Statistics of Applied Mathematics_BoS

Central University of Tamil Nadu

School of Mathematics and Computer Science

Department of Statistics and Applied Mathematics

Board of Studies

Minutes of Meeting

Meeting Scheduled on 15 July, 2023 at 11:00 am in the Department of Statistics and Applied Mathematics in the hybrid mode(online as well as offline). Following members were present:

Internal Members:

Dr. Deepak M. Sakate, Head of the Department-Chair Person	15/07/2023
Dr. C. Vijayalakshmi, Associate Professor, Department of Statistics and Applied Mathematics	C-Vijaya 15/7/23
Dr. J. Kokila, Assistant Professor, Department of Statistics and Applied Mathematics	15/7/23
Dr. D. Narsimhulu, Assistant Professor, Department of Statistics and Applied Mathematics	15/7/23
Dr. Bhabani Shankar Mohanty, Assistant Professor, Department of Statistics and Applied Mathematics	15/07/23
Dr. Chandra Mouli P.V.S.S.R., Associate Professor and Head, Department of Computer Science (Member from Other Department)	Leave of absence was granted.
Dr. Akhandanand Shukla, Associate Professor and Head, Department of Library and Information Sciences (Observer)	Leave of absence was granted.

External Members

Prof. R. Muthukrishnan, Department of Statistics, Bharathiar University, Coimbatore	Joined online on Google Meet.
Prof. Tirupati Rao Padi, Department of Statistics, Pondicherry Universtiy, Puducherry	15/7/23
Prof. K. Murugesan, NIT, Trichy	15/7/2023

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Agenda 1: Approval of revised M.Sc. Statistics and Applied Mathematics syllabus to be implemented from AY 2023-24.

Resolution: The board of Studies approved the revised syllabus of M.Sc. Statistics and Applied Mathematics to be implemented from AY 2023-24. The details of the revison made are as follows:

a) **The Board of Studies (BoS) approved the changes (addition, deletion or modification) made in the following courses:**

No	Course Code	Course Title	Changes Made	Reason
1	SAM2011	Real Analysis	Analysis I (SAM011), Analysis II (SAM021) are converted to Real Analysis and Advanced Mathematical Analysis (New Course)	Teacher's feedback
2	SAM2012	Linear Algebra	**Removed:** Dual spaces, Theory and computational aspects, Applications of Cayley-Hamilton theorem, Matrix limits and Markov Chains, Operators on complex and real vector spaces, least squares. **Added:** Types of matrices, Moore-Penrose inverse, Cholesky decomposition.	Teacher's feedback
3	SAM2013	Probability Distributions	**Removed:** Limit Theorems, Convergence of sequence of random variables and modes of convergence. **Added:** Applications to random number generation. Sampling distributions: Students' t, Chi-square & Snedecors' F.	Teacher's feedback
4	SAM2014	Statistical Inference	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
5	SAM2022	Multivariate Statistical Analysis	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
6	SAM2023	Regression Analysis	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
7	SAM2024	Numerical Analysis	**Removed:** Convergence considerations, Approximation by trigonometric polynomials, Fast Fourier transforms, Error estimation and convergence of single and multistep methods. **Added:** Newton-Raphson method	Teacher's feedback
8	SAM2031	Stochastic Processes	Unit III and IV are interchanged. Added: Concept of Stationary Process. Unit V.	Teacher's feedback

