

erion : I – Curricular Aspects ric : 1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) – B.Sc. MATHEMATICS r : 2015 - 2020



#### FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

#### NAME OF THE PROGRAMME: B.SC. MATHEMATICS

#### **PROGRAMME OUTCOMES:**

The learners will be able to

- PO1: Apply acquired scientific knowledge to solve complex issues.
- **PO2:** Attain Analytical skills to solve complex cultural, societal and environmental issues.
- **PO3:** Employ latest and updated tools and technologies to analyse complex issues.
- **PO4:** Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

#### **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.

#### **PROGRAMME CODE: UAMA**



Criterion: I - Curricular AspectsMetric: 1.1.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and<br/>Course Outcomes (COs) - B.Sc. MATHEMATICSYear: 2015 - 2020



#### 2019 - 2020

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.	<ul> <li>CO1: Explain higher derivatives and apply Leibnitz theorem to find the n<sup>th</sup> derivative of functions.</li> <li>CO2: Solve problems on curvature, envelopes, asymptotes and curve tracing.</li> <li>CO3: Construct reduction formula for trigonometric functions.</li> <li>CO4: Define Jacobian, double &amp; triple integrals and apply the knowledge of</li> </ul>



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	Criter Metri	rion : I – Cum Ic : 1.1.1 – I Course	ricular Aspects Programme Outco Outcomes (COs)	omes (POs), Programme Specific - B.Sc. MATHEMATICS	Outcomes (PSOs) and
19P1A	CM1	Allied Mathematics – I	Local	importance of statistical literacy in today's data rich world. This course provides the basic concepts in various branches of Mathematics	<ul> <li>equation.</li> <li>CO3: Explain random variables and probability density function</li> <li>CO4: Solve problems on expectation.</li> <li>CO5: Define and explain analysis of time series and index numbers.</li> <li>CO 1: Find summation of any series.</li> <li>CO 2: Explain the concepts of theory of equations.</li> <li>CO 3: Calculate roots of equations using different methods.</li> <li>CO 4: Expand trigonometric functions</li> <li>CO 5: Apply the Leibnitz's theorem to find the n<sup>th</sup> derivative</li> </ul>
19M1N 19M2N	IME / IME/	Quantitative Aptitude	National	This course is designed to help the students to	CO1: Solve problems on ages CO2: Illustrate profit and loss with examples





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19G1NME/1 9G2NME			appear in competitive examinations.	<ul> <li>CO3: Explain partnership and related problems</li> <li>CO4: Discuss problems on time and work</li> <li>CO5: Solve problems on time and distance</li> </ul>
19M2CC3 / 19G2CC3	Differential Equations	National	This course will provide the knowledge for solving ordinary and partial differential equations	<ul> <li>CO 1: Solve problems in differential equations of first order.</li> <li>CO 2: Classify homogeneous and Non homogeneous differential equations of second order and solve problems.</li> <li>CO 3: Solve differential equation problems using Laplace transform.</li> <li>CO 4: Define Partial differential equations and solve problems.</li> <li>CO 5: Solve problems on Growth, decay and chemical reactions</li> </ul>
9M2CC4/19	Numerical	National	This course enables the students to solve	<b>CO1:</b> Solve algebraic and transcendental



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G2CC4	Methods		equations using various Numerical Methods	<ul> <li>equations using various methods.</li> <li>CO2: Identify the various methods of solving simultaneous linear algebraic equations.</li> <li>CO3: Recognize difference operators and apply the concept of interpolation.</li> <li>CO4: Compute the values of the derivatives at some point using numerical differentiation and integration.</li> <li>CO5: Solve problems on higher order differential equations using Euler's, Runge- kutta and Predictor-Corrector methods</li> </ul>
19M2AC2 /	Advanced	National	This course provides a	<b>CO1</b> : Classify discrete and continuous
1962AC2	Statistics	Ivational	strong background in	random variables and characteristics
1702/102	Statistics		statistical tools which	of Pinomial distribution and Poisson
				distribution
			will be used in various	aistribution
			physical and social	<b>CO2:</b> Explain and illustrate the properties of



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			sciences.	<ul> <li>Normal distribution and solve variety of problems.</li> <li>CO3: Distinguish between a population and a sample and explain testing of hypothesis.</li> <li>CO4: Explain chi square distribution, t-distribution and describe their various applications is Statistics.</li> <li>CO5: Define F- distribution and apply it to solve problems in analysis of variance.</li> </ul>
19P2ACM2	Allied Mathematic s –II	Local	This course provides the fundamentals concepts in various branches of Mathematics	<ul> <li>CO 1: Solve linear differential equations.</li> <li>CO 2: Solve second order linear differential equations with variable coefficient.</li> <li>CO 3: Define Laplace transform and apply it to solve differential equation.</li> <li>CO 4: Explain the concepts of gradient, divergence, curl and their properties</li> <li>CO 5: Apply line, volume and surface</li> </ul>





			integr	als to verify the Gauss divergence
			and	Stoke's theorem.

