

## I – Academic Planner

### A. Teaching Plan (Year:2021-2022 Semester: Odd)

Teacher's Name: Mr. B Semthanga Department: Mathematics

S. No.	UPC	Paper Name	Core/ AECC /GE/SEC	Topic/Unit	Start Date	End Date
1	32351501	BSc (Hons) Semester-V <b>Metric Spaces</b>	Core	Definition of metric space, Illustration using the usual metric on $\mathbb{R}$ , Euclidean and max metric on $\mathbb{R}$ and $\mathbb{C}$ , Euclidean and max metric on $\mathbb{R}$ , Discrete metric, Sup metric on $B(S)$ and $C[a, b]$ . Sequences in metric space, Definition of limit of a sequence, Illustration through examples, Cauchy sequences	20 <sup>th</sup> July 2021	3 <sup>rd</sup> August 2021
				Definition of complete metric spaces, Illustration through examples. Open and closed balls, Neighborhood, Open sets, Examples and basic results.	4 <sup>th</sup> August 2021	18 <sup>th</sup> August 2021
				Interior point, Interior of a set, Limit point, Derived set, Examples and basic results. Closed set, Closure of a set, Examples and basic results.	19 <sup>th</sup> August 2021	1 <sup>st</sup> September 2021
				Bounded set, Diameter of a set, Cantor's theorem. Relativisation and subspaces, Dense sets.	2 <sup>nd</sup> September 2021	15 <sup>th</sup> September 2021
				Continuous mappings, Sequential and other characterizations of continuity, Uniform continuity, Homeomorphism, Contraction mappings, Banach fixed point theorem.	16 <sup>th</sup> September 2021	30 <sup>th</sup> September 2021
				Connectedness and compactness	1 <sup>st</sup> October 2021	15 <sup>th</sup> October 2021
				Definitions and properties of connected and compact spaces.	16 <sup>th</sup> October 2021	30 <sup>th</sup> October 2021
				Revision	1 <sup>st</sup> November 2020	15 <sup>th</sup> November 2021

S. No.	UPC	Paper Name	Core/AECC/GE/SEC	Topic/Unit	Start Date	End Date
1	32351102	BSc (Hons) Mathematics Semester-I <b>Algebra</b>	Core	Polynomials, The remainder and factor theorem, Synthetic division, Factored form of a polynomial, Fundamental theorem of algebra, Relations between the roots and the coefficients of polynomial equations, Theorems on imaginary, integral and rational roots.	22 <sup>nd</sup> November 2021	3 <sup>rd</sup> December 2021
				Polar representation of complex numbers, De Moivre's theorem for integer and rational indices and their applications, The nth roots of unity.	4 <sup>th</sup> December 2021	13 <sup>th</sup> December 2021
				Equivalence relations, Functions, Composition of functions, Invertibility and inverse of functions, One-to-one correspondence and the cardinality of a set.	14 <sup>th</sup> December 2021	28 <sup>th</sup> December 2021
				Well ordering principle, The division algorithm in $\mathbb{Z}$ , Divisibility and the Euclidean algorithm, Modular arithmetic and basic properties of congruences, Statements of the fundamental theorem of arithmetic and principle of mathematical induction.	29 <sup>th</sup> December 2021	10 <sup>th</sup> January 2021
				Systems of linear equations, Row reduction and echelon forms, Vector equations, The matrix equation $Ax = b$ , Solution sets of linear systems, The inverse of a matrix.	11 <sup>th</sup> January 2021	24 <sup>th</sup> January 2021
				Subspaces, Linear independence, Basis and dimension	25 <sup>th</sup> January 2021	31 <sup>st</sup> January 2021
				The rank of a matrix and applications. Introduction to linear transformations, Matrix of a linear transformation; Applications to computer graphics.	1 <sup>st</sup> February 2021	14 <sup>th</sup> February 2021
				Introduction to linear transformations, Matrix of a linear transformation; Applications to computer graphics. Eigenvalues and eigenvectors, The characteristic equation and Cayley–Hamilton theorem	15 <sup>th</sup> February 2022	28 <sup>th</sup> February 2022
				Revision	1 <sup>st</sup> March 2022	11 <sup>th</sup> March 2022
2	32351101	BSc (Hons) Mathematics Semester-I <b>Calculus</b>	Core	Practical 1 & 2	22.11.21	02.12.21
				Practical 3&4	03.12.21	17.12.21
				Practical 5&6	18.12.21	02.01.22
				Practical 7&8	03.01.22	17.01.22
				Practical 9&10	18.01.22	31.02.22
				Practical 11&12	01.02.22	14.02.22
				Revision	15.02.22	11.03.22

