



Fatima College

(Autonomous)

Re-Accredited with 'A++'(CGPA 3.61) by NAAC (Cycle- IV)

College with Potential for Excellence (2004 - 2019)

101 - 150 Rank Band in India Ranking 2021 (NIRF)

Mary Land, Madurai - 625018, Tamil Nadu.



FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

2020 – 2021

CRITERION 1 - CURRICULAR ASPECTS

1.1.1 Curricula developed and implemented have relevance to the local, national, regional and global developmental needs which is reflected in Programme outcomes (POs), Programme specific outcomes (PSOs) and Course Outcomes (COs), of the Programmes offered by the Institution.

NAME OF THE PROGRAMME: B.SC. MATHEMATICS

PROGRAMME CODE: UAMA

PROGRAMME OUTCOMES:

The learners will be able to

- PO1:** Apply mathematical concepts to concrete and abstract problems and draw logical conclusions using the logic and inductive and deductive reasoning.
- PO2:** Mathematical concepts are used in environmental issues such as population growth, wastefulness, resource scarcity, air and water pollution and electrical energy demand.
- PO3:** The course strives to encourage women to study higher Mathematics, promote excellent women students and support their academic careers.



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PO4: Mathematics is a subject which is exact, real, original and precise and one who studies Mathematics needs to follow the laws and rules. Thus, Mathematics helps the people to be cultured citizens having sound morals.

PO5: Explore employment in fields such as information technology, corporate sector, banking sector, public sector and service sector utilizing their mathematical knowledge

PROGRAMME SPECIFIC OUTCOMES:

PSO 1: Gain broad knowledge and understanding in pure Mathematics and applications of Mathematics.

PSO 2: Demonstrate a computational ability and apply logical thinking skills to solve problems that can be modelled Mathematically.

PSO 3: Read, understand, analyse and formulate Mathematical theorems.

PSO 4: Acquire proficiency in the use of technology to assist in learning and investigating, Mathematical ideas and in problem solving.

PSO 5: Communicate Mathematical concepts accurately, precisely and effectively with clarity and coherence both verbal and in written form.



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COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL /REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OUTCOMES
19M1CC1/ 19G1CC1	Calculus	National	This course provides broad view on differential and integral calculus.	CO1: Explain higher derivatives and apply Leibnitz theorem to find the nth derivative of functions. CO2: Solve problems on curvature, envelopes, asymptotes and curve tracing. CO3: Construct reduction formula for trigonometric functions. CO4: Define Jacobian, double & triple integrals and apply the knowledge of change of variables to solve the



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				problems in double and triple integrals. CO5: Construct Fourier series by recalling integration.
19M1CC2/ 19GICC2	Classical Algebra	National	This course is designed to understand the concepts of algebra which are useful for solving various real word problems.	CO1: Explain sets, relations and functions CO2: Define binomial series, logarithmic and exponential series and solve problems. CO3: Identify Relations between the roots and coefficients of equations. CO4: Explain the transformations of equations. CO5: Recognize the important Methods in finding roots.



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19M1AC1/ 19G1AC1	Statistics	National	This course is designed to make students understand the importance of statistical literacy in today's data rich world.	CO1: Solve problems on moments, skewness, kurtosis and correlation. CO2: Construct regression line and curve equation. CO3: Explain random variables and probability density function CO4: Solve problems on expectation. CO5: Define and explain analysis of time series and index numbers.
19P1ACM1	Allied Mathematics -I	Local	This course provides the basic concepts in	CO 1: Find summation of any series.



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			various branches of Mathematics	CO 2: Explain the concepts of theory of equations. CO 3: Calculate roots of equations using different methods. CO 4: Expand trigonometric functions CO 5: Apply the Leibnitz's theorem to find the nth derivative
19M1NME/ 19M2NME	Quantitative Aptitude	National	This course is designed to help the students to appear in competitive examinations.	CO1: Solve problems on ages CO2: Illustrate profit and loss with examples CO3: Explain partnership and related problems CO4: Discuss problems on time and work



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				CO5: Solve problems on time and distance
19M2CC3/ 19G2CC3	Differential Equations	National	This course will provide the knowledge for solving ordinary and partial differential equations	<p>CO 1: Solve problems in differential equations of first order.</p> <p>CO 2: Classify homogeneous and Non homogeneous differential equations of second order and solve problems.</p> <p>CO 3: Solve differential equation problems using Laplace transform.</p> <p>CO 4: Define Partial differential equations and solve problems.</p> <p>CO 5: Solve problems on Growth, decay and chemical reactions</p>



