Academic Planner (2021 - 2022)

A. Teaching Plan

Teacher's Name: RAJ KUMAR

Department: MATHEMATICS

Year: 2021-2022 (Odd Semester)   **Course:** B.Sc. (Hons.) Mathematics

Paper Type: Theory   **Semester:** V

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
1	32357507	Probability Theory and Statistics	Core	Sample space, Probability set function and examples, Random variable,	20/07/2021	24/07/2021
2	32357507	Probability Theory and Statistics	Core	Probability mass/density function, Cumulative distribution function and its properties.	26/07/2021	31/07/2021
3	32357507	Probability Theory and Statistics	Core	Discrete and continuous random variables, and Transformations. Expectation of random	02/08/2021	07/08/2021

				variables, and some special expectations		
4	32357507	Probability Theory and Statistics	Core	Mean, Variance, Standard deviation, Moments and moment generating function, Characteristic function.	09/08/2021	14/08/2021
5	32357507	Probability Theory and Statistics	Core	The discrete distributions - Uniform, Bernoulli and binomial.	16/08/2021	21/08/2021
6	32357507	Probability Theory and Statistics	Core	The discrete distributions - negative Binomial, Geometric and Poisson The continuous distributions - Uniform, Gamma, Exponential, Chi-square and Beta.	23/08/2021	28/08/2021
7	32357507	Probability Theory and Statistics	Core	The continuous distributions - Uniform, Gamma, Exponential, Chi-square and Beta.	30/08/2021	04/09/2021
8	32357507	Probability Theory and Statistics	Core	Normal distribution, and normal approximation to the binomial distribution.	06/09/2021	11/09/2021
09	32357507	Probability Theory and Statistics	Core	Random vector: Discrete and continuous, Joint cumulative distribution function and its properties.	13/09/2021	18/09/2021
10	32357507	Probability Theory and Statistics	Core	Joint probability mass/density function, Marginal probability mass function, and expectation of two random variables, Joint moment generating function, Conditional distributions and expectations	20/09/2021	25/09/2021
11	32357507	Probability Theory and Statistics	Core	Correlation coefficient, Covariance, Calculation of covariance from joint moment generating function, Independent random variables.	27/09/2021	09/10/2021

				MID-SEMESTER BREAK	10/10/2021	17/10/2021
12	32357507	**Probability Theory and Statistics**	Core	Linear regression for two variables, and the method of least squares. Bivariate normal distribution; Chebyshev's theorem.	18/10/2021	23/10/2021
13	32357507	**Probability Theory and Statistics**	Core	Statement and interpretation of the strong law of large numbers.	25/10/2021	30/10/2021
14	32357507	**Probability Theory and Statistics**	Core	Central limit theorem and the weak law of large numbers.	01/11/2021	06/11/2021
15	32357507	**Probability Theory and Statistics**	Core	**Revision**	08/11/2021	16/11/2021

Year: 2021-2022 (Odd Semester)   **Course: B.Sc. (Prog.) Physical Science**

Paper Type: Theory   **Semester: III**

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
1	42354302	**Algebra**	Core	**Groups: Definition and examples of abelian and non-abelian groups,**	16/08/2021	21/08/2021
2	42354302	**Algebra**	Core	**The group $\mathbb{Z}_n$ of integers under addition modulo n and the group U(n) of units under multiplication modulo n.**	23/08/2021	28/08/2021
3	42354302	**Algebra**	Core	**Cyclic groups from sets of numbers, Group of nth roots of unity, The general linear group; Elementary properties of groups. Groups of symmetries of (i) an isosceles**	30/08/2021	04/09/2021

					triangle, (ii) an equilateral triangle, (iii) a rectangle, and (iv) a square.		
4	42354302	**Algebra**	Core		**The permutation group Sym(n), and properties of permutations. Order of an element, Subgroups and its examples, Subgroup tests, Cyclic subgroup.**	06/09/2021	11/09/2021
5	42354302	**Algebra**	Core		**Center of a group, Properties of cyclic groups. Cosets and its properties, Lagrange's theorem, Index of a subgroup.**	13/09/2021	18/09/2021
6	42354302	**Algebra**	Core		**Normal subgroups: Definition, examples and characterizations, Factor groups. Definition and examples of rings, commutative and noncommutative rings.**	20/09/2021	25/09/2021
7	42354302	**Algebra**	Core		**Properties of rings, Subrings and ideals.**	27/09/2021	09/10/2021
8	42354302	**Algebra**	Core		**Integral domains and fields, Examples of fields: $\mathbb{Z}_n$, $\mathbb{Q}$, $\mathbb{R}$ and $\mathbb{C}$.**	11/10/2021	23/10/2021
9	42354302	**Algebra**	Core		**Definition and examples of vector spaces, Subspaces.**	25/10/2021	30/10/2021
10	42354302	**Algebra**	Core		**Linear independence, Basis and dimension of a vector space.**	01/11/2021	06/11/2021
11	42354302	**Algebra**	Core		**Linear transformations, examples and some theorems based on Linear transformations**	08/11/2021	13/11/2021
12	42354302	**Algebra**	Core		**Linear transformations continued, Matrix of transformation with**	15/11/2021	20/11/2021