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9	SAM2032	Design and Analysis of Experiments	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
10	SAM2033	Differential Equations	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
11	SAM2041	Calculus of Variations & Integral Equations	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
12	SAMEC01	Fluid Dynamics	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
13	SAMEC02	Artificial Intelligence	Converted 4 units to 5 units by splitting units	To comply with NEP 2020
14	SAMEC04	Industrial Statistics	Title Changed from Statistical Quality Control to Industrial Statistics. Converted 4 units to 5 units by splitting units	To comply with NEP 2020
15	SAMEC06	Machine Learning	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units	To comply with NEP 2020
16	SAMEC07	Biostatistics	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units	To comply with NEP 2020
17	SAMEC08	Integral Transforms	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units	To comply with NEP 2020
18	SAMEC09	Advanced Numerical Methods	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
19	SAMEC11	Time Series Analysis	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
20	SAMEC12	Mechanics	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
21	SAMEC13	Advanced Topics in Differential Equations	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
22	SAMEC14	Mathematical Modeling in Biology	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
23	SAMEC15	Econometrics	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
24	SAMEC17	Statistical Methods in Clinical Trails	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
25	SAMEC19	Generalized Linear Models	Credits changed from 4 to 3. Converted 4 units to 5 units by splitting units.	To comply with NEP 2020
26	SAM2042	Project	**Added:** The guidelines for doing project.	Teacher's feedback

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b) **The total percentage of changes made:** 10%

c) **The Board of Studies (BoS) approved the inclusion of new courses:**

No	Course Code	Course Title	CBCS Nature	Course Type	Credit	Hours / week	Marks	
							Int	Ext
1	SAM2015	Sampling Theory	CC	Theory	3	3	40	60
2	SAM2016	Introduction to R programming	CCP	Practical	2	4	100	
3	SAM2017	Introduction to PYTHON	CCP	Practical	2	4	100	
4	SAM2021	Probability Theory	CC	Theory	3	3	40	60
5	SAM2025	Introduction to MATLAB and Practicals on Numerical Analysis	CCP	Practical	2	4	100	
6	SAM2026	Practicals on Multivariate Statistical Analysis & Regression Analysis	CCP	Practical	2	4	100	
7	SAMOE01	Basic Statistics	OE	Theory	3	3	40	60
8	SAMOE02	Essential Mathematical Methods	OE	Theory	3	3	40	60
9	SAMOE03	Exploratory Data Analysis	OE	Theory	3	3	40	60
10	SAM2027	Internship	Internship	Internship	4	*	40	60
11	SAM2034	Optimization Techniques	CC	Theory	4	4	40	60
12	SAM2035	Practicals on Stochastic Processes and Design and Analysis of Experiments	CCP	Practical	2	4	100	
13	SAM2036	Practicals on Differential Equations and Optimization Techniques	CCP	Practical	2	4	100	
14	SAMSS01	Type Setting using LATEX	Soft Skill	Theory	2	2	40	60
15	SAMEC03	Advanced Mathematical Analysis	DSE	Theory	4	4	40	60
16	SAMEC05	Demography	DSE	Theory	4	4	40	60
17	SAMEC10	Game Theory	DSE	Theory	3	3	40	60
18	SAMEC16	Reliability Theory	DSE	Theory	3	3	40	60
19	SAMEC18	Evolutionary Algorithms	DSE	Theory	3	3	40	60
20	SAMEC20	Actuarial Statistics	DSE	Theory	3	3	40	60

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21	SAMEC21	Deep Learning	DSE	Theory	3	3	40	60
22	SAMEC22	Fuzzy Set Theory and Fuzzy Logic	DSE	Theory	3	3	40	60
23	SAMVA01	Introduction to SAS	VAC	Practical	2	4	100	
24	SAMVA02	Data Analysis using MS Excel	VAC	Practical	2	4	100	
25	SAMVA03	Indian Official Statistics	VAC	Theory	2	2	40	60

d) **Course that focus on employability / entrepreneurship/ skill development:** Approved List Attached

e) **Research projects / Internships:** are included in the Curriculum. The details mentioned in the syllabus are approved by BoS.

f) **Cross-cutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability and other value framework enshrined in Sustainable Development goals and National Education Policy – 2020 in the Curriculum**
Following are the courses that integrate the above: Approved List Attached

g) **Following Question Paper Template is approved:**

Question Paper Template

Part – A

Answer *ALL* the questions **(10 x 1 = 10 Marks)**
Question nos: 1 to 10
TEN questions – TWO questions from each unit- only MCQ

Part – B

Answer *ALL the* questions **(5 x 3 = 15 Marks)**
Question nos: 11-15
FIVE questions – ONE question from each unit

Part – C

Answer *FIVE* questions **(5 x 7 = 35 Marks)**
Question nos: 16-20
FIVE questions – ONE question from each unit with internal choice (either or type).
It can be a question with seven marks or with sub-divisions

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Question paper analysis- to be submitted by the course teacher along with the question paper.