COURSE CODE	Course Title	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	Course Objectives
M3CC5/G3CC5	Modern Algebra	National	• The advent of modern approach to Mathematical Logic started with the study of set theory. Set theory later developed into Groups, Rings and Fields with various conditions imposed on sets. Application of these find place in different fields of science. The objective of this paper is to expose the students to these concepts.





M3CC6/G3CC6	Analytical Geometry & Vector Calculus	National	• To know the fundamentals of vector calculus and polar equations.
SKILL BASED: M3SB1/G3SB1	Applications of Calculus and Differential Equations	National	• The objective of this course is to discuss several applications of the Calculus and Differential Equations to Geometry, Physics, Chemistry, Mechanics and Astronomy, etc.
M4CC7/G4CC7	Sequence and series	National	• To enable the students to learn theorems and problems in sequences and series which is essential for learning higher Mathematics.
M4CC8/G4CC8	Linear Algebra	National	• Vector Space is a new class of Algebraic system. Fields like Graph theory, Physics, Chemistry





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		COL	and Economics etc extensively use the applications of Matrices and their properties. Hence the students are exposed to these important topics.
Skill Based: M4SB2/G4SB2	Foundations of Mathematics	Local	• To enable the students to have ideas in Discrete Mathematics
C3ACM1	Allied Mathematics-I	Local	• To develop Mathematical skills in students so as to understand their Mathematical related papers.
C4ACM2	Allied Mathematics-II	Local	• To develop Mathematical skills in students so as to understand their Mathematical related papers.
B3ACM1	Linear Programming	National	• To enable the students to convert real problems into a Mathematical



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			model and solve them using different techniques.
B4ACM2	Algebra and Graph Theory	Regional	<ul> <li>Abstract concepts in Mathematics, in all branches of Science and Technology and in Social and Natural sciences find representations in graph theory. This paper is to enable the students to have better application of abstract concepts through graph theory.</li> </ul>
MAJOR M5CC9/G5CC9	Real Analysis	National	• To introduce the basic concepts in Analysis and to enable the students to understand fundamental ideas and theorems on Metric spaces
M5CC10/G5CC10	Mechanics	National	• Enable the students to apply the laws, principles, postulates,





			governing the statics of the system and to apply the laws and principles governing dynamics of the system, in physical reality.
M5CC11/G5CC11	Computer Programming in C	Global	• C language is one of the most popular computer languages today and the programs 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.
MAJOR ELECTIVE	Graph Theory	National 41GH	Abstract concepts in     Mathematics, in all branches of
M5ME1/G5ME1		DURA	Science and Technology, even in Social and Natural sciences find representations in graph theory.

Criterion Metric Year	<ul> <li>I - Curricular Aspects</li> <li>1.1.1 - Programme Outcomes (PC Course Outcomes (COs) - B.Sc. N</li> <li>2015 - 2020</li> </ul>	Ds), Programme Specific Outcome IATHEMATICS	es (PSOs) and
			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 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.
SKILL BASED- Mathematics Skill Development M5SB3/G5SB3	Fourier Transforms	Regional	• Enable the students to apply Fourier transforms which plays an important role in the study of continuous time signals.
M5SB4/G5SB4	Advanced Linear Programming	National	• To enable the students to convert real problems into a Mathematical

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- Criterion : I Curricular Aspects
- Metric : 1.1.1 Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) - B.Sc. MATHEMATICS
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M6CC14/G6CC14	Operations Research	National	• This course deals with sequencing
		0	problem, Game theory, Inventory
			Control, Queuing theory and
		EAN	Network scheduling by
		LLAD	PERT/CPM and it emphasis the
			students to convert real problem
			into a mathematical model and
			solve them using these
			techniques.
MAJOR ELECTIVE-	Object Oriented	Global	• In the expanding field of
Ι	Programming with C++		computer education, one of the
M6ME3/G6ME3	<u>ب</u>		fastest growing, versatile and
,	à		much sought after languages is
	KIN	LIGHT	C++. This course enables the
		·····	students to understand the
			fundamentals of the language, the
		DITR 3	concepts related to the syntax of
			the language.





M6ME4/G6ME4	Astronomy	National	• To introduce the concepts about the celestial bodies such as Earth, Moon and Planets and to import the knowledge on duration of day and night, lunar and solar eclipses, maximum number of eclipses.
MAJOR ELECTIVE- II M6ME5/G6ME5	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/G6ME6	Automata Theory	National	• It provides techniques useful in a wide variety of applications and helps to develop a way of thinking that leads to understanding of the structure behavior and limitations and capabilities of logical machines.





M6ME7/G6ME7	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 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.
SKILL BASED- Mathematics Skill Development M6SB5/G6SB5	MATLAB	National	•	To learn the MATLAB tools and its applications in various areas of Mathematics.
M6SB6/G6SB6	Applied Dynamics	Regional	•	To enable the students to apply the laws and principles governing dynamics of the system in physical reality.



