DR.MGR JANAKI COLLEGE OF ARTS AND SCIENCE FOR WOMEN

DEPARTMENT OF MATHEMATICS

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN

SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Bachelor of Mathematics
(With effect from the Academic Year 2023-24)

I.PREAMBLE

Mathematics is the study of quantity, structure, space and change, focusing on problem solving, with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real Complex), Differential Equations, Geometry, and Mechanics. The Bachelor's Degree B.Sc. Mathematics is awarded to the students on the basis of knowledge, understanding, skills, attitudes, values and academic achievements expected to be acquired by learners at the end of the Programme. Learning outcomes of Mathematics are aimed at facilitating the learners to acquire these attributes, keeping in view of their preferences and aspirations for gaining knowledge of Mathematics.

Bachelor's degree in Mathematics is the culmination of in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of Mathematics. This also leads to study of related areas like Computer science, Financial Mathematics, Statistics and many more. Thus, this programme helps learners in building a solid foundation for higher studies in Mathematics. The skills and knowledge gained have intrinsic aesthetics leading to proficiency in analytical reasoning. This can be utilized in Mathematical modeling and solving real life problems.

Students completing this programme will be able to present Mathematics clearly and precisely, make abstract ideas precise by formulating them in the language of Mathematics, describe Mathematical ideas from multiple perspectives and explain fundamental concepts of Mathematics to non-Mathematicians.

Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASEDREGULATIONS FOR UNDER GRADUATE PROGRAMME	
Programme:	**B.Sc. MATHEMATICS**
Programme Code:	
Duration:	**3 years[UG]**

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN

SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Programme Outcomes:	**PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study
	PO2: Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
	PO3: Critical thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulatecoherentarguments;criticallyevaluatepractices,policiesandtheories by following scientific approach to knowledge development.
	PO4: Problem solving: Capacity to extrapolate from what one has learned and applytheircompetenciestosolvedifferentkindsofnon-familiarproblems,rather thanreplicatecurriculumcontentknowledge;andapplyone'slearningtoreallife situations.
	PO5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others;analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
	PO6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
	PO7: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team
	PO8: Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
	PO9:Reflective thinking: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society.
	PO10 Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
	PO 11 Self-directed learning: Ability to work independently, identifies appropriate resources required for a project, and manages a project through to completion.
	PO12Multiculturalcompetence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN

SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about anethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to ones work, avoid unethical behaviour such as fabrication, falsification or misrepresentationofdataorcommittingplagiarism,notadheringtointellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

PO14:Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.

PO 15: Lifelong learning: Ability to acquire knowledge and skills, including "learninghowtolearn",thatarenecessaryforparticipatinginlearningactivities throughoutlife,throughself-pacedandself-directedlearningaimedatpersonal development,meetingeconomic,socialandculturalobjectives,andadaptingto changing trades and demands of work place through knowledge/skill development/reskilling.

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN

SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

I. Programme Outcomes and Programme Specific Outcomes of B.Sc.Degree

Programme in Mathematics

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an under graduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and applies their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes inthe arguments of others; analyze and synthesize data from avariety of sources; draw valid conclusions and support them with evidence and examples and adressing opposing viewpoints.

PO5: Scientific Reasoning: Ability to analyse, interpret and draw conclusions from quantitative/ qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

II   Programme Specific Objectives

PSO1: Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, and beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

I. Highlights of the Revamped Curriculum:

➢ Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.

➢ The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, and devising mathematical model sand algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.

➢ The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.

➢ The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

➢ The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.

➢ The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.

➢ Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.