Q.No	Question	CO Matching	Type (Understand, Apply, Analyze, Create, Skill)	Strength (Low, Medium, High)
1				
2				
3				

Agenda 2: Approval of Research Proposals

esolution: The research proposal for Ph.D. Applied Mathematics was submitted by Ms. K. Athira (R202601) under the guidance of Dr. D. Narsimhulu. The proposal with title, "Study of Admissible Numerical Solutions for Self-Similar Compressible Fluids", is approved.

Agenda 3: Approval for Change in Nomenclature of M.Sc. Statistics and Applied Mathematics to M.Sc. Statistics.

The change in Nomenclature of M.Sc. Statistics and Applied Mathematics to M.Sc. Statistics was discussed.

esolution: It is resolved to

a) Change nomenclature of M.Sc. Statistics and Applied Mathematics to M.Sc. Statistics.

Agenda 4:

The change in the Nomenclature of Department of Statistics and Applied Mathematics to Department of Statistics was discussed.

esolution: It is resolved to

a) Change nomenclature of Department of Statistics and Applied Mathematics to Department of Statistics.
b) The faculty members working in the Department of Statistics and Applied Mathematics will work in the proposed Department of Statistics.
c) The Department will continue running Ph.D. Statistics and Ph.D. Applied Mathematics Programs.
d) However, it is opined that once nomenclature is changed to M.Sc. Statistics, all the courses shall be according to the M.Sc. Statistics and faculty members of M.Sc. Statistics only should handle the course. Hence, appropriate measure may be adopted without deviations from the spirit of competent discipline faculty only shall handle the respective courses.

Meeting Ended with Vote of thanks proposed by Dr. Deepak M Sakate.

15/07/2023

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Central University of Tamil Nadu

School of Mathematics and Computer Sciences

Department of Statistics and Applied Mathematics

M.Sc. Statistics and Applied Mathematics

Syllabus

(As Per NEP 2020)

To Be Implemented from AY 2023-24

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Chairperson, BOS

Head
Department of Statistics and Applied Mathematics
School of Mathematics and Computer Sciences
Central University of Tamil Nadu

M.Sc. Statistics and Applied Mathematics
Programme Structure

No	Course Code	Course Title	CBCS Nature	Course Type	Credit	Hours / week	Marks	
							Int	Ext
SEMESTER – I								
1	SAM2011	Real Analysis	CC	Theory	4	4	40	60
2	SAM2012	Linear Algebra	CC	Theory	4	4	40	60
3	SAM2013	Probability Distributions	CC	Theory	4	4	40	60
4	SAM2014	Statistical Inference	CC	Theory	4	4	40	60
5	SAM2015	Sampling Theory	CC	Theory	3	3	40	60
6	SAM2016	Introduction to R programming	CCP	Practical	2	4	100	
7	SAM2017	Introduction to PYTHON	CCP	Practical	2	4	100	
Total					23	27		
Total Hours in Semester I: 27x15=405 hours								
SEMESTER – II								
1	SAM2021	Probability Theory	CC	Theory	3	3	40	60
2	SAM2022	Multivariate Statistical Analysis	CC	Theory	3	3	40	60
3	SAM2023	Regression Analysis	CC	Theory	3	3	40	60
4	SAM2024	Numerical Analysis	CC	Theory	3	3	40	60
5	SAM2025	Introduction to MATLAB and Practicals on Numerical Analysis	CCP	Practical	2	4	100	
6	SAM2026	Practicals on Multivariate Statistical Analysis & Regression Analysis	CCP	Practical	2	4	100	
7	SAMOE**	Open Elective	OE	Theory	3	3	40	60
8	SAM2027	Internship	Internship		4	*	40	60
Total					23	23+*		
	SAMVA**	Value Added Course			2			
*Internship will be conducted in continuous mode for 160 hrs (1 credit = 40hrs)								
Total Hours in Semester II: 23x15=345+160 (Internship)=505 hours								
SEMESTER – III								
1	SAM2031	Stochastic Processes	CC	Theory	4	4	40	60
2	SAM2032	Design and Analysis of Experiments	CC	Theory	4	4	40	60
3	SAM2033	Differential Equations	CC	Theory	3	3	40	60
4	SAM2034	Optimization Techniques	CC	Theory	4	4	40	60
5	SAM2035	Practicals on Stochastic Processes and Design and Analysis of Experiments	CCP	Practical	2	4	100	