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#### 2018 - 2019

COURSE CODE	<b>COURSE TITLE</b>	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	COURSE OBJECTIVE
MAJOR M1CC1/G1CC1	Calculus	National	• To enable the students to learn Higher derivatives, Curvature, Singular points, Envelopes, Asymptotes, Reduction formula, Multiple integrals and Fourier series in Calculus.
M1CC2/G1CC2	Classical Algebra & Trigonometry	National GH	• To enable the students to learn the fundamentals of Algebra & Trigonometry. That is Binomial series, Exponential and Logarithmic series, Theory of Equations and Expansions sinnx



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				cosnx etc
ALLIED	Statistics I	National	•	To provide a strong background in
M1AC1/GIAC1				statistical methods and random
		LEAD		processes which will be used in
				various social sciences, business
				management, public
				administration, etc.
NON MAJOR	Mathematics in day to day	National	•	To enable the students to know the
ELECTIVE	life			facts and formulae and to get
M1NME /			Ν	trained in the objective type
M2NME/				questions and its solutions by
G1NME/G2NME				short cut methods on the topics -
	Ċ,			Profit & Loss, Partnership, Time &
	KIN	DIN LIGHT		Work and Time & Distance.
MAJOR	Differential Equations	National	•	To enable the students to get
M2CC3/G2CC3		DTTD AV		thorough knowledge of solving
, -		DUN		Differential Equations of first
				order, second order, Laplace



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			transforms Partial differential equations and its applications.
M2CC4/G2CC4	Linear Programming	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through graphical method, simplex method, Big – M and Two - phase method, Transportation and Assignment problem
ALLIED M2AC2/G2AC2	Statistics II	National	• To provide a strong background in statistical tools which will be used in various physical and social sciences, also to enable the students to know the concepts of discrete distributions, continuous distribution, test of significance for large and small samples and





				analysis of variance.
P1ACM1	Allied Mathematics -I	Local	·	To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in Algebra, Theory of equations, Trigonometry and Differential Calculus.
P2ACM2	Allied Mathematics -II	Local	•	To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in differential equations, laplace transforms & fourier series and vector calculus.
M3CC5/G3CC5	Modern Algebra	National	•	The advent of modern approach to Mathematical Logic started with the study of set theory. Set theory later developed into Groups, Rings and Fields with various conditions





		COLLEAD		imposed on sets. Application of these find place in different fields of science. The objective of this paper is to expose the students to these concepts.
M3CC6/G3CC6	Analytical Geometry & Vector Calculus	National	•	To know the fundamentals of vector calculus and polar equations.
SKILL BASED: M3SB1/G3SB1	Applications of Calculus and Differential Equations	National	•	The objective of this course is to discuss several applications of the Calculus and Differential Equations to Geometry, Physics, Chemistry, Mechanics and Astronomy, etc.
M4CC7/G4CC7	Sequence and series	National	•	To enable the students to learn theorems and problems in sequences and series which is essential for learning higher



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				Mathematics.
M4CC8/G4CC8	Linear Algebra	National		Vector Space is a new class of Algebraic system. Fields like Graph theory, Physics, Chemistry and Economics etc extensively use the applications of Matrices and their properties. Hence the students are exposed to these important topics.
SKILL BASED:	Foundations of	Local	•	To enable the students to have
M4SB2/G4SB2	Mathematics			ideas in Discrete Mathematics
C3ACM1	Allied Mathematics-I	Local	•	To develop Mathematical skills in
				students so as to understand their
	(S) AINT	IN LIGHT		Mathematical related papers.
C4ACM2	Allied Mathematics-II	Local	•	To develop Mathematical skills in
				students so as to understand their
		DURB		Mathematical related papers.





B3ACM1	Linear Programming	National	• To enable the students to conver real problems into a Mathematica model and solve them usin
		LEAD	different techniques.
B4ACM2	Algebra and Graph Theory	Regional	<ul> <li>Abstract concepts in Mathematics in all branches of Science an Technology and in Social an Natural sciences fin representations in graph theory This paper is to enable th students to have better application of abstract concepts through grap theory.</li> </ul>
MAJOR	Real Analysis	National	• To introduce the basic concepts i
M5CC9/G5CC9		DURA	Analysis and to enable the students to understane fundamental ideas and theorem on Metric spaces





M5CC10/G5CC10	Mechanics	National	• Enable the students to apply the laws, principles, postulates, governing the statics of the system and to apply the laws and principles governing dynamics of
M5CC11/G5CC11	Computer Programming in C	Global	<ul> <li>the system, in physical reality.</li> <li>C language is one of the most popular computer languages today and the programs 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.</li> </ul>
MAJOR ELECTIVE M5ME1/G5ME1	Graph Theory	National	• Abstract concepts in Mathematics, in all branches of Science and Technology, even in Social and





		LEAD	Natural sciences find representations in graph theory. 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 concepts
M5ME2/G5ME2	Fuzzy Mathematics	Regional	<ul> <li>The objective of this course is to introduce to the students the concepts of Fuzzy Sets, Fuzzy Logic, Fuzzy Operations and Fuzzy Relations.</li> </ul>
SKILL BASED- Mathematics Skill Development M5SB3/G5SB3	Fourier Transforms	Regional GH	• Enable the students to apply Fourier transforms which plays an important role in the study of continuous time signals.