➢ State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and interdisciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

Dr. MGR–JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

2. Value additions in the Revamped Curriculum:

Semester	Newly Introduced Components	Outcome /Benefits
I	Foundation Course To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Mathematics and simulating mathematical concepts to real world.	• Instill confidence among students • Create interest for the subject
I,II,III, IV	Skill Enhancement papers (Discipline Centric/ Generic / Entrepreneurial)	Industry ready graduates Skilled human resource Students are equipped with essential skills to make them employable Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc. Entrepreneurial skill training will provide an opportunity for independent lively hood Generates self – employment Create small scale entrepreneurs Training to girls leads to women Empowerment Discipline centric skill will improve the Technical knowhow of solving real life problems using ICT tools

**Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN**
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

| III, IV,V&VI | Elective papers- An open choice of topics Categorized under Generic and Discipline Centric | Strengthening the domain knowledge • Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature • Students are exposed to Latest topics on Computer Science / IT, that require strong mathematical Background • Emerging topics in higher education / industry /9 communication network / health sector etc. are introduced with hands-on-training, facilitates designing of mathematical models in the respective sectors |

**Dr. MGR–JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN**
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Template for Curriculum Design for UG Programme in Mathematics Credit Distribution for UG Programme in Mathematics

B.Sc. Mathematics

First Year

SEMESTER-I

Part	List of Courses	Credit	Hours per week (L/T/P)
Part–I	Language	3	6
Part–II	English	3	6
Part–III	Core Courses 2 (CC1,CC2)	10	10
	Elective Course1(Generic/Discipline specific) EC1	3	4
Part– IV	Skill Enhancement Course SEC-1 (Non Major Elective)	2	2
	Foundation Course FC	2	2
		23	**30**

SEMESTER–II

Part	List of Courses	Credit	Hours per week (L/T/P)
Part–I	Language	3	6
Part–II	English	3	6
Part–III	Core Courses2 (CC1,CC2)	10	10
	Elective Course 1 (Generic/Discipline specific) EC2	3	4
Part– IV	Skill Enhancement Course-SEC-2(Non Major Elective)	2	2
	Skill Enhancement Course-SEC-3 (Discipline Specific / Generic)	2	2
		23	**30**

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

SECOND YEAR
SEMESTER-III

Part	List of Courses	Credit	Hours Per Week (L/T/P)
Part–I	Language	3	6
Part– II	English	3	6
Part– III	Core Courses2(CC5,CC6)	10	10
	Elective Course1 (Generic/Discipline Specific)EC3	3	4
Part – IV	Skill Enhancement Course -SEC-4 (Entrepreneurial Based)	1	1
	Skill Enhancement Course-SEC-5 (Discipline Specific/ Generic)	2	2
	Environmental Studies(EVS)	-	1
		22	30

SEMESTER–IV

Part	List of Courses	Credit	Hours Per Week (L/T/P)
Part–I	Language	3	6
Part–II	English	3	6
Part–III	Core Courses2(CC7,CC8)	10	9
	Elective Course2(Generic/Discipline Specific)EC4	3	4
Part – IV	Skill Enhancement Course–SEC6	2	2
	Skill Enhancement Course-SEC-7 (Discipline Specific / Generic)	2	2
	Environmental Studies EVS	2	1
		25	30

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28

An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

THIRD YEAR

SEMESTER–V

Part	List of Courses	Credit	Hours per week (L/T/P)
Part III	Core Courses3(CC9,CC10,CC11)	12	15
	Elective Courses 2 (Generic / Discipline Specific) EC5,EC6	6	8
	Core /Project with VivaVoce CC12	4	5
Part IV	Value Education	2	2
	Internship / Industrial Training(Carried out in II Year Summer vacation) (30 hours)	2	
		26	**30**

SEMESTER–VI

Part	List of Courses	Credit	Hours PerWeek (L/T/P)
Part–III	CoreCourses3 (CC13,CC14,CC15)	12	18
	ElectiveCourses2(Generic/Discipline Specific)EC7,EC8	6	10
Part–IV	Professional Competency Skill Enhancement Course SEC8	2	2
Part–V	Extension Activity(Outside college hours)	1	--
		22	**30**