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6	SAM2036	Practicals on Differential Equations and Optimization Techniques	CCP	Practical	2	4	100	
7	SAMEC**	DSE – 1	DSE	Theory	4	4	40	60
8	SAMSS01	Type Setting using LATEX	Soft Skill	Theory	2	2	40	60
Total					25	29		
Total Hours in Semester III: 29x15=435 hours								
SEMESTER – IV								
1	SAM2041	Calculus of Variations & Integral Equations	CC	Theory	4	4	40	60
2	SAMEC**	DSE – 2	DSE	Theory	3	3	40	60
3	SAMEC**	DSE – 3	DSE	Theory	3	3	40	60
4	SAMEC****	DSE – 4	DSE	Theory	3	3	40	60
5	SAM2042	Project	Project	Project	8	#	40	60
Total					21	13+#		
# 8x40=320 hours (1 credit = 40 hours)								
Total Hours in Semester IV: 13x15=195 (DSE/CC) + 320 (Research Project) = 515 hours								
Total Credits=92								
Total Hours=1860								

Multiple Entry and Exit Option

1) Students can exit the program after successfully completing First Year (Semester I and II) of M.Sc. Statistics and Applied Mathematics. Such students will be awarded PG Diploma in Statistics and Applied Mathematics.
2) Students successfully completing all four Semesters will be awarded M.Sc. Statistics and Applied Mathematics.
3) Students can enter the program at the beginning of Semester I after completing THREE year Bachelor Degree
   OR
   at the beginning of Semester III after completing FOUR year Bachelor Degree/First two semesters of M.Sc. Statistics and Applied Mathematics/M.Sc. Statistics/M.Sc. Applied Mathematics.

S. No.	Course Components / Name of the Course	Credits	Percentage
1	Core Courses (CC)	50	54.34
2	Core Courses Practical (CCP)	12	13.04
3	Discipline Specific Elective (DSE)	13	14.13
4	Open Elective (OE)	3	3.26
5	Soft-Skill (SS)	2	2.17
6	Internship	4	4.34
7	Project	8	8.69
	Total	92	100
8	Value Added Course	2	

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ELECTIVE BASKET

List of Electives for DSE – 1

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMEC01	Fluid Dynamics	4	4	DSE
2	SAMEC02	Artificial Intelligence	4	4	DSE
3	SAMEC03	Advanced Mathematical Analysis	4	4	DSE
4	SAMEC04	Industrial Statistics	4	4	DSE
5	SAMEC05	Demography	4	4	DSE

List of Electives for DSE – 2

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMEC06	Machine Learning	3	3	DSE
2	SAMEC07	Biostatistics	3	3	DSE
3	SAMEC08	Integral Transforms	3	3	DSE
4	SAMEC09	Advanced Numerical Methods	3	3	DSE
5	SAMEC10	Game Theory	3	3	DSE