M5SB4/G5SB4	Advanced Linear	National	•	To enable the students to convert
	Programming	600		real problems into a Mathematical
				model and solve them using
		LEAD		different techniques. That is
				through method of duality,
				Bound Technique. Dynamic
				programming method .
MAJOR	Complex Analysis	National	•	To provide the student with an
M6CC12/G6CC12				introduction to Complex Analysis
1100012/000012				of one variable since it has its
				application in almost every branch
	A A			of Mathematics.
M6CC13/G6CC13	Numerical Methods	National	•	To give basic knowledge in
				Numerical methods and to solve
		DITRA		problems purely mathematical in
		DUN		nature so that the students
				develop the confidence of solving



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				research level problems.
M6CC14/G6CC14	Operations Research	National	•	This course deals with sequencing
				problem, Game theory, Inventory
		LEAD		Control, Queuing theory and
				Network scheduling by PERT/CPM
				and it emphasis the students to
				convert real problem into a
				mathematical model and solve
				them using these techniques.
MAJOR ELECTIVE-	Object Oriented	Global	•	In the expanding field of computer
Ι	Programming with C++			education, one of the fastest
M6ME3/G6ME3		VT UN		growing, versatile and much
	$\langle \mathbf{S} \rangle$			sought after languages is C++. This
	AIM	LIGHL		course enables the students to
				understand the fundamentals of
				the language, the concepts related
				to the syntax of the language.





M6ME4/G6ME4	Astronomy	National	• To introduce the concepts about
		COLLEAD	the celestial bodies such as Earth, Moon and Planets and to import the knowledge on duration of day and night, lunar and solar
			eclipses.
MAJOR ELECTIVE-	Lattices and Boolean	National	• To enable the students to know
II	Algebra		more about lattices and Boolean
M6ME5/G6ME5			Algebra and their usefulness in other areas of Mathematics.
M6ME6/G6ME6	Automata Theory	National GHT DUR	• It provides techniques useful in a wide variety of applications and helps to develop a way of thinking that leads to understanding of the structure behavior and limitations and capabilities of logical machines.



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M6ME7/G6ME7	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 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.
SKILL BASED- Mathematics Skill Development M6SB5/G6SB5	Matlab	National		To learn the MATLAB tools and its applications in various areas of Mathematics.
M6SB6/G6SB6	Applied Dynamics	Regional	•	To enable the students to apply the laws and principles governing dynamics of the system in physical reality.



Criterion: I - Curricular AspectsMetric: 1.1.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and<br/>Course Outcomes (COs) - B.Sc. MATHEMATICSYear: 2015 - 2020



#### 2017 - 2018

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	COURSE OBJECTIVE
MAJOR M1CC1/G1CC1	Calculus	National	• To enable the students to learn Higher derivatives, Curvature, Singular points, Envelopes, Asymptotes, Reduction formula, Multiple integrals and Fourier series in Calculus
M1CC2/G1CC2	Classical Algebra & Trigonometry	National	• To enable the students to learn the fundamentals of Algebra & Trigonometry. That is Binomial series, Exponential and Logarithmic series, Theory of Equations and Expansions sinnx cosnx etc
ALLIED M1AC1/GIAC1	Statistics I	National	• To provide a strong background in statistical methods and random





			processes which will be used in various social sciences, business management, public administration, etc.
NON MAJOR ELECTIVE M1NME1/ G1NME1	Mathematics in day to day life	National	• To enable the students to know the facts and formulae and to get trained in the objective type questions and its solutions by short cut methods on the topics – Profit & Loss, Partnership, Time & Work and Time & Distance.
MAJOR M2CC3/G2CC3	Differential Equations	National	• To enable the students to get thorough knowledge of solving Differential Equations of first order, second order, Laplace transforms Partial differential equations and its applications.
M2CC4/G2CC4	Linear Programming	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through graphical method,





			simplex method, Big – M and Two - phase method, Transportation and Assignment problem
ALLIED M2AC2/G2AC2	Statistics II	National	• To provide a strong background in statistical tools which will be used in various physical and social sciences, also to enable the students to know the concepts of discrete distributions, continuous distribution, test of significance for large and small samples and analysis of variance.
P1ACM1	Allied Mathematics -I	Local	• To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in Algebra, Theory of equations, Trigonometry and Differential Calculus.
P2ACM2	Allied Mathematics -II	Local	• To enable the Physics major students to develop the skills of Mathematical



