SBAS			YEAR 2018-2021 (SCHEME OF STUDIES)										B.SC. MATHEMATICS			

YEAR: FIRST

			ODD SEMESTER								EVEN SEMESTER				
SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C	SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C
1	BSMA137	CC	ALGEBRA	4	0	0	4	1	BSMA132	CC	MODERN ALGEBRA	4	0	0	4
2	BSMA133	CC	CALCULUS	4	0	0	4	2	BSMA134	CC	ORDINARY DIFFERENTIAL EQUATIONS	4	0	0	4
3	BSMA135	CC	VECTOR CALCULUS	4	0	0	4	3	BSMA136	CC	SOLID GEOMETRY	4	0	0	4
4	BSCH125	AECC	ENVIRONMENTAL STUDIES	3	0	0	3	4	BSEL101	AECC	COMMUNICATION SKILLS	4	0	0	4
5	BSMC119	CC	MATHEMATICAL FINANCE	4	0	0	4	5	BSPH120	GEC	PHYSICS-I	3	1	0	4
6	BSCA131	SEC	INTRODUCTION TO COMPUTERS AND IT-OFFICE AUTOMATION	4	0	0	4	6	BSCH120	GEC	CHEMISTRY-I	4	0	0	4
7	BSCS157	SEC	C PROGRAMMING LAB	0	0	2	1	7	BSPH158	SEC	PHYSICS LAB-I	0	0	2	1
8	BSMA131	SEC	DATA PRESENTATION FOR SCIENCES			2	1	8	BSCH154	SEC	CHEMISTRY LAB-I	0	0	2	1
								9	BSEL171	SEC	COMMUNICATION SKILLS LAB	0	0	2	1
			TOTAL	23	0	4	25				TOTAL	23	1	6	27

YEAR: SECOND

SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C	SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C
1	BSMA217	CC	REAL ANALYSIS	4	0	0	4	1	BSMA218	CC	SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS	4	0	0	4
2	BSMA219	CC	PARTIAL DIFFERENTIAL EQUATIONS	4	0	0	4	2	BSMA220	CC	LINEAR ALGEBRA	4	0	0	4
3	BSMA221	CC	STATICS	4	0	0	4	3	BSMA224	SEC	BASICS OF MATLAB	2	0	0	2
4	BSPH217	GEC	PHYSICS-II	3	1	0	4	4	BSCS110	CC	OBJECT ORIENTED PROGRAMMING	2	1	0	3
5	BSCH207	GEC	CHEMISTRY-II	4	0	0	4	5	BSMC226	CC	PORTFOLIO OPTIMIZATION	4	0	0	4
6	BSEL217	SEC	PERSONALITY DEVELOPMENT AND COMMUNICATION SKILLS	3	0	0	3	6	BSCS166	SEC	OBJECT ORIENTED PROGRAMMING LAB	0	0	2	1
7	BSPH257	SEC	PHYSICS-II LAB	0	0	2	1	7	BSMA254	SEC	MATLAB PROGRAMMING LAB	0	0	2	1
8	BSCH257	SEC	CHEMISTRY LAB-II	0	0	2	1	8	BSMA332	CC	COMBINATORIAL MATHEMATICS	4	0	0	4
			TOTAL	22	1	4	25				TOTAL	20	1	4	23

YEAR: THIRD

SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C	SN	COURSE CODE	NATURE OF	COURSE TITLE	L	T	P	C
1	BSMA323	CC	METRIC SPACES	4	0	0	4	1	BSMA324	CC	REIMANN INTEGRATION AND SERIES OF FUNCTIONS	4	0	0	4
2	BSMA325	CC	COMPLEX ANALYSIS	4	0	0	4	2	BSMA326	CC	OPERATIONAL RESEARCH	4	0	0	4
3	BSMA327	CC	DYNAMICS	4	0	0	4	3			ELECTIVE	4	0	0	4
4	BSCS214	CC	THEORY OF COMPUTATION	3	1	0	4	4			ELECTIVE	4	0	0	4
5	BSMA329	CC	DISCRETE MATHEMATICS	4	0	0	4	5	BSMA342	CC	MATHEMATICAL STATISTICS	4	0	0	4
5	BSMA331	CC	NUMERICAL ANALYSIS	4	0	0	4	6	BSMA354	CC	PROJECT	0	0		5
6	BSDM301	AECC	DIAASTER MANAGEMENT	3	0	0	3								
7	BSMA351	SEC	NUMERICAL ANALYSIS LAB	0	0	2	1								
			TOTAL	26	1	2	28				TOTAL	20	0	0	25