TOTAL HOURS: 140

Dr. MGR–JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

3. B.Sc. Mathematics Curriculum Design
First Year-Semester-I

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-I	Language Paper-I	3	6
Part-II	100L1Z:English Paper-I	3	6
Part-III	134C1A:CorePaper–I Algebra & Trigonometry@	5	4
	134C1B:CorePaper- II Differential Calculus@	5	5
	Elective Course -1 (Anyone) 134E1A: Allied Physics – I 134E1B:Numerical Methods with Applications	3	5
Part-IV	134S1A:SkillEnhancementCourse–I Financial Mathematics* 100L1L: Basic Tamil-I (Other Language Students) * 100L1M: Advanced Tamil-I (Other Language Students) *	2	2
	134B1A:FoundationCourseFC–Bridge Mathematics@	2	2
		23	**30**

@COMMON TO B.Sc. MATHEMATICS WITH COMPUTER APPLICATIONS

I *PART-IV: SEC-1/Basic Tamil/Advanced Tamil (Anyone)

Students who have studied Tamil upto XIISTD and also have taken Tamil in Part I shall take SEC-I.

Studentswhohave**not**studiedTamiluptoXIISTDandhavetakenanyLanguageotherthanTamil in Part-I shall take **Basic Tamil** comprising of Two Courses (level will be at6thStd.).

StudentswhohavestudiedTamiluptoXIISTDandhavetakenanyLanguageotherthanTamilin Part-I shall take **Advanced Tamil** comprising of Two Courses.

First Year-Semester-II

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-I	Language Paper-II	3	6
Part-II	100L2Z:EnglishPaper-II	3	6
Part-III	134C2A:CorePaperIIIAnalyticalGeometry(Two &Three Dimensions)@	5	4
	134C2B:CorePaper IV Integral Calculus@	5	5
	Elective Course–2(Any one) 134E2A:AlliedPhysics-II(Practical I and II) 134E2B:Calculus of Finite Differences	3	5
Part-IV	134S2A:SEC–II-Basic Data Analysis Using Excel * 100L2L:BasicTamil-II(Other Language Students)* 100L2M:AdvancedTamil-II(Other Language Students)*	2	2
	Skill Enhancement Course – III(Any One) 134S2B: Computational Mathematics 134S2C:Latex	2	2
		23	**30**

@COMMON TO B.Sc MATHEMATICS WITH COMPUTER APPLICATIONS

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Second Year-Semester-III

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language Paper-III	3	6
Part-II	200L3Z:EnglishPaper-III	3	6
Part-III	234C3A:CorePaperV- Vector Calculus and Applications@	5	4
	234C3B:CorePaperVI- Differential Equations and Applications@	5	5
	Elective Course–III(Anyone) 234E3A:MathematicalStatisticsTheory&PRACTICAL@ 234E3B: Chemistry I	3	5
Part-IV	234S3A:SkillEnhancementCourse-IV(Entrepreneurial Based)	1	1
	Skill Enhancement Course–V(Any One) 234S3B:StatisticswithRProgramming 234S3C:E-Commerce&Tally	2	2
	Environmental Studies	--	1
		22	30

@COMMON TO B.Sc MATHEMATICS WITH COMPUTER APPLICATIONS

Second Year- Semester-IV

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language Paper-IV	3	6
Part-II	200L4Z:EnglishPaper-IV	3	6
Part-III	234C4A:CorePaper –VII Industrial Mathematics–Resource Management Techniques@	5	4
	234C4B:CorePaper–VIII Elements of Mathematical Analysis@	5	4
	Elective Course–IV(Any One) 234E4A: Transform Techniques@ 234E4B:ChemistryII(Practical I and II)	3	5
Part-IV	Skill Enhancement Course – VI(Any One) 234S4A: Introduction to Data Science 234S4B: Web Designing	2	2
	Skill Enhancement Course – VII(Any One) 234S4C: Data Analysis Using SPSS 234S4D:IntroductiontoArtificialIntelligence	2	2
	234V4A:EnvironmentalStudies	2	1
		25	30

@COMMON TO B.Sc MATHEMATICS WITH COMPUTER APPLICATIONS

**Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN**
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Third Year-Semester-V