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		<b>A CO</b> 7		reasoning and Analytical thinking in differential equations, laplace transforms & fourier series and vector calculus.
M3CC5/G3CC5	Modern Algebra	National		The advent of modern approach to Mathematical Logic started with the study of set theory. Set theory later developed into Groups, Rings and Fields with various conditions imposed on sets. Application of these find place in different fields of science. The objective of this paper is to expose the students to these concepts.
M3CC6/G3CC6	Analytical Geometry & Vector Calculus	Regional	•	To know the fundamentals of vector calculus and polar equations
SKILL BASED: M3SB1/G3SB1	Applications of Calculus and Differential Equations	Regional	•	The objective of this course is to discuss several applications of the Calculus and Differential Equations to Geometry, Physics, Chemistry, Mechanics and



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			Astronomy, etc.
M4CC7/G4CC7	Sequence and series	National	• To enable the students to learn theorems and problems in sequences and series which is essential for learning higher Mathematics.
M4CC8/G4CC8	Linear Algebra	National	• Vector Space is a new class of Algebraic system. Fields like Graph theory, Physics, Chemistry and Economics etc extensively use the applications of Matrices and their properties. Hence the students are exposed to these important topics.
SKILL BASED: M4SB2/G4SB2	Foundations of Mathematics	Local	• To enable the students to have ideas in Discrete Mathematics
C3ACM1	Allied Mathematics-I	Local	• To develop Mathematical skills in students so as to understand their Mathematical related papers.





C4ACM2	Allied Mathematics-II	Local	• To develop Mathematical skills in students so as to understand their Mathematical related papers.
B3ACM1	Linear Programming	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques.
B4ACM2	Algebra and Graph Theory	Regional	• Abstract concepts in Mathematics, in all branches of Science and Technology and in Social and Natural sciences find representations in graph theory. This paper is to enable the students to have better application of abstract concepts through graph theory.
MAJOR M5CC9/G5CC9	Real Analysis	National	• To introduce the basic concepts in Analysis and to enable the students to understand fundamental ideas and theorems on Metric spaces





M5CC10/G5CC10	Mechanics	National	• Enable the students to apply the laws, principles, postulates, governing the Statics of the system and to apply the laws and principles Governing Dynamics of the system, in Physical reality.
M5CC11/G5CC11	Computer Programming in C	Global	• C language is one of the most popula computer languages today and th programs written in C are powerful efficient, fast and compact. Realizing th need for educating our students in th various applications of mathematics, w have introduced this course.
MAJOR ELECTIVE M5ME1/G5ME1	Graph Theory	National GH	• Abstract concepts in Mathematics, in all branches of Science and Technology, even in Social and Natural sciences find representations in graph theory. 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 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.
SKILL BASED- Mathematics Skill Development M5SB3/G5SB3	Fourier Transforms	Regional	• Enable the students to apply Fourier transforms which plays an important role in the study of continuous time signals.
M5SB4/G5SB4	Advanced Linear Programming	National GH	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through method of duality, Gomory's method, Branch and Bound Technique, Dynamic programming



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				method .
MAJOR M6CC12/G6CC12	Complex Analysis	National	•	To provide the student with an introduction to Complex Analysis of one
		LEAD		variable since it has its application in almost every branch of Mathematics
M6CC13/G6CC13	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 DV VIGH		This course deals with sequencing problem, Game theory, Inventory Control, Queuing theory and Network scheduling by PERT/CPM and it emphasis the students to convert real problem into a mathematical model and solve them using these techniques

Criterion Metric Year	<ul> <li>I - Curricular Aspects</li> <li>1.1.1 - Programme Outcomes (P Course Outcomes (COs) - B.Sc.</li> <li>2015 - 2020</li> </ul>	POs), Programme Specific MATHEMATICS	Outcomes (PSOs) and
MAJOR ELECTIVE-I M6ME3/G6ME3 M6ME4/G6ME4	Object Oriented Programming with C++ Astronomy	Global	<ul> <li>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 language, the concepts related to the syntax of the language.</li> <li>To introduce the concepts about the celestial bodies such as Earth, Moon and Planets and to import the knowledge on duration of day and night, lunar and solar eclipses, maximum number of eclipses.</li> </ul>
MAJOR ELECTIVE-II M6ME5/G6ME5	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.

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M6ME6/G6ME6	Automata Theory	National	• It provides techniques useful in a wide variety of applications and helps to develop a way of thinking that leads to understanding of the structure behavior and limitations and capabilities of logical machines.
M6ME7/G6ME7	Theory of Numbers	National	• The objective of this course to present the students an introduction to an area of Pure mathematics which has intrigued nonprofessionals as well as the greatest minds of human kind since the 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.
SKILL BASED- Mathematics Skill Development	Matlab	National	• To learn the MATLAB tools and its applications in various areas of Mathematics.



Criterion: I - Curricular AspectsMetric: 1.1.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and<br/>Course Outcomes (COs) - B.Sc. MATHEMATICSYear: 2015 - 2020



M6SB5/G6SB5				
M6SB6/G6SB6	Applied Dynamics	Regional	•	To enable the students to apply the laws
				and principles Governing Dynamics of
		LEAD		the system in Physical reality.