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
				respect to standard bases and given bases. Null spaces.		
13	42354302	Algebra	Core	Ranges and illustrations of the rank nullity theorem.	22/11/2021	27/11/2021
14	42354302	Algebra	Core	Revision	29/11/2021	07/12/2021

Year: 2021-2022(Even Semester)   **Course: B.Sc. (Hons.) Mathematics**

Paper Type: Theory   **Semester: II**

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
1	32351201	Real Analysis	Core	Algebraic and order properties of $\mathbb{R}$. Absolute value of a real number; Bounded above and bounded below sets.	07/04/2022	16/04/2022
2	32351201	Real Analysis	Core	Supremum and infimum of a nonempty subset of $\mathbb{R}$. Statement of order completeness property of $\mathbb{R}$.	18/04/2022	23/04/2022
3	32351201	Real Analysis		Archimedean property of $\mathbb{R}$. Density of rational numbers in $\mathbb{R}$, Definition	25/04/2022	30/04/2022

				and types of intervals, Nested intervals property		
4	32351201	**Real Analysis**		**Neighborhood of a point in $\mathbb{R}$, Open and closed sets in $\mathbb{R}$.**	02/05/2022	07/05/2022
5	32351201	**Real Analysis**	Core	**Real sequences, convergence, sum and product of convergent sequences, Order preservation and squeeze theorem.**	09/05/2022	14/05/2022
6	32351201	**Real Analysis**		**Continuation of real sequences and their convergence with more examples and demonstration. Monotone sequences and their convergence with illustrations.**	16/05/2022	28/05/2022
7	32351201	**Real Analysis**	Core	**Bolzano−Weierstrass theorem (statement and examples), Cauchy Sequences and examples.**	30/05/2022	04/06/2022
8	32351201	**Real Analysis**	Core	**Examples of Cauchy Sequences, Cauchy Convergence Criterion for sequences.**	06/06/2022	11/06/2022
9	32351201	**Real Analysis**	Core	**Limit superior and limit inferior for bounded sequence of real numbers with illustrations.**	13/06/2022	18/06/2022
10	32351201	**Real Analysis**		**Definition of an infinite series. Convergence and divergence of infinite series, Sequence of partial sums of infinite series, Necessary condition for convergence,**	20/06/2022	25/06/2022
11	32351201	**Real Analysis**	Core	**Cauchy criterion for convergence of series. Geometric series, Cauchy convergence criterion for series. Tests for convergence of positive**	27/06/2022	02/07/2022

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
				term series: Integral test of infinite series.		
12	32351201	Real Analysis		D'Alembert's ratio test and Cauchy's root test.	04/07/2022	09/07/2022
13	32351201	Real Analysis		Alternating series, Leibniz test, Absolute and conditional convergence.	11/07/2022	16/07/2022
14	32351201	Real Analysis	Core	Revision of some sections, taking doubts and Internal Assessment Test.	18/07/2022	26/07/2022

Year: 2021-2022 (Even Semester)   **Course: B.Sc. (Prog.) Physical Science**

Paper Type: Theory   **Semester: IV**

Sl. No.	UPC	Paper Name	Core/ AECC/ GE/ SEC	Topic/Unit	Start Date	End Date
1	42354401	Real Analysis	Core	Finite and infinite sets, Examples of countable and uncountable sets.	03/01/2022	08/01/2022
2	42354401	Real Analysis	Core	Bounded sets, Statement of order completeness property of $\mathbb{R}$, Archimedean property of $\mathbb{R}$.	10/01/2022	15/01/2022
3	42354401	Real Analysis	Core	Real sequences, convergence, sum and product of convergent sequences, Order preservation and squeeze theorem.	17/01/2022	22/01/2022
4	42354401	Real Analysis	Core	Monotone sequences and their convergence with illustrations.	24/01/2022	29/01/2022

5	42354401	**Real Analysis**	Core	**Bolzano–Weierstrass theorem (statement and examples), Cauchy Sequences.**	31/01/2022	05/02/2022
6	42354401	**Real Analysis**	Core	**Examples of Cauchy Sequences, Cauchy Convergence Criterion for sequences.**	07/02/2022	12/02/2022
7	42354401	**Real Analysis**	Core	**Definition and a necessary condition for convergence of an infinite series, Geometric series, Cauchy convergence criterion for series, positively termed series, convergence of p-series, Comparison test, Limit comparison test and examples.**	14/02/2022	19/02/2022
8	42354401	**Real Analysis**	Core	**D'Alembert's ratio test. Cauchy's root test.**	21/02/2022	26/02/2022
9	42354401	**Real Analysis**	Core	**Alternating series, Leibnitz's test Absolute and conditional convergence.**	28/02/2022	05/03/2022
10	42354401	**Real Analysis**	Core	**convergence. Sequences and series of functions, Pointwise convergence.**	07/03/2022	16/03/2022
				MID-SEMESTER BREAK	**17/03/2022**	**20/03/2022**
11	42354401	**Real Analysis**	Core	**Uniform convergence of sequence of functions, Mn-Test.**	21/03/2022	26/03/2022
12	42354401	**Real Analysis**	Core	**Cauchy general principle for uniform convergence of series of functions, Weierstrass M-Test.**	28/02/2022	02/04/2022
13	42354401	**Real Analysis**	Core	**Definition of power series, Radius and interval of convergence.**	04/04/2022	09/04/2022
14	42354401	**Real Analysis**	Core	**Power series expansions for exponential, sine and cosine functions and their properties.**	11/04/2022	16/04/2022