**B. FDP/Seminar/Workshops/Lectures to be attended and/or to be conducted by Teachers**

<b>Event Topic</b>					
<b>Type / Nature (FDP/Webinar/Workshop etc.)</b>					
<b>Organizing In-charge</b>					
<b>Details regarding invited Resource Person</b>					
<b>Nature of Participation (e.g. Invited Speaker, Participant etc.)</b>					
<b>Date/s</b>		<b>Timing/s</b>		<b>Mode</b>	

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

<b>Course Code</b>	<b>Course Name</b>	<b>Unique Paper Code</b>	<b>Topic Name</b>	<b>Day and Date</b>	<b>Date/s of Exhibiting the Assessment Sheet to students, Discussing the marks, Returning/Retaining</b>
563	BSc (Hons) Semester-V <b>Metric Spaces</b>	32351501	Class Test Unit 1, Unit 2 & Unit 3	Monday 18 <sup>th</sup> October 2021	Monday 25 <sup>th</sup> October 2021
563	BSc (Hons) Semester-V <b>Metric Spaces</b>	32351501	Assignment Unit 4	Thursday 11 <sup>th</sup> November 2021	Thursday 11 <sup>th</sup> November 2021
563	BSc (Hons) Mathematics Semester-I <b>Algebra</b>	32351102	Class Test Unit 1, Unit 2 & Unit 3	Friday 18 <sup>th</sup> February 2022	Friday 25 <sup>th</sup> February 2022
563	BSc (Hons) Mathematics Semester-I <b>Algebra</b>	32351102	Assignment Unit 4	Monday 28 <sup>th</sup> February 2022	Wednesday 9 <sup>th</sup> March 2022

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

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

<b>Department/Society</b>	<b>Meeting Date</b>	<b>Purpose</b>

**E. College Functions**

<b>College Function</b>	<b>Function Date</b>	<b>Role to be played</b>

## I – Academic Planner

### B. Teaching Plan (Year:2021-2022 Semester: Even)

Teacher's Name: Mr. B Semthanga Department: Mathematics

S. No.	UPC	Paper Name	Core/AECC/GE/SEC	Topic/Unit	Start Date	End Date
1	32351202	BSc (Hons) Mathematics Semester-II <b>Differential Equations</b>	Core	Differential equations and mathematical models, Order and degree of a differential equation, Exact differential equations and integrating factors of first order differential equations, Reducible second order differential equations.	7 <sup>th</sup> April 2022	18 <sup>th</sup> April 2022
				Application of first order differential equations to acceleration-velocity model, Growth and decay model.	19 <sup>th</sup> April 2022	3 <sup>rd</sup> May 2022
				Introduction to compartmental models, Lake pollution model (with case study of Lake Burley Griffin)		
				Drug assimilation into the blood (case of a single cold pill, case of a course of cold pills, Case study of alcohol in the bloodstream).	17 <sup>th</sup> May 2022	30 <sup>th</sup> May 2022
				Exponential growth of population, Density dependent growth, Limited growth with harvesting.		
				General solution of homogeneous equation of second order, Principle of superposition for a homogeneous equation; Wronskian, its properties and applications; Linear homogeneous and non-homogeneous equations of higher order with constant coefficients; Euler's equation.	1 <sup>st</sup> June 2022	14 <sup>th</sup> June 2022
				Method of undetermined coefficients, Method of variation of parameters; Applications of second order differential equations to mechanical vibrations.	15 <sup>th</sup> June 2022	29 <sup>th</sup> June 2022
				Interacting population models, Epidemic model of influenza and its analysis, Predator-prey model and its analysis, Equilibrium points, Interpretation of the phase plane, Battle model and its analysis.	30 <sup>th</sup> June 2022	14 <sup>th</sup> July 2022
				Revision	15 <sup>th</sup> July 2022	4 <sup>th</sup> August 2022
				Practical 1 & 2	07.04.22	14.04.22