List of Electives for DSE – 3

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMEC11	Time Series Analysis	3	3	DSE
2	SAMEC12	Mechanics	3	3	DSE
3	SAMEC13	Advanced Topics in Differential Equations	3	3	DSE
4	SAMEC14	Mathematical Modeling in Biology	3	3	DSE
5	SAMEC15	Econometrics	3	3	DSE
6	SAMEC16	Reliability Theory	3	3	DSE

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List of Electives for DSE – 4

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMEC17	Statistical Methods in Clinical Trails	3	3	DSE
2	SAMEC18	Evolutionary Algorithms	3	3	DSE
3	SAMEC19	Generalized Linear Models	3	3	DSE
4	SAMEC20	Actuarial Statistics	3	3	DSE
5	SAMEC21	Deep Learning	3	3	DSE
6	SAMEC22	Fuzzy Set Theory and Fuzzy Logic	3	3	DSE

List of Open Electives

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMOE01	Basic Statistics	3	3	OE
2	SAMOE02	Essential Mathematical Methods	3	3	OE
3	SAMOE03	Exploratory Data Analysis	3	3	OE

List of Value Added Courses

S. No	Course Code	Course Name	Credit	Hours	Type
1	SAMVA01	Introduction to SAS	2	4	VAC
2	SAMVA02	Data Analysis using MS Excel	2	4	VAC
3	SAMVA03	Indian Official Statistics	2	2	VAC

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A. Vision

Vision Statement of the Department

Vision Statement
To provide quality education to bring out potentialities in the students

B. Mission

Mission Statements of the Department

M1	To produce able statisticians and Applied Mathematicians
M2	To impart current knowledge on cross cutting issues in the domain
M3	To equip students with knowledge to work in domain specific targeted industries

C.Program Objective (PO)

After two years of successful completion of the program, the student will

PO1	Have a broad background in Statistics and Applied Mathematics, an appreciation of its various sub-disciplines and their inter-relationships, acquire in-depth knowledge about topics chosen from those offered through the department.
PO2	Be familiar with a variety of real-life situations where Statistics and Mathematics help accurately explain the underlying abstract or physical phenomena and able to recognize and appreciate the connections between theory and applications
PO3	Develop the ability to effectively and aptly use techniques from different sub-disciplines in solving a broad range of real-life problems.
PO4	Be Statistically and Mathematically literate. Graduates will recognize the importance and value of discipline.
PO5	Have the versatility to work effectively in a broad range of companies (including R&D sectors of financial, pharmaceutical, market research, software development companies, consultancy etc), or analytic, scientific, government, financial, health, teaching and other positions or continue for higher education.
PO6	Be able to independently read and analyze Statistical and Mathematical literature including survey articles, scholarly books, and online sources.
PO7	Be life-long learner, able to independently expand their expertise when needed, or out of their own interest.
PO8	Be able to exhibit ethical and professional behaviour in teamwork

D. Graduate Attributes for M.Sc. Statistics and Applied Mathematics Program

1. In-depth knowledge in sub-disciplines offered in this program
2. Problem Solving in various fields
3. Model Building and Data Analysis
4. Using Computational Software
5. Life-long learner
6. Ethical and professional behaviour in teamwork

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E. PO to Mission Statement Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
M1	3	3	3	3	3	3	3	3
M2	3	3	3	3	3	3	3	3
M3	3	3	3	3	3	3	3	3

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F. program Specific Outcomes (PSO)

On the successful completion of the program, the student will be able to

PSO1	Effectively recall basics and display knowledge of conventions.
PSO2	Develop stochastic and Mathematical models for studying real-life phenomena in diverse disciplines.
PSO3	Efficiently interpret and translate the outcomes obtained from the analysis of stochastic and mathematical models to an environment understandable to a layman.
PSO4	Effectively use necessary computational software.
PSO5	Apply statistical and mathematical techniques to optimize and monitor real-life phenomena related to industry and business analytics at local and global levels.