ELECTIVES

1	BSMA336	DSE	NUMBER THEORY	4	0	0	4	3	BSMA338	DSE	MATHEMATICAL MODELING	4	0	0	4
2	BSMA334	DSE	DIFFERENTIAL GEOMETRY	4	0	0	4	4	BSMA340	DSE	THEORY OF RELIABILITY	4	0	0	4

TOTAL HOURS: LECT [L]+PRAC [P]+TUT [T] (EXCLUDING NO L, T, S, P COURSES)	158
TOTAL CREDITS [C]	153

Course Typ	Nomenclature
CC	Core Course
SEC	Skill Enhancement Course
AECC	Ability Enhancement Compulsory
GEC	Generic Elective Course
DSE	Discipline Specific Elective
VAC	Value added course
MOOC	Massive open online course

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

B.Sc. (H) Mathematics: 2022 - 2025 (Scheme of Studies as per Choice-Based Credit System and Learning Outcome-Based Curriculum   25-Jul-22

ODD SEMESTER

Y	SN	COURSE CODE	NATURE	COURSE TITLE	L	T	P	C
First	1	BSMA121A	CC	Calculus	4	0	0	4
	2	BSMA171A	SEC	Calculus Lab	0	0	4	2
	3	BSMA123A	CC	Algebra And Geometry	5	1	0	6
	4	UCES 125A	AECC	Environmental Studies(AEC)	3	0	0	3
	5	UCDM 301A	AECC	Disaster Management(AEC)	3	0	0	3
	6			Open /Generic Elective- I	4	0	0	4
				TOTAL				**22 Credits**
Second	1	BSMA211A	CC	Partial Differential Equations and Calculus of Variations	4	0	0	4
	2	BSMA275A	SEC	Partial Differential Equations and Calculus of Variations Lab	0	0	4	2
	3	BSMA213A	CC	Group Theory	5	1	0	6
	4	BSMA215A	CC	Probability and Statistics	4	0	0	4
	5	BSMA277A	SEC	Probability and Statistics Lab	0	0	2	1
	6	ETCS109A	SEC	Data Analysis and Visualization	2	0	0	2
	7	ETCS159A	SEC	Data Analysis and Visualization Lab(SEC)	0	0	2	1
	8			Generic Elective -III	-	-	-	-
	9		MOOC		-	-	-	2
				TOTAL				**22 + GE Credits**
Third	1	BSMA301A	CC	Numerical Analysis	4	0	0	4
	2	BSMA371A	SEC	Numerical Analysis Lab	0	0	4	2
	3	BSMA303A	CC	Set Theory and Metric Spaces	5	1	0	6
	4		DSE	Discipline Specific Elective- I	-	-	-	6
	5		DSE	Discipline Specific Elective- II	-	-	-	6
	6	VAC	VAC	VAC	0	0	0	0
				TOTAL				**24 Credits**

EVEN SEMESTER

SN	COURSE CODE	Nature	COURSE TITLE	L	T	P	C
1	BSMA122A	CC	Multivariable Calculus	4	0	0	4
2	BSMA172A	SEC	Multivariable Calculus Lab	0	0	4	2
3	BSMA124A	CC	Ordinary Differential Equations	4	0	0	4
4	BSMA174A	SEC	Ordinary Differential Equations Lab	0	0	4	2
5	ETCS104A	SEC	Programming in Python	3	1	0	4
6	ETCS150A	SEC	Introduction to Computer Science and Programming in Python Lab(SEC)	0	0	2	1
7	UCCS 155A	AECC	Communication Skills(AEC)	4	0	0	4
8			Open/Generic Elective- II	4	0	0	4
			TOTAL				**25 Credits**
1	BSMA212A	CC	Advanced Algebra	5	1	0	6
2	BSMA214A	CC	Linear Algebra	5	1	0	6
3	BSMA216A	CC	Real Analysis	5	1	0	6
4	BSMA274A	SEC	Introduction to LaTeX (SEC)	0	0	2	1
5			Generic Elective- IV	-	-	-	-
6	BSMA222A	SEC	Internship program in Mathematics				2
7	VAC	VAC	VAC	0	0	0	0
			TOTAL				**21 + GE Credits**
1	BSMA302A	CC	Complex Analysis	4	0	0	4
2	BSMA372A	SEC	Complex Analysis Lab	0	0	4	2
3	BSMA304A	CC	Linear Programming	4	0	0	4
4	BSMA374A	SEC	Linear Programming Lab	0	0	4	2
5		DSE	Discipline Specific Elective- III	-	-	-	6
6	BSMA314A	DSE	Discipline Specific Elective- IV (Dissertation o	-	-	-	6
			TOTAL				**24 Credits**