2	32351202	BSc (Hons) Mathematics Semester-II <b>Differential Equations Practical</b>	Core	Practical 3&4	15.04.22	03.05.22
				Practical 5&6	17.05.22	30.05.22
				Practical 7&8	01.06.22	14.06.22
				Practical 9&10	15.06.22	30.06.22
				Practical 11&12	28.07.22	13.07.22
				Revision	14.07.22	02.08.22
3	32355202	BSc (Hons) Semester-II <b>Linear Algebra</b>	GE	Fundamental operation with vectors in Euclidean space $R^n$ , Linear combination of vectors, dot product and their properties, Cauchy-Schwarz inequality, Triangle inequality, Projection vectors.	7 <sup>st</sup> April 2022	18 <sup>th</sup> April 2022
				Some elementary results on vectors in $R^n$ ; Matrices: Gauss–Jordan row reduction, Reduced row echelon form, Row equivalence, Rank.		
				Linear combination of vectors, Row space, Eigenvalues, Eigenvectors, Eigenspace, Characteristic polynomials, Diagonalization of matrices. Definition and examples of vector space, Some elementary properties of vector spaces.	19 <sup>th</sup> April 2022	3 <sup>rd</sup> May 2022
				Subspace, Span of a set, a spanning set for an eigenspace, Linear independence and dependence, Basis and dimension of a vector space, Maximal linearly independent sets, Minimal spanning sets.	17 <sup>th</sup> May 2022	30 <sup>th</sup> May 2022
				Application of rank: Homogenous and non-homogenous systems of linear equations; Coordinates of a vector in ordered basis, Transition matrix. Linear transformations: Definition and examples, Elementary properties.	1 <sup>st</sup> June 2022	14 <sup>th</sup> June 2022
				The matrix of a linear transformation, Linear operator and similarity. Application: Computer graphics, Fundamental movements in a plane, Homogenous coordinates, Composition of movements	15 <sup>th</sup> June 2022	29 <sup>th</sup> June 2022
				Kernel and range of a linear transformation, Statement of the dimension theorem and examples. One to one and onto linear transformations, Invertible linear transformations, isomorphism, isomorphic vector spaces	30 <sup>th</sup> June 2022	14 <sup>th</sup> July 2022
				Orthogonal and orthonormal vectors, orthogonal and orthonormal bases, orthogonal complement, statement of the projection theorem and examples. Orthogonal projection onto a subspace. Application: Least square solutions for inconsistent systems, non-unique least square solutions.	15 <sup>th</sup> July 2022	25 <sup>th</sup> July 2022
				Revision	26 <sup>th</sup> July 2022	2 <sup>nd</sup> August 2022

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Event Topic				
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563	BSc (Hons) Mathematics Semester-II <b>Differential Equations</b>	32351202	Class Test on Unit 1 & Unit 2	Monday 27 <sup>th</sup> June 2022	Monday 4 <sup>th</sup> July 2022
563	BSc (Hons) Mathematics Semester-II <b>Differential Equations</b>	32351202	Assignment Unit 3 & 4	Thursday 21 <sup>th</sup> July 2022	Thursday 28 <sup>th</sup> July 2022
567	BSc (Hons) Semester-II <b>Linear Algebra</b>	32355202	Class Test on Unit 1 & Unit 2	Monday 27 <sup>th</sup> June 2022	Monday 4 <sup>th</sup> July 2022
567	BSc (Hons) Semester-II <b>Linear Algebra</b>	32355202	Assignment Unit 2 & 3	Thursday 21 <sup>th</sup> July 2022	Thursday 28 <sup>th</sup> July 2022
563	BSc (Hons) Mathematics Semester-II <b>Differential Equations Practical</b>	32351202	Class Test on Practical 1 to 10	Friday 29 <sup>th</sup> July 2022	Friday 5 <sup>th</sup> August 2022

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