15	42354401	Real Analysis	Core	Riemann Integration and examples. Integrability of continuous and monotone functions.	18/04/2022	27/04/2022

A. Outstation Field visits for students

Project Name / Paper Name	N.A.		
Destination	N.A.	Travel Mode	N.A.
Departure Month	N.A.	Return	N.A.
Faculty-in-Charge	N.A.	Number of Students going	N.A.

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B. Internal Assessment: House Exam (Test/Presentation etc.) & Assignment*

Course Code	Course Name	Unique Paper Code	Topic Name	Day and Date	Date/s of Exhibiting the Assessment Sheet to students, Discussing the marks, Returning/Retaining
2021 – 2022 (Odd Sem.)					
563	B.Sc. (Hons.) Mathematics (V sem)	32357507	Test: Probability Theory and Statistics	27/10/2021	01/11/2021
582	B.Sc. (Prog.) Physical Science(III sem)	42354302	Test: Algebra	04/12/2021	07/12/2021

563	B.Sc. (Hons.) Mathematics (V sem)	32357504	Assignment: Probability Theory and Statistics	21/09/2021	30/09/2021
582	B.Sc. (Prog.) Physical Science(III sem)	42354302	Assignment: Algebra	12/11/2021	20/11/2021
			2021 – 2022 (Even Sem.)		
563	B.Sc. (Hons.) Mathematics (II sem)	32351201	Test: Real Analysis (H)	21/07/2022	26/07/2022
582	B.Sc. (Prog.) Physical Science(IV sem)	42354401	Test: Real Analysis	20/04/2022	26/04/2022
563	B.Sc. (Hons.) Mathematics (II sem)	32351201	Assignment: Real Analysis (H)	06/07/2022	21/07/2022
582	B.Sc. (Prog.) Physical Science(IV sem)	42354401	Assignment: Real Analysis	19/03/2022	25/03/2022

*Marks of the Internal Assessment to be submitted to the College 15 days before the last working day of every semester

C. Organization of Department/College Society Meetings by Staff Advisor/Convener

Department/Society	Meeting Date	Purpose
Tensors-The Mathematical Society	20.01.2022	Nomination Notice for the selection of office bearers
Tensors-The Mathematical Society	28.01.2022	Interviews for the selection of office bearers declared
Tensors-The Mathematical Society	10.02.2022	Meeting for discussion on SUPREMUM 2022
Tensors-The Mathematical Society	25.02.2022	Meeting for the organization of Qazi Zameeruddin lecture
Tensors-The Mathematical Society	28.02.2022	Meeting for discussing further proceedings of the upcoming event SUPREMUM-22
Tensors-The Mathematical Society	02.03.2022	Permission taken from the principal to conduct SUPREMUM
Tensors-The Mathematical Society	08.03.2022	Arrangements for SUPREMUM 2022

Department activities for students – Election/Freshers/Welcome/Farewell/Department Seminars/Society functions

Event	Date	Timing	Venue	Event In-charge / Supervisor
Department Election	28.01.2022	12.40 p.m	Google meet	Dr. Raj Kumar and Dr. Kavita Gupta
Farewell	05.04.2022	3.00 p.m.	In Parking lawn of KMC	Dr. Raj Kumar and Dr. Kavita Gupta
Department Society functions				
Department Seminars	10.03.2022	10.00 am – 12.00 noon	Seminar room	Dr. Raj Kumar and Dr. Kavita Gupta
Any Other	-----	-----	-----	-------

FDP/Seminar/Workshops/Lectures to be attended and/or to be conducted

Event Topic	Fractals – Mysterious World in real life
Type / Nature (FDP/Webinar/Workshop etc.)	**Qazi Zameeruddin Lecture**
Organizing In-charge	**Dr. RAJ KUMAR and DR. KAVITA GUPTA**
Details regarding invited Resource Person	Prof. Rashmi Bhardwaj, GGSIPU, School of Basic and Applied Sciences, Fellow of Institute of Mathematics & Applications, UK, Professor of Mathematics, Non-Linear Dynamics Research Lab
Nature of Participation (e.g. Invited Speaker, Participant etc.)	**-----**

Date/s	10.03.2022	**Timing/s**	10.00 a.m. – 12.00 noon	**Mode**	**Physically**

D. College Functions

College Function	Function Date	Role to be played
NA	NA	NA