Electi

Discipline Specific Elective I and II (Choose any two)

			L	T	P	C
1	BSMA305A	Tensors and Differential Geometry	5	1	0	6
2	BSMA307A	Mathematical Logic	5	1	0	6
3	BSMA309A	Integral Transforms and Fourier Analysis	5	1	0	6
4	BSMA311A	Information Theory and Coding	5	1	0	6
5	BSMA313A	Graph Theory	5	1	0	6
6	BSMA327A	Dynamics	5	1	0	6
7	BSMA315A	Special Theory of Relativity	5	1	0	6

Discipline Specific Elective III (Choose any two)

				L	T	P	C
1	BSMA306A	DSE	Advanced Mechanics	5	1	0	6
2	BSMA308A	DSE	Wavelets and Applications	5	1	0	6
3	BSMA310A	DSE	Number Theory	5	1	0	6
4	BSMA312A	DSE	Cryptography	5	1	0	6
	BSCS113A	DSE	C++Programming for Mathematics	4	1	0	5
5	BSCS167A	DSE	C++Programming for Mathematics Lab	0	0	2	1
6	BSMC671A	DSE	Mathematical Finance	5	1	0	6
7	BSMA338A	DSE	Mathematical Modelling	5	1	0	6

Generic Elective III (Choose any one)

			L	T	P	C
1	BSMA329A	Discrete Mathematics	4	1	0	5
	ETCS425A	Machine Learning	4	-	-	4
2	ETCS455A	Machine Learning Lab(SEC)	-	-	1	1
	ETCS217A	Data Structures	4	0	0	4
3	ETCS 257A	Data Structures Lab(SEC)	0	0	2	1
4	SHES213A	Statistical Methods for Economics	5	1	0	6

Generic Elective IV (Choose any one)

				L	T	P	C
1	ETCS401A		Artificial Intelligence	3	1	0	4
	ETCS451A		Artificial Intelligence Lab(SEC)	0	0	2	1
	ETCS307A		DATABASE MANAGEMENT SYSTEMS	3	1	-	4
2	ETCS 355A		DATABASE MANAGEMENT SYSTEMS LAB(SEC)	-	-	2	1
	ETCS 220A		Analysis and Design of Algorithms	4	0	0	4
3	ETCS262A		Analysis and Design of Algorithms Lab(SEC)	0	0	2	1
4	SHES216A		Econometrics	5	1	0	6

COURSE TYPE	NOMENCLATURE
CC	CORE COURSE
SEC	SKILL ENHANCEMENT COURSE
AECC	ABILITY ENHANCEMENT COMPULSORY COURSE
GEC	GENERIC ELECTIVE COURSE
DSE	DISCIPLINE SPECIFIC ELECTIVE

Student may Student may	
Total Credits [C]	**148-150 as per the generic electives chosen by students**

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Yellow Highlighted are New Courses Introduced

B.Sc (H) Mathematics

BSMA314A	DISSERTATION	L	T	P	C
Version 1.0		0	0	0	6
Total Contact Hours					
Pre-requisites/Exposure	--				
Co-requisites	--				

Course Objectives

1   Demonstrate advanced critical research skills in relation to career development or work-related learning studies.

2   Acquire the skills to publish the data in reputed journals, conference proceeding and workshops.

3   Demonstrate an ability to present and defend their research work to a panel of experts.

Course Outcomes

On completion of this course, the students will be able to

CO1   Know the concept, scope of research.

CO2   Enable the students to gain knowledge on particular areas of research.

CO3   Understand the scientific methods to study region.

CO4   Analyze the practical knowledge of research and apply the subject matter knowledge in the field

CO5   Learn the art of reporting.

CO6   Able to educate the technical skill of writing.