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19M2CC4/ 19G2CC4	Numerical Methods	National	This course enables the students to solve equations using various Numerical Methods	CO1: Solve algebraic and transcendental equations using various methods. CO2: Identify the various methods of solving simultaneous linear algebraic equations. CO3: Recognize difference operators and apply the concept of interpolation. CO4: Compute the values of the derivatives at some point using numerical differentiation and integration. CO5: Solve problems on higher order differential equations using Euler's, Runge- kutta
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				and Predictor Corrector methods.
19M2AC2/ 19G2AC2	Advanced Statistics	National	This course provides a strong background in statistical tools which will be used in various physical and social sciences.	CO1: Classify discrete and continuous random variables and characteristics of Binomial distribution and Poisson distribution CO2: Explain and illustrate the properties of Normal distribution and solve variety of problems. CO3: Distinguish between a population and a sample and explain testing of hypothesis. CO4: Explain chi square distribution, distribution and



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				describe their various applications is Statistics. CO5: Define F- distribution and apply it to solve problems in analysis of variance
19P2ACM2	Allied Mathematics - II	Local	This course provides the fundamentals concepts in various branches of Mathematics	CO 1: Solve linear differential equations. CO 2: Solve second order linear differential equations with variable coefficient. CO 3: Define Laplace transform and apply it to solve differential equation. CO 4: Explain the concepts of gradient, divergence, curl and their properties



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				CO 5: Apply line, volume and surface integrals to verify the Gauss divergence and Stoke's theorem
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COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	COURSE OBJECTIVES
19M3CC5/ 19G3CC5	Modern Algebra	National	CO1: Classify groups and explain their properties. CO2: Describe cosets and Lagrange's theorem. CO3: Explain the characteristics of



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			<p>different types of rings and their properties.</p> <p>CO4: Classify various types of ideals.</p> <p>CO5: Construct polynomial rings over UFD.</p>
19M3CC6/ 19G3CC6	Vector calculus and Fourier Transform	National	<p>CO 1: Explain the concept of differentiation of vectors.</p> <p>CO 2: Compute divergence and curl of vectors.</p> <p>CO 3: Solve problems on line and surface integrals.</p>



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			CO 4: Compute fourier sine and cosine transforms. CO 5: Describe the properties of fourier transforms
19M3SB1 \ 19G3SB1	Applications of Calculus and Differential Equations	National	CO1: Explain Beta and Gamma functions and their properties. CO2: Solve the problems in Maxima minima of functions of two variables. CO3: Describe trajectories and orthogonal trajectories.



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			<p>C04: Solve Brachistochrone problems</p> <p>C05: Discuss dynamical problems with variable mass</p>
19C3ACM1	Allied Mathematics - I	Local	To enable the students to understand mathematical concepts like matrices, higher derivatives of functions, solving differential equations, trigonometric series, measures of dispersion and moments..
19B3ACM1	Linear Programming	National	To enable the students to convert real life problems into a Mathematical problem and to solve them using different



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			techniques like graphical method, simplex method, Big – M method, Two - phase method and dual simplex method and also to obtain optimality in transportation, assignment problems.
19M4CC7/ 19G4CC7	Sequences and Series	National	CO 1: Define basic concepts of sequences CO 2: Explain subsequences and Cauchy sequences CO 3: Differentiate various convergence test for



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			<p>series and use them to solve problems</p> <p>CO 4: Recognize alternating, convergent, conditionally and absolutely convergent series</p> <p>CO 5: Distinguish the behaviour of series and power series</p>
19M4CC8/ 19G4CC8	Linear Algebra	National	<p>CO 1: Define Vector Space and explain its various concepts</p> <p>CO 2: Illustrate Inner Product Spaces</p>



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			<p>CO 3: Define basic concepts of matrices and solve linear equations</p> <p>CO 4: Appraise Eigen Value and Eigen Vectors of matrices</p> <p>CO 5: Describe bilinear forms and quadratic forms</p>
19M4SB2/ 19G4SB2	Foundations of Mathematics	Local	<p>CO 1: Recall some expansions of Trigonometric functions.</p> <p>CO 2: Explain Logarithms of Complex quantities.</p>



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			<p>CO 3: Describe properties of integers.</p> <p>CO 4: Solve puzzles using Chinese remainder Theorem.</p> <p>CO 5: Analyse inequalities</p>
19C4ACM2	Allied Mathematics - II	Local	To enable the students to understand the mathematical concepts like groups, integration, Laplace transform, Correlation, Regression and curve fitting.



