
- understand Linear Transformations

MATHEMATICS (CHOICE BASED PAPER -I)

MAT5CBP01 - NUMERICAL ANALYSIS

- Use numerical methods to find missing values of data.
- Solve differential equation using numerical methods.
- Apply numerical methods to solve linear algebra
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MATHEMATICS (CHOICE BASED PAPER -II)

MAT6CBP02-OPERATIONS RESEARCH

- convert a given real problem to LPP
- identify a feasible solution, a basic feasible solution, and an optimal solution using simplex method.
- identify the Transportation Problem and formulate it as an LPP and hence solve the problem
- analyze that an Assignment problem is a special case of LPP and hence solve by Hungarian method.

(COMPLEMENTARY COURSE TO PHYSICS/CHEMISTRY)

FIRST SEMESTER

MAT1CMP01-DIFFERENTIAL CALCULUS, TRIGNOMETRY AND MATRICES

- Explain existence and fundamentals of limits and applications
- able to obtain the derivatives of functions and apply it in appropriate situations.
- Get the relation between circular and hyperbolic function.
- Use Matrices in solving system of equations

SECOND SEMESTER

MAT2CMP01-APPLICATIONS OF INTEGRAL, PARTIAL DERIVATIVES AND ANALYTIC GEOMETRY

- Apply integrals for finding area, volume etc
- Get the idea of conic section

THIRD SEMESTER

MAT3CMP01-VECTOR CALCULUS, ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

- Students will be able to solve first order differential equation using the standard techniques for separable, exact, linear, homogenous or Bernoulli cases.
- Students will have the working knowledge of solving a differential equation and connecting that with the some real life applications

FOURTH SEMESTER

MAT4CMP01-FOURIER SERIES, LAPLACE TRANSFORM, COMPLEX NUMBERS AND NUMERICAL METHODS

- Able to find the Fourier series of functions
- Able to transform the functions
- Handle numerical problem
- Get the basic idea of complex numbers




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MATHEMATICS (COMPLEMENTARY COURSE TO ECONOMICS)

THIRD SEMESTER

MAT3CME01-GRAPHING FUNCTIONS, EQUATIONS AND LINEAR ALGEBRA

- Draw Graphs of linear equations
- Use system of equations in business and economics
- Solve system of equations using matrices

FOURTH SEMESTER

MAT4CME02- CALCULUS, EXPONENTIAL AND LOGARITHMIC FUNCTIONS

- Use derivative and integrals in concepts in Economics
- Solve optimization problem

B.A.(HONOURS)DEGREE PROGRAMME

SEMESTER I, CORE IV

ECH1COR04- MATHEMATICS IN ECONOMICS I (HONOURS)

1. to study basics of Set theory and properties with illustrations
2. Understand the concept of limit of a function and derivative with problems.
3. Solve linear system of equations using matrices and determinants.

SEMESTER II, CORE IV

ECH2COR08- MATHEMATICS IN ECONOMICS II (HONOURS)

1. Understand the idea of multivariable functions and partial derivatives and properties.
2. Obtain Maxima and minima of two variable functions using partial derivatives.
3. Obtain Rank, Eigen values and eigen vectors of a matrix and properties.




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