Faculty of Pharmacy
Bachelor of Pharmacy (B. Pharm.)
(W. E. F.: 2023-24)
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Name of Faculty	:	Faculty of Pharmacy
Name of Program	:	Bachelor of Pharmacy
Course Code	:	1BPH07
Course Title	:	Remedial Mathematics
Type of Course	:	Basic Sciences
Year of Introduction	:	2023-24

Prerequisite	:	Zeal to learn the subject
Course Objective	:	This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	To **understand** the theory of mathematics and their application in Pharmacy.
	CO2	To **understand** how to apply the different types of problems by applying theory of mathematics in various pharmaceutical formulations manufacturing and analysis.
	CO3	To **remember** how to use mathematics in method development of various active pharmaceutical ingredients.
	CO4	To **remember** how to use mathematics in pharmacokinetics and chemical kinetics and pharmacodynamics.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
02	00	00	02	35	15	00	00	50

Legends: ***L****-Lecture;* ***T****–Tutorial/Teacher Guided Theory Practice;* ***P*** *– Practical,* ***C*** *– Credit,* ***SEE*** *– Semester End Examination,* ***CIA*** *- Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with COs
1	**Partial fraction** Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction , Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics **Logarithms** Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. **Function:** Real Valued function, Classification of real valued functions, **Limits and continuity** : Introduction , Limit of a function, Definition of limit of a function	06	20%	CO1 CO2
2	**Matrices and Determinant:** Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants , Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix , Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley–Hamilton theorem,Applicationof Matrices in solving Pharmacokinetic equations	06	20%	CO1 CO2 CO3
3	**Calculus Differentiation** : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function , Derivative of the sum or difference of two functions,Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of xn w.r.t x ,where n is any rational number, Derivative of ex,, Derivative of loge x , Derivative of ax, Derivative of trigonometric	06	20%	CO1 CO2 CO3

	functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application			
4	**Analytical Geometry** **Introduction**: Signs of the Coordinates, Distance formula, **Straight Line** : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line **Integration**: Introduction, Definition, Standard formulae, Rules of integration , Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application	06	20%	CO1 CO2
5	**Differential Equations** : Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, **Application in solving Pharmacokinetic equations** Laplace Transform : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, **Application in solving Chemical kinetics and Pharmacokinetics equations**	06	20%	CO1 CO2 CO4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**50**	**50**	**00**	**00**	**00**	**00**

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments/Tutorials - NA

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Microsoft Mathematics App

Suggested Learning Websites

Sr. No.	Name of Website
1	https://pci.nic.in/pdf/Syllabus_B_Pharm.pdf
2	https://nptel.ac.in

Reference Books

Sr. No.	Name of Reference Books
1	Differential Calculus by Shanthinarayan
2	Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3	Integral Calculus by Shanthinarayan
4	Higher Engineering Mathematics by Dr.B.S.Grewal