#### 2016 - 2017

COURSE CODE	Course Title	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	COURSE OBJECTIVE
MAJOR M1CC1/G1CC1	Calculus	National	• To enable the students to learn Higher derivatives, Curvature, Singular points, Envelopes, Asymptotes, Reduction formula, Multiple integrals and Fourier series in Calculus.
M1CC2/G1CC2	Classical Algebra & Trigonometry	National	• To enable the students to learn the fundamentals of Algebra & Trigonometry.





		A COT	•	That is Binomial series , Exponential and Logarithmic series, Theory of Equations and Expansions sinnx cosnx etc
ALLIED M1AC1/GIAC1	Statistics I	National		To provide a strong background in statistical methods and random processes which will be used in various social sciences, business management, public administration, etc .
NON MAJOR ELECTIVE M1NME1/ G1NME1	Mathematics in day to day life	National	·	To enable the students to know the facts and formulae and to get trained in the objective type questions and its solutions by short cut methods on the topics – Profit & Loss, Partnership, Time & Work and Time & Distance.
MAJOR M2CC3/G2CC3	Differential Equations	National	•	To enable the students to get thorough knowledge of solving Differential Equations of first order, second order, Laplace transforms, Partial differential



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			equations and its applications.
M2CC4/G2CC4	Linear Programming	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through graphical method, simplex method, Big – M and Two - phase method, Transportation and Assignment problem
ALLIED M2AC2/G2AC2	Statistics II	National	• To provide a strong background in statistical tools which will be used in various physical and social sciences, also to enable the students to know the concepts of discrete distributions, continuous distribution, test of significance for large and small samples and analysis of variance.
P1ACM1	Allied Mathematics -I	Local	• To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



				Algebra, Theory of equations, Trigonometry and Differential Calculus.
P2ACM2	Allied Mathematics -II	Local	•	To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in differential equations,laplace transforms & fourier series and vector calculus.
M3CC5/G3CC5	Modern Algebra	National		The advent of modern approach to Mathematical Logic started with the study of set theory. Set theory later developed into Groups, Rings and Fields with various conditions imposed on sets. Application of these find place in different fields of science. The objective of this paper is to expose the students to these concepts
M3CC6/G3CC6	Analytical Geometry &	Regional	•	To know the fundamentals of vector





	Vector Calculus			calculus and polar equations.
SKILL BASED: M3SB1/G3SB1	Foundations of Mathematics	Local	•	To enable the students to have ideas in Discrete Mathematics.
M4CC7/G4CC7	Sequence and series	National	•	To enable the students to learn theorems and problems in sequences and series which is essential for learning higher Mathematics.
M4CC8/G4CC8	Linear Algebra	National	·	Vector Space is a new class of Algebraic system. Fields like Graph theory, Physics, Chemistry and Economics etc extensively use the applications of Matrices and their properties. Hence the students are exposed to these important topics.
SKILL BASED: M4SB2/G4SB2	Applications of Calculus and Differential Equations	Regional	•	The objective of this course is to discuss several applications of the Calculus and Differential Equations to Geometry, Physics, Chemistry, Mechanics and



Year

: 2015 - 2020



				Astronomy, etc.
C3ACM1	Allied Mathematics-I	Local	•	To develop Mathematical skills in students so as to understand their Mathematical related papers.
C4ACM2	Allied Mathematics-II	Local	•	To develop Mathematical skills in students so as to understand their Mathematical related papers.
B3ACM1	Linear Programming	National	•	To enable the students to convert real problems into a Mathematical model and solve them using different techniques.
B4ACM2	Algebra and Graph Theory	Regional	•	Abstract concepts in Mathematics, in all branches of Science and Technology, even in Social and Natural sciences find representations in graph theory. This paper is to enable the students to have better application of



Year

: 2015 - 2020



			<ul><li>abstract concepts</li><li>through graph theory.</li></ul>
MAJOR M5CC9/G5CC9	Real Analysis	National	• To introduce the basic concepts in Analysis and to enable the students to understand fundamental ideas and theorems on Metric spaces
M5CC10/G5CC10	Mechanics	National	• Enable the students to apply the laws, principles, postulates, governing the Statics of the system and to apply the laws and principles Governing Dynamics of the system, in Physical reality.
M5CC11/G5CC11	Computer Programming in C	Global DOM GH	• C language is one of the most popular computer languages today and the programs written in C are powerful, efficient, fast and compact. Realizing the need for educating our students in the various applications of mathematics, we



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			have introduced this course.
MAJOR ELECTIVE 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. 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 concepts through graph theory.
M5ME2/G5ME2	Fuzzy Mathematics	National	• The objective of this course is to introduce to the students the concepts of Fuzzy Sets, Fuzzy Logic, Fuzzy Operations and Fuzzy Relations.
SKILL BASED- Mathematics Skill Development	Fourier Transforms	Regional	• Enable the students to apply Fourier transforms which plays an important role in the study of continuous time signals.