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-III	334C5A:Core PaperIX Abstract Algebra@	4	5
	334C5B:CorePaperX Real Analysis@	4	5
	334C5C:CorePaperXI Mathematical Modelling@	4	5
	Elective–V(Any One) 334E5A:OptimizationTechniques@ 334E5B:ProgramminginCTheoryandPractical	4	5
	Elective–VI(Any One) 334E5C: Introduction to Machine Learning – Theory & Practical 334E5D: Discrete Mathematics	3	4
	334C5D:CorePaperXIIProjectwithVivavoce	3	4
Part-IV	334V5A:ValueEducation	2	2
	334V5B:Internship/Industrial Training (Summer vacation at the end of IV semester activity)	2	---
		26	30

@COMMON TO B.Sc MATHEMATICS WITH COMPUTER APPLICATIONS

Third Year–Semester-VI

Part	List of Courses	Credit	Hours per week(L/T/P)
Part-III	334C6A:CorePaperXIII Linear Algebra@	4	6
	334C6B:Core Paper XIV Complex Analysis@	4	6
	334C6C:CorePaperXV Mechanics@	4	6
	Elective Course–VII (Anyone) 334E6A:ProgrammingInC++Theory & Practical 334E6B: Fuzzy Sets and Applications@	3	5
	Elective Course–VIII(Any One) 334E6C: Graph Theory and Its Application@ 334E6D:ProgramminginPythonwithPractical	3	5
Part-IV	334V6A:ProfessionalCompetencySkill Mathematics for Competitive Examinations & General Studies	2	2
Part-V	334V6B:ExtensionActivity	1	---
		22	30

@COMMON TO B.Sc MATHEMATICS WITH COMPUTER APPLICATIONS

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

Bachelor of Mathematics (BSc)
(With effect from the Academic Year 2020-21)

1. PREAMBLE

The curriculum of B.Sc. Mathematics is structured in a way that the students acquire in-depth knowledge to perceive the principles of the core. Basics in Algebra, Calculus , Analytical Geometry , Differential Equations and Transform Techniques are covered exclusively to prepare the students to proceed to the next level of Higher Mathematics of Linear Algebra, Real and Complex Analysis, Mechanics. A list of varied electives namely, Operations Research, Graph Theory, Number Theory, Programming Language 'C', Mathematical Modeling, Programming with Python are furnished to bridge between the Main and Applied Mathematics. The comprehensive curriculum design yields an excellent career opportunity in Research, Education, Public and Private Sectors, Business sectors, Banking, IT Industries and in every domain of contemporaries.

2. PROGRAM LEARNING OUTCOMES

The comprehensive course outline enables the students to enhance Computational skills and Mathematical reasoning. The program develops the ability to think critically, logically and analytically thereby preparing the students to enhanced career opportunities in Industries, Commerce, Education and Research.

a. NATURE AND EXTENT OF BACHELOR'S DEGREE PROGRAMME

Mathematics is the culmination of in-depth of knowledge of Algebra, Calculus, Differential equations and several other branches of Mathematics. This also leads to selected areas like Computer science and Statistics. Mathematics is a diverse discipline that deals with data, measurement and observations from science, with inference, deduction and proof and with mathematical models of natural phenomena of human behaviour and of social systems.

b. AIMS OF BACHELOR'S DEGREE PROGRAMME IN MATHEMATICS

The overall aim of B.Sc. Mathematics is to
- Develop broad and balanced knowledge and understanding of definitions, concepts, principles and theorems.
- Enhance the ability of learners to apply the knowledge and skills acquired by them during the programme to solve specific theoretical and applied problems in mathematics.
- Provide students/learners sufficient knowledge and skills enabling them to undertake further studies in mathematics and its allied areas on multiple disciplines concerned with mathematics.

c. GRADUATE ATTRIBUTES IN MATHEMATICS

The graduate attributes in mathematics are mentioned in the expected course learning outcomes of each course which provides critical thinking, analytical reasoning, problem solving and research related skills etc,.