Catalog Description

The objective of research project is to enable the student with hands-on experiences with learning to lead a research work. Research gives them experience based and active learning. It engages students with contexts, including the social and civic. The mentoring and collaboration dimensions of undergraduate research can foster ownership for commitment to high standards and accountability. While the research process in a discipline may be well-established, research always requires creativity, as well as patience and resolve in grappling with what sometimes feels ambiguous to all participants, including the faculty mentor. These features create

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)
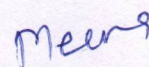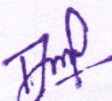
DEAN
School of Basic & Applied Sciences (SBAS)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103

opportunities for students to explore their own learning styles as well as develop exposure to those of others.
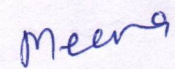
Guidelines

1. Students will be divided among faculty members for the supervision of the research work.
2. In the first week of Semester V, each faculty member will assign a suitable research topic to the students from the selected topics in the areas of mathematical sciences.
3. The student will work on the assigned research topic during semesters V and VI in regular consultation with his/her assigned faculty member.
4. The student will write a dissertation based on the research work carried out during Semesters V and VI and prepare two copies to be submitted to the office of the Dean duly signed by the student and the supervisor in the sixth week of VI semester or a date decided by the Dean of the school.
5. Before preparing power point presentation and submission of dissertation, each student has to deliver a seminar talk on his/ her research project work on a date fixed by HOD, necessary suggestions has to be incorporated in the final draft of dissertation.
6. The student will make a power point presentation based on the work carried out and mentioned in the dissertation to the board of examiners appointed by the University.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Internal (Interaction of Student with Supervisor)	External			Total
		Relevance of topic (20)	Presentation (20)	viva (10)	100
Weightage (%)	50	20	20	10	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

	Course Outcomes (COs)	Mapped Program Outcomes
Mapping between COs and POs		
CO1	Know the concept, scope of research.	**PO4**
CO2	Enable the students to gain knowledge on particular areas of research.	**PO6**
CO3	Understand the scientific methods to study region.	**PO5**
CO4	Analyze the practical knowledge of research and apply the subject matter knowledge in the field	**PO8**
CO5	Learn the art of reporting.	**PO7**
CO6	Able to educate the technical skill of writing.	**PO3**

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

DEAN
School of Basic & Applied Sciences (SBAS)
K.R. Mangalam University
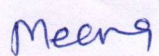Sohna road, Gurugram
Haryana 122103

DISSERTATION

Course Code	Course Title	PO1 Apply information on scientific facts to face day to day requirements	PO2 Apply moral principles and responsibilities of a science graduate to serve the society	PO3 Create innovative ideas by using scientific knowledge for analysis and interpretation of data.	PO4 Ability to work independently as well as in collaboration with other individuals /institutions.	PO5 Knowledge regarding advancement in various branches of mathematics	PO6 Inculcate moral/ethical values and environmental consciousness	PO7 Enhance employability/ entrepreneurship skills	PO8 Ability to communicate various concepts of mathematics effectively.	PO9 Capable to use appropriate software's to solve mathematical equations.	PO10 Develop the protocols as per laboratory standards to accomplish the objectives	PSO1 To gain a strong foundation in various branches of mathematics to investigate and solve the real-life problem	PSO2 Acquire jobs in government and public sector undertakings, banks, central government institutes and pursuing higher studies at countrywide.	PSO3 Analyze the local and global impacts of understanding of values, ideas, and outcomes in a specific subject area.	PSO4 To develop entrepreneurial skills to become empowered and self-reliant	PSO5 Understand the basic concepts of statistics, algebra, and differential equations	PSO6 Apply the mathematical modeling and reasoning to solve basic problems.
BSMA 314A				3	3	3	3	3	3			3		3	3		

1=weakly mapped
2= moderately mapped
3=strongly mapped

Programme and Course Mapping

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PO11	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	2											3	2	1	1	2	1
CO2								2				3	2	1	1	2	1
CO3		3										3	2	1	1	2	1
CO4				2								3	2	1	1	2	1
CO5			3									3	2	1	1	2	1
CO6	3											3	2	1	1	2	1

1=lightly mapped   2= moderately mapped   3=strongly mapped

	Dissertation/Research Project
Local	-
Regional	-
National	-
Global	-
Employability	Choice Based Credit System having field projects / research projects / internships (1.3.4) Courses on employability/ entrepreneurship/ skill development (1.1.3); Student centric methods, such as experiential learning, participative learning and problem-solving methodologies (2.3.1)
Entrepreneurship	Entrepreneurship; Team work/ Creativity by designing research problem

Registrar
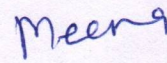K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