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



M5SB3/G5SB3			
M5SB4/G5SB4	Advanced Linear Programming	National	<ul> <li>To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through method of duality, Gomory's method, Branch and Bound Technique, Dynamic programming method</li> </ul>
MAJOR M6CC12/G6CC12	Complex Analysis	National	• To provide the student with an introduction to Complex Analysis of one variable since it has its application in almost every branch of Mathematics
M6CC13/G6CC13	Numerical Methods	National Joseph Joseph	• 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

	Criterion	I – Curricular Aspects			
Р́т.	Metric :	1.1.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and			
		Course Outcomes (COs) – B.Sc	. MATHEMATICS	V	
	Year :	2015 - 2020			
			A COZ	problem, Game theory, Inventory Control, Queuing theory and Network scheduling by PERT/CPM and it emphasis the students to convert real problem into a mathematical model and solve them using these techniques.	
MAJOR I M6ME3	ELECTIVE-	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 language, the concepts related to the syntax of the language.	
M6ME4	/G6ME4	Astronomy	National GH	• To introduce the concepts about the celestial bodies such as Earth, Moon and Planets and to import the knowledge on duration of day and night, lunar and solar eclipses, maximum number of eclipses.	

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MAJOR ELECTIVE-	Lattices and Boolean	National	• To enable the students to know more
II	Algebra		about lattices and Boolean Algebra and
M6ME5/G6ME5		A CU/	their usefulness in other areas of
		LEAD	Mathematics.
M6ME6/G6ME6	Automata Theory	National	• It provides techniques useful in a wide
			variety of applications and helps to
			develop a way of thinking that leads to
			understanding of the structure behavior
			and limitations and capabilities of logical
			machines.
SKILL BASED-	Elements of Topology	National	• To enable the students to understand the
Mathematics Skill			fundamental concepts in topological
Development			spaces.
M6SB5/G6SB5		VDL1 LIGH	
M6SB6/G6SB6	Applied Dynamics	Regional	•
		HDIR	and principles Governing Dynamics of the
			system in Physical reality.





#### 2015 - 2016

COURSE CODE	Course Title	NATURE OF THE COURSE (LOCAL/NATIONAL/ REGIONAL/GLOBAL)	COURSE OBJECTIVE
MAJOR M1CC1/G1CC1	Calculus	National	<ul> <li>To enable the students to learn Higher derivatives, Curvature, Singular points, Envelopes, Asymptotes, Reduction formula, Multiple integrals and Fourier series in Calculus.</li> </ul>
M1CC2/G1CC2	Classical Algebra & Trigonometry	National	<ul> <li>To enable the students to learn the fundamentals of Algebra &amp; Trigonometry.</li> <li>That is Binomial series , Exponential and Logarithmic series, Theory of Equations and Expansions sinnx cosnx etc</li> </ul>
ALLIED M1AC1/GIAC1	Statistics I	National OR	• To provide a strong background in statistical methods and random processes





		ACO	which will be used in various social sciences, business management, public administration, etc .
NON MAJOR ELECTIVE M1NME1/ G1NME1	Mathematics in day to day life	National	• To enable the students to know the facts and formulae and to get trained in the objective type questions and its solutions by short cut methods on the topics – Profit & Loss, Partnership, Time & Work and Time & Distance.
MAJOR M2CC3/G2CC3	Differential Equations	National	• To enable the students to get thorough knowledge of solving Differential Equations of first order, second order, Laplace transforms, Partial differential equations and its applications.
M2CC4/G2CC4	Linear Programming	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques. That is through graphical method, simplex



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			method, Big – M and Two - phase method, Transportation and Assignment problem
ALLIED M2AC2/G2AC2	Statistics II	National	• To provide a strong background in statistical tools which will be used in various physical and social sciences, also to enable the students to know the concepts of discrete distributions, continuous distribution, test of significance for large and small samples and analysis of variance.
P1ACM1	Allied Mathematics -I	Local	• To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in Algebra, Theory of equations, Trigonometry and Differential Calculus.
P2ACM2	Allied Mathematics -II	Local	• To enable the Physics major students to develop the skills of Mathematical reasoning and Analytical thinking in



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			differential equations, laplace transforms & fourier series and vector calculus.
M3CC5/G3CC5	Modern Algebra	National	• The advent of modern approach to Mathematical Logic started with the study of set theory. Set theory later developed into Groups, Rings and Fields with various conditions imposed on sets. Application of these find place in different fields of science. The objective of this paper is to expose the students to these concepts
M3CC6/G3CC6	Analytical Geometry & Vector Calculus	Regional	• To know the fundamentals of vector calculus and polar equations.
SKILL BASED: M3SB1/G3SB1	Fractals	Local	• To know the fundamentals of fractals and its applications.
M4CC7/G4CC7	Sequence and series	National	• To enable the students to learn theorems and problems in sequences and series which is essential for learning higher