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19B4ACM2	Algebra and graph theory	Regional	To study the concepts of functions, matrices and graph theory.
M5CC9/ G5CC9	Real Analysis	National	CO 1: Define basic concepts of sequences CO 2: Explain sub sequences and Cauchy sequences CO 3: Differentiate various convergence test for series and use them to solve problems CO 4: Recognize alternating, convergent, conditionally



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			<p>and absolutely convergent series</p> <p>CO 5: Distinguish the behaviour of series and power series</p>
M5CC10/ G5CC10	Mechanics	National	<p>Enable the students to apply the laws, principles, postulates, 12 governing the statics of the system and to apply the laws and principles governing dynamics of the system, in physical reality.</p>
M5CC11/ G5CC11	Computer Programming in C	Global	<p>C language is one of the most popular computer languages today and the programs</p>



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			written in C are powerful, efficient, fast and compact. Realizing the need for educating our students in the various applications of mathematics, we have introduced this course.
M5CCP1	C - Practicals	National	Abstract concepts in Mathematics, in all branches of Science and Technology, even in Social and Natural sciences find representations in graph theory. 13 There is hardly any field where graph theory does not find application. This paper is to



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			enable the students to have better application of abstract concepts through graph theory.
M5ME1/ G5ME1	Graph Theory	National	Abstract concepts in Mathematics, in all branches of Science and Technology, even in Social and Natural sciences find representations in graph theory. 13 There is hardly any field where graph theory does not find application. This paper is to enable the students to have better application of abstract



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			concepts through graph theory.
M5ME2/ G5ME2	Fuzzy Mathematics	Regional	The objective of this course is to introduce to the students the concepts of Fuzzy Sets, Fuzzy Logic, Fuzzy Operations and Fuzzy Relations.
M5SB3/ G5SB3	Fourier Transforms	Regional	Enable the students to apply Fourier transforms which plays an important role in the study of continuous time signals



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M5SB4/ G5SB4	Advanced Linear Programming	National	To enable the students to convert real problems into a Mathematical 14 model and solve them using different techniques. That is through method of duality, Gomory's method, Branch and Bound Technique, Dynamic programming method .
M6CC12/ G6CC12	Complex Analysis	National	To provide the student with an introduction to Complex Analysis of one variable since it has its



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			application in almost every branch of Mathematics.
M6CC13/ G6CC12	Numerical Methods	National	To give basic knowledge in Numerical methods and to solve problems purely mathematical in nature so that the students develop the confidence of solving research level problems.
M6CC14/ G6CC14	Operations Research	National	This course deals with sequencing problem, Game theory, Inventory Control, Queuing theory and Network scheduling



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			by PERT/CPM and it emphasis the students to convert real problem into a mathematical model and solve them using these techniques.
M6ME3/ G6ME3	Object Oriented Programming with C++	Global	In the expanding field of computer education, one of the fastest growing, versatile and much sought after languages is C++. This course enables the students to understand the fundamentals of the



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			language, the concepts related to the syntax of the language.
M6MEP1	C++ - Practicals	National	In the expanding field of computer education, one of the fastest growing, versatile and much sought after languages is C++.
M6ME4/ G6ME4	Astronomy	National	To introduce the concepts about the celestial bodies such as Earth, Moon and Planets and to impart the knowledge on duration of day and night, lunar and



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			solar eclipses, maximum number of eclipses.
M6MEP2	Astronomy Project	National	
M6ME5	Lattices and Boolean Algebra	National	To enable the students to know more about lattices and Boolean Algebra and their usefulness in other areas of Mathematics.
M6ME6	Automata Theory	National	It provides techniques useful in a wide variety of applications and helps to develop a way of thinking that leads to



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			understanding of the structure behavior and limitations and capabilities of logical machines.
M6ME7	Theory of Numbers	National	The objective of this course to present the students an introduction to an area of Pure mathematics which has intrigued non professionals as well as the greatest minds of human kind since the



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			dawn of history. A brief history of the development of numbers and some of the influential number theorist will be presented. Some application will also be considered.
M6SB5	MATLAB	National	To learn the MATLAB tools and its applications in various areas of Mathematics.
M6SB6	Applied Dynamics	Regional	To enable the students to apply the laws and principles governing



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			dynamics of the system in physical reality
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