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

3. COURSE STRUCTURE

FIRST SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part – I	Language Paper –I	6	3	25	75	100
Part – II	**BP2-ENG01-Communicative English I**	**3**	**3**	**50**	**50**	**100**
Part – III	BMA-CSC01: Algebra@	4	4	25	75	100
	BMA-CSC02: Differential Calculus@	4	4	25	75	100
	Allied Paper- I	9	5	25	75	100
Part – IV	Basic Tamil/Adv. Tamil/NME –I*	-	2	25	75	100
	BP4-EPSC 01-English for Physical Sciences I	**4**	**4**	**50**	**50**	**100**

SECOND SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part – I	Language Paper –II	6	3	25	75	100
Part – II	**BP2-ENG02-Communicative English II**	**3**	**3**	**50**	**50**	**100**
Part – III	BMA-CSC03: Trigonometry@	4	4	25	75	100
	BMA-CSC04: Integral Calculus and Vector Analysis@	4	4	25	75	100
	Allied Paper- II	9	5	25	75	100
Part – IV	Basic Tamil/Adv. Tamil/NME-II*	-	2	25	75	100
	BP4-EPSC 02-English for Physical Sciences II	**4**	**4**	**50**	**50**	**100**

*NME: CHOOSE ANY ONE OF THE PAPER FROM THE OTHER DEPARTMENT

THIRD SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext. Marks	Total
Part – I	Language Paper –III	6	3	25	75	100
Part – II	**BP2-ENG03-Language Through Literature- I**	**6**	**3**	**50**	**50**	**100**
Part – III	BMA-CSC05: Analytical Geometry@	5	4	25	75	100
	BMA-CSC06: Differential Equations@	4	4	25	75	100
	Allied Paper- III	9	5	25	75	100
Part – IV	Environmental Studies	-	Examination will be held in the IV Sem.			
	Soft Skills	-	3	50	50	100

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

FOURTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part – I	Language Paper –IV	6	3	25	75	100
Part – II	**BP2-ENG04-Language Through Literature- II**	**6**	**3**	**50**	**50**	**100**
Part – III	BMA-CSC07: Transform Techniques@	4	4	25	75	100
	BMA-CSC08: Statics@	5	4	25	75	100
	Allied Paper- IV	9	5	25	75	100
Part – IV	Environmental Studies	-	2	25	75	100
	Soft Skills	-	3	50	50	100

FIFTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part – III	BMA-CSC09: Algebraic Structures-I@	6	4	25	75	100
	BMA-CSC10: Real Analysis-I@	6	4	25	75	100
	BMA-CSC11: Dynamics@	6	4	25	75	100
	BMA-CSC12: Discrete Mathematics@	6	4	25	75	100
	Elective Paper -I: Choose any one from Group-A	6	5	25	75	100
Part – IV	Value Education		2	25	75	100

SIXTH SEMESTER

Course Content	Name of the Course	Ins. Hrs	Credits	Int. Marks	Ext.Marks	Total
Part – III	BMA-CSC13: Algebraic Structures-II@	6	4	25	75	100
	BMA-CSC14: Real Analysis-II@	6	4	25	75	100
	BMA-CSC15: Complex Analysis@	6	4	25	75	100
	Elective Paper -II: Choose any one from Group-B	6	5	25	75	100
	Elective Paper -III: Choose any one from Group-B	6	5	25	75	100
Part – V	Extension Activity		1			

@ Common to B.Sc. Mathematics with Computer Applications.

LIST OF ALLIED SUBJECTS:

BPS-CSA01	Allied Physics – I (Theory)
BCY-CSA1A	Allied Chemistry – I (Theory)
BMA-CSA01	Calculus of finite differences and Numerical Analysis –I@
BMA-CSA02	Mathematical Statistics – I@
BMA-CSA05	Financial Accounting – I
BPS-CSA02	Allied Physics – II (Theory) (pre-requisite Physics – I).
BPS-CSAP1	Allied Physics I & II (Practical)
BCY-CSA2A	Allied Chemistry – II (Theory) (pre-requisite Chemistry – I)
BCY-CSAP1	Allied Chemistry – I & II (Practical)
BMA-CSA03	Calculus of finite differences and Numerical Analysis -II (pre-requisite Calculus of finite differences and Numerical Analysis -I)@
BMA-CSA04	Mathematical Statistics II - (pre requisite Mathematical Statistics- I)@
BMA-CSA06	Financial Accounting - II (prerequisite Financial Accounting - I)
	Cost Accounting
	Management Accounting.