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			Mathematics.
M4CC8/G4CC8	Linear Algebra	National	• Vector Space is a new class of Algebraic system. Fields like Graph theory, Physics, Chemistry and Economics etc extensively use the applications of Matrices and their properties. Hence the students are exposed to these important topics.
SKILL BASED: M4SB2/G4SB2	Applications of Calculus and Differential Equations	Regional	• The objective of this course is to discuss several applications of the Calculus and Differential Equations to Geometry, Physics, Chemistry, Mechanics and Astronomy, etc.
C3ACM1	Allied Mathematics-I	Local	• To develop Mathematical skills in students so as to understand their Mathematical related papers.
C4ACM2	Allied Mathematics-II	Local	• To develop Mathematical skills in students so as to understand their Mathematical



Year

: 2015 - 2020



			related papers.
B3ACM1	Allied Mathematics-I	National	• To enable the students to convert real problems into a Mathematical model and solve them using different techniques.
B4ACM2	Allied Mathematics-II	Regional	<ul> <li>Abstract concepts in Mathematics, in all branches</li> <li>of Science and Technology, even in Social and</li> <li>Natural sciences find representations in graph</li> <li>theory. This paper is to enable the students to have</li> <li>better application of abstract concepts through</li> <li>graph theory.</li> </ul>
MAJOR M5CC9/G5CC9	Real Analysis	National OR	• To introduce the basic concepts in Analysis and to enable the students to understand fundamental ideas and theorems on Metric



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



			spaces
M5CC10/G5CC10	Mechanics	National	• Enable the students to apply the laws, principles, postulates, governing the Statics of the system and to apply the laws and principles Governing Dynamics of the system, in Physical reality.
M5CC11/G5CC11	Computer Programming in C	Global	• C language is one of the most popular computer languages today and the programs 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.
MAJOR ELECTIVE M5ME1/G5ME1	Graph Theory	National	<ul> <li>Abstract concepts in Mathematics, in all branches</li> <li>of Science and Technology, even in Social and</li> <li>Natural sciences find representations in</li> </ul>

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				NAAC – 4 <sup></sup> CYCLE – Self Study Report	(SSR
ATUNA COLAR	Criterion Metric Year	<ul> <li>I – Curricular Aspects</li> <li>1.1.1 – Programme Outcomes</li> <li>Course Outcomes (COs) – B.S</li> <li>2015 - 2020</li> </ul>	(POs), Programme Specific c. MATHEMATICS	Outcomes (PSOs) and	
			LEAD	<ul> <li>graph</li> <li>theory. There is hardly any field where graph</li> <li>theory does not find application. This paper is to</li> <li>enable the students to have better application of</li> <li>abstract concepts through graph theory.</li> </ul>	
M5MI	E2/G5ME2	Fuzzy Mathematics	National	The objective of this course is to introduce	

M5ME2/G5ME2	Fuzzy Mathematics	National	• The objective of this course is to introduce
			to the students the concepts of Fuzzy Sets,
			Fuzzy Logic, Fuzzy Operations and Fuzzy
	Ŕ		Relations.
SKILL BASED-	Fourier Transforms	Regional	• Enable the students to apply Fourier
Mathematics Skill		VDL'LIGH	transforms which plays an important role
Development			in the study of continuous time signals.
M5SB3/G5SB3		ANTIR	
M5SB4/G5SB4	Advanced Linear	National	• To enable the students to convert real



	Programming	A CO	problems into a Mathematical model and solve them using different techniques. That is through method of duality, Gomory's method, Branch and Bound Technique, Dynamic programming method .
MAJOR M6CC12/G6CC12	Complex Analysis	National	• To provide the student with an introduction to Complex Analysis of one variable since it has its application in almost every branch of Mathematics
M6CC13/G6CC13	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 by PERT/CPM and it emphasis the students to





		A CO	convert real problem into a mathematical model and solve them using these techniques.
MAJOR ELECTIVE-I	Object Oriented	Global	• In the expanding field of computer
M6ME3/G6ME3	Programming with C++		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 language, the concepts related to the syntax of the language.
M6ME4/G6ME4	Astronomy	National	• To introduce the concepts about the celestial bodies such as Earth, Moon and Planets and to import the knowledge on duration of day and night, lunar and solar eclipses, maximum number of eclipses.
MAJOR ELECTIVE- II	Lattices and Boolean Algebra	National	• To enable the students to know more about lattices and Boolean Algebra and their



Year

**Criterion** : I – Curricular Aspects

: 2015 - 2020



M6ME5/G6ME5			usefulness in other areas of Mathematics.
M6ME6/G6ME6	Automata Theory	National	• It provides techniques useful in a wide variety of applications and helps to develop a way of thinking that leads to understanding of the structure behavior and limitations and capabilities of logical machines.
SKILL BASED- Mathematics Skill Development M6SB5/G6SB5	Elements of Topology	National	• To enable the students to understand the fundamental concepts in topological spaces.
M6SB6/G6SB6	Applied Dynamics	Regional	• To enable the students to apply the laws and principles Governing Dynamics of the system in Physical reality.