G. PSO to PO Mapping

	PSO1	PSO2	PSO3	PSO4	PSO5
PO1	3	3	3	3	3
PO2	3	2	2	2	3
PO3	3	3	2	3	3
PO4	3	3	2	3	3
PO5	3	3	3	3	3
PO6	3	2	2	1	2
PO7	3	2	2	3	3
PO8	1	3	3	1	3

H. Question Paper Template

Part – A

Answer *ALL* the questions **(10 x 1 = 10 Marks)**

Question nos: 1 to 10

TEN questions – TWO questions from each unit- only MCQ

Part – B

Answer *ALL the* questions **(5 x 3 = 15 Marks)**

Question nos: 11-15

FIVE questions – ONE question from each unit

Part – C

Answer *FIVE* questions **(5 x 7 = 35 Marks)**

Question nos: 16-20

FIVE questions – ONE question from each unit with internal choice (either or type).

It can be a question with seven marks or with sub-divisions

J. Rubrics for core course practical (CCPR) evaluation:

The split up for CCPR evaluation is as follows:

Component	Marks
Practical Examination	60
Practical Work Record	20
Practical Viva	10
Observation	10
Total	**100**

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via Syllabus

CENTRAL UNIVERSITY OF TAMIL NADU, THIRUVARUR
SCHOOL OF MATHEMATICS AND COMPUTER SCIENCES

M.Sc. STATISTICS AND APPLIED MATHEMATICS

COURSE STRUCTURE 2020-2021

Semester	Course code	Course title	Credits	Page No.
Semester 1	SAM011	Analysis I	4	2
	SAM012	Linear Algebra	4	3
	SAM013	Probability Distributions	4	4
	SAM014	Statistical Computing with "R" (Theory and Lab)	4	5
Semester 2	SAM021	Analysis II	4	6
	SAM022	Multivariate Statistical Analysis (Theory and Lab)	4	7
	SAM023	Numerical Analysis (Theory and lab)	4	8
	SAM024	Differential Equations	4	9
	SAM025	Statistical Inference	4	10
Semester 3	SAM031	Fluid Dynamics	4	11
	SAM032	Stochastic Processes	4	12
	SAM**E	Elective 1	4	13-33
	SAM**E	Elective 2	4	13-33
	SAM**E	Elective 3	4	13-33
Semester 4	SAM**E	Elective 4	4	13-33
	SAM**E	Elective 5	4	13-33
	SAM04P	Project work	8	
		Total credits	**72**	

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List of Electives *(This list may be extended if needed)*

Sl. No.	Course code	Course title	Credits
1	SAM01E	Artificial Intelligence	4
2	SAM02E	Biostatistics	4
3	SAM03E	Calculus of Variations and Integral Equations	4
4	SAM04E	Design and analysis of experiments	4
5	SAM05E	Econometrics	4
6	SAM06E	Advanced Topics in Differential Equations	4
7	SAM07E	Mathematical Modeling in Biology	4
8	SAM08E	Integral Transforms	4
9	SAM09E	Machine Learning	4
10	SAM10E	Mechanics	4
11	SAM11E	Statistical Methods in Clinical Trials	4
12	SAM12E	Industrial Statistics	4
13	SAM13E	Advanced Numerical Methods	4
14	SAM14E	Time Series Analysis	4
15	SAM15E	Introduction to Cryptography	4
16	SAM16E	Computational Introduction to Number Theory	4
17	SAM17E	Regression Analysis	4
18	SAM18E	Generalized Linear Models	4
19	SAM19E	Introduction to Fractional Calculus	4

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M.Sc. Statistics and Applied Mathematics (List of courses)