@ Common to B.Sc. Mathematics with Computer Applications.

LIST OF ELECTIVE SUBJECTS

GROUP – A

BMA-DSEA1	PROGRAMMING LANGUAGE 'C' WITH PRACTICALS
BMA-DSEA2	PROGRAMMING LANGUAGE PYTHON WITH PRACTICALS
BMA-DSEA3	MATHEMATICAL MODELING
BMA-DSEA4	NUMERICAL METHODS

GROUP - B

BMA-DSEB1	ELEMENTARY NUMBER THEORY
BMA-DSEB2	GRAPH THEORY
BMA-DSEB3	OPERATIONS RESEARCH
BMA-DSEB4	SPECIAL FUNCTIONS
BMA-DSEB5	APPLIED STATISTICS

The following distribution of marks for Computer related subjects which have both theory and practical (syllabus combined both theory and practical in each paper together) in B.Sc. Mathematics be followed:

PAPER	INTERNAL	EXTERNAL	TOTAL
Theory	25	75	100
Practical	40	60	100

Finally, theory marks (100) be reduced to 60% and practical marks (100) be reduced to 40%.

**Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN**
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

LEARNING OUTCOME

	Programme Name			B.Sc MATHEMATICS
	Shift – I			
Semester	**Course Name**	**Course Code**	**Course Outcome**	**LINK**
	BSc MATHEMATICS			
I	**Algebra & Trignomentry**	**134-C1A**	Basic ideas on Theory of Equations, Matrices and Number Theory. Knowledge to find expansion of trignomentry functions. solve theoretical and applied problems.	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/134C1A.pdf?206371836
	Differential Calculus	**134-C1B**	Basic skills of differentiation, successive differentiation and their applications. Basic knowledge on notion of curvature, evolutes, involutes and polar co-ordinates and solving related problems	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/134C1B.pdf?58318129
	Numerical Methods with Applications	**134E1B**	To solve transcendental and algebraic equations. To understand different operators and their relations. To interpolate given data using different methods. To use difference formula to compute derivatives and integrals.	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/134E1B.pdf?1213431466
	Bridge Mathematics	**134B1A**	To bridge the gap and facilitate transition from higher secondary to tertiary education. To instill confidence among stakeholders and to inculcate interest for Mathematics.	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/134B1A.pdf?615061201
	Financial Mathematics	**134S1A**	Understand the concept of time value of money and its application in finance.Analyse different types of annuities and calculate their present and future values. Understand the principles of bond valuation and pricing.Analyse different type of stocks and evaluate their performance.	https://egovernance.unom.ac.in/ugsyllabus2324/pdf/134S1A.pdf?1687561284

Dr. MGR-JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

III	**Analytical Geometry**	**BMA-CSC05**	To analyze characteristics and properties of two and three dimensional geometric shapes. To develop mathematical arguments about geometric relationships. In Geometry and its applications in real world.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC05.pdf?535987226
	Differential Equations	**BMA-CSC06**	About the methods of solving Ordinary and Partial Differential Equations. To introduce Differential Equation as a powerful tool in solving problems in Science.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC06.pdf?2082144296
	Mathematical Statistics – I	**BMA-CSA02**	The laws of Probability and Baye's theorem. Measures of Location, Dispersion, Correlation and Regression. The Discrete and Continuous Probability Distributions.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSA04.pdf?882589154
IV	**Transform Techniques**	**BMA-CSC07**	About Laplace Transforms and its inverse. To apply Laplace transform in solving Ordinary Differential Equations with constant coefficients, simultaneous Ordinary Differential Equations. To solve problems in Fourier series and Fourier transforms.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC07.pdf?591432374
	Statics	**BMA-CSC08**	Particles or body in rest under the given forces. Forces, equilibrium of a particle and Centre of mass of various bodies.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC08.pdf?2095337424
	Mathematical Statistics II	**BMA-CSA04**	To provide the foundation of statistical analysis used in varied applications. Of Sampling methods, Tests of significance and testing of hypothesis.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSA06.pdf?891418063
V	**Algebraic Structures-I**	**BMA-CSC09**	Students will acquire knowledge about the concepts of Sets, Groups and Rings.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC09.pdf?1538320346
	Real Analysis-I	**BMA-CSC10**	Apply Mathematical concepts and Principles to perform numerical and symbolic computations. Understand and perform simple proofs. Know how abstract ideas and rigorous methods in	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC10.pdf?975704268