Meena
DEAN
School of Basic & Applied Sciences (SBAS)
K.R. Mangalam University
Sohna road, Gurugram
Haryana 122103

Skill Development	Disciplinary knowledge; Research related skills; scientific skills,
Professional Ethics	-
Gender	-
Human Values	-
Environment & Sustainability	-
SDG	Equal Access to TVET and Higher Education (SDG 4.3), Quality Education and skills for employability 4.4
NEP	Higher Education System through scientific temper (9.1.1) India's Higher Education System through scientific temper (9.1.1)Towards a More Holistic and Multidisciplinary Education opportunitiesfor cross-disciplinary and interdisciplinary thinking (11.6); strong culture of research and knowledge creation (17.6) "
POE/4th IR	Employability, Project, Hands on Experience, Entrepreneurship; Team work

BSMA222A	Internship in Mathematics	L	T	P	C
Version 1.0		0	0	0	2
Pre-requisites/Exposure	Practical exposure				
Co-requisites	--				

Course Objectives

1. To learn how to carry out literature surveys on the assigned topic.
2. To be associated with an area of research/research project and contribute towards domain knowledge through hands on.
3. To learn the art of technical report writing.
4. To learn the art of verbal communication with the help of modern presentation techniques.

Course Outcomes

On completion of this course, the students will be able to

CO1. Carry out the extensive literature survey on the topic assigned by academicians and industry experts.

CO2. Learn to write and present technical reports/articles.

CO3. Learn to analyze various methods and techniques applicable to the topic to study and contribute to domain knowledge.

CO4. Learn to analyze/evaluate the result of the experiment carried out and present the results using data visualization methods.

Catalog Description

1. In the end of Semester IV, students will be asked to join research/academic organizations or industries to get hands on knowledge on the selected topics.

3. The student will work on the assigned topic for 3-4 weeks in regular consultation with his/her assigned expert/guide.

4. The student will write a report based on the work carried out during internship and prepare two copies to be submitted to the office of the Head of the Department duly signed by the student and the expert.

5. The student will make a power point presentation based on the work carried out and mentioned in the report to the board of examiners appointed by the University in the fifth semester. The student will be evaluated based on a report and presentation.
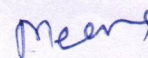
Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Internal (Interaction of Student with Supervisor)	External			Total
		Relevance of topic (20)	Presentation (20)	viva (10)	100
Weightage (%)	50	20	20	10	

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

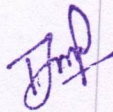DEAN
School of Basic & Applied Sciences (SBAS)
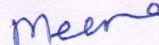K.R. Mangalam University
Sohna r   , Gurugram
Ha   .ia 122103

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Carry out the extensive literature survey.	**PO1, PO3**
CO2	Learn to write and present technical reports/articles.	**PO1, PO5, PO8, PO9**
CO3	Learn to analyze various methods and techniques applicable to the topic to study and contribute to domain knowledge.	**PO2, PO3, PO4, PSO1, PSO4**
CO4	Learn to analyze/evaluate the result of the experiment carried out and present the results using data visualization methods.	**PO5, PO6,PSO2 and PSO3**

Programme and Course Mapping															
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**	**PSO3**	**PSO4**
CO1	3		3												
CO2	3				3			3	3						
CO3		3	3	3								3			3
CO4					3	3							2	3	
	1=lightly mapped				2= moderately mapped					3=strongly mapped					

	Internship
Local	-
Regional	-
National	-
Global	-
Employability	Choice Based Credit System having field projects /

		research projects / internships (1.3.4) Courses on employability/ entrepreneurship/ skill development (1.1.3); Student centric methods, such as experiential learning, participative learning and problem-solving methodologies (2.3.1)
Entrepreneurship		Entrepreneurship; Team work/ Creativity by designing research problem
Skill Development		Disciplinary knowledge; Research related skills; scientific skills,
Professional Ethics		-
Gender		-
Human Values		-
Environment & Sustainability		-
SDG		Equal Access to TVET and Higher Education (SDG 4.3), Quality Education and skills for employability 4.4
NEP		Higher Education System through scientific temper (9.1.1) India's Higher Education System through scientific temper (9.1.1)Towards a More Holistic and Multidisciplinary Education opportunitiesfor cross-disciplinary and interdisciplinary thinking (11.6); strong culture of research and knowledge creation (17.6) "
POE/4th IR		Employability, Project, Hands on Experience, Entrepreneurship; Team work

Meena