No	Course Code	Course Title	CBCS Nature	Employability	Entrepreneurship	Skill development	Professional Ethics	Gender	Human Values	Environment & Sustainability
1	SAM2011	Real Analysis	CC	Yes	Yes					
2	SAM2012	Linear Algebra	CC	Yes	Yes					
3	SAM2013	Probability Distributions	CC	Yes	Yes					
4	SAM2014	Statistical Inference	CC	Yes	Yes					
5	SAM2015	Sampling Theory	CC	Yes	Yes					
6	SAM2016	Introduction to R programming	CCP	Yes	Yes	Yes				
7	SAM2017	Introduction to PYTHON	CCP	Yes	Yes	Yes				
8	SAM2021	Probability Theory	CC	Yes	Yes					
	SAM2022	Multivariate Statistical Analysis	CC	Yes	Yes					
9	SAM2023	Regression Analysis	CC	Yes	Yes					
10	SAM2024	Numerical Analysis	CC	Yes	Yes					
11	SAM2025	Introduction to MATLAB and Practicals on Numerical Analysis	CCP	Yes	Yes	Yes				
12	SAM2026	Practicals on Multivariate Statistical Analysis & Regression Analysis	CCP	Yes	Yes	Yes				
13	SAM2027	Internship	Internship	Yes	Yes		Yes	Yes	Yes	Yes
14	SAM2031	Stochastic Processes	CC	Yes	Yes					
15	SAM2032	Design and Analysis of Experiments	CC	Yes	Yes					
16	SAM2033	Differential Equations	CC	Yes	Yes					
17	SAM2034	Optimization Techniques	CC	Yes	Yes					
18	SAM2035	Practicals on Stochastic Processes and Design and Analysis of Experiments	CCP	Yes	Yes	Yes				
19	SAM2036	Practicals on Differential Equations and Optimization Techniques	CCP	Yes	Yes	Yes				
20	SAMSS01	Type Setting using LATEX	Soft Skill	Yes	Yes	Yes				
21	SAM2041	Calculus of Variations & Integral Equations	CC	Yes	Yes	Yes				
22	SAM2042	Project	Project	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	SAMEC01	Fluid Dynamics	DSE	Yes	Yes					

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24	SAMEC02	Artificial Intelligence	DSE	Yes	Yes					
25	SAMEC03	Advanced Mathematical Analysis	DSE	Yes	Yes					
26	SAMEC04	Industrial Statistics	DSE	Yes	Yes					
27	SAMEC05	Demography	DSE	Yes	Yes					
28	SAMEC06	Machine Learning	DSE	Yes	Yes					
29	SAMEC07	Biostatistics	DSE	Yes	Yes					
30	SAMEC08	Integral Transforms	DSE	Yes	Yes		Yes	Yes		
31	SAMEC09	Advanced Numerical Methods	DSE	Yes	Yes					
32	SAMEC10	Game Theory	DSE	Yes	Yes					
33	SAMEC11	Time Series Analysis	DSE	Yes	Yes					
34	SAMEC12	Mechanics	DSE	Yes	Yes					
35	SAMEC13	Advanced Topics in Differential Equations	DSE	Yes	Yes					
36	SAMEC14	Mathematical Modeling in Biology	DSE	Yes	Yes					
37	SAMEC15	Econometrics	DSE	Yes	Yes					
38	SAMEC16	Reliability Theory	DSE	Yes	Yes					
39	SAMEC17	Statistical Methods in Clinical Trails	DSE	Yes	Yes		Yes	Yes		
40	SAMEC18	Evolutionary Algorithms	DSE	Yes	Yes					
41	SAMEC19	Generalized Linear Models	DSE	Yes	Yes					
42	SAMEC20	Actuarial Statistics	DSE	Yes	Yes					
43	SAMEC21	Deep Learning	DSE	Yes	Yes					
44	SAMEC22	Fuzzy Set Theory and Fuzzy Logic	DSE	Yes	Yes					
45	SAMOE01	Basic Statistics	OE	Yes	Yes					
46	SAMOE02	Essential Mathematical Methods	OE	Yes	Yes					
47	SAMOE03	Exploratory Data Analysis	OE	Yes	Yes					
48	SAMVA01	Introduction to SAS	VAC	Yes	Yes	Yes				
49	SAMVA02	Data Analysis using MS Excel	VAC	Yes	Yes	Yes				
50	SAMVA03	Indian Official Statistics	VAC	Yes	Yes		Yes			

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