Dr. MGR–JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

			Mathematical Analysis can be applied to practical problems.	
	Dynamics	BMA-CSC11	The motion of bodies under the influence of forces. Rectilinear motion of particles, Projectiles, Impact and Moment of Inertia of Particles	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC11.pdf?64124150
	Discrete Mathematics	BMA-CSC12	To apply tools and ideas in Mathematics for solving Applied Problems. To Evaluate Boolean functions and to express a logic sentence in terms of predicates, quantifiers, and logical connectives. To Evaluate Boolean functions and to express a logic sentence in terms of predicates, quantifiers, and logical connectives.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC12.pdf?1591443737
	Programing Language 'C' With Practicals	BMA-DSEA1	About the basic concepts and structure of 'C' program. To write simple programs with Mathematical Applications.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-DSEA1.pdf?2080315522
VI	Algebraic Structures-II	BMA-CSC13	Students will acquire knowledge about the Vector Spaces, Dual spaces, Inner product spaces and linear transformations.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC13.pdf?886301457
	Real Analysis-II	BMA-CSC14	The Real Numbers and the Analytic Properties of Real-Valued Functions. The Analytic concepts of Connectedness, Compactness, Completeness And Calculus.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC14.pdf?507251756
	Complex Analysis	BMA-CSC15	Students will acquire knowledge about the basic ideas of analysis of Complex Functions in solving Complex Variables.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-CSC15.pdf?1630448114
	Graph Theory	BMA-DSEB2	To describe and apply some basic algorithms for graph. To model real world problems using graph theory.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-DSEB2.pdf?44193161
	Operations Research	BMA-DSEB3	Solving Linear Programming Problems. Sequencing the jobs to be carried out based on Cost Optimization. Solving assignment and transportation problems and Queuing Theory Models.	https://egovernance.unom.ac.in/ugsyllabus/pdf/BMA-DSEB3.pdf?797759074

**Dr. MGR–JANAKI COLLEGE
OF ARTS & SCIENCE FOR WOMEN**
SATHYABAMA MGR MALIGAI
11 & 13, Durgabai Deshmukh Road, RA Puram, Chennai - 28
An ISO 9001:2015 CERTIFIED INSTITUTION
Affiliated to the University of Madras

ASSESSMENT PATTERN
CORE PAPERS, ELECTIVE PAPERS AND EXTRA DISCIPLINARY PAPERS

INTERNAL ASSESSMENT: 25 Marks
EXTERNAL ASSESSMENT: 75 Marks
TOTAL: 100 Marks

INTERNAL ASSESSMENT PATTERN

Attendance (5 Marks)			Seminar	Assignment	Test	Total
90-100	80-90	70-80	(5 Marks)	(5 Marks)	(10 Marks)	25

EXTERNAL ASSESSMENT
End Semester External University Examination: 75 MARKS
Duration 3 Hours
- Part -A-(10X2=20) Answer any 10 out of 12   Questions 1-12
- Part -B-(5X5=25) Answer any 5 out of 7   Questions 13-19
- Part -C-(3X10=30) Answer any 3 out of 5   Questions 20-24

QUESTION PAPER PATTERN

Subject Name	Marks	Total
Language, English, Core, Allied and NME Papers	PART- A: 10 out of 12 = 10 x 2 = 20 marks	75
	PART- B: 5 out of 7 = 5 x 5 = 25 marks	
	PART- C: 3 out of 5 = 3 x 10 = 30 marks	