

# Gandhinagar Institute of Pharmacy

Bachelor of Pharmacy (Undergraduate)

Semester I



<b>Subject Code: BP106RMT</b>	<b>Subject Title: Remedial Mathematics (Theory)</b>
<b>Pre-requisite: --</b>	

**Course Objective:** Upon completion of the course student shall be able to

- (a) Understand basic concepts of functions of single variable and characteristics (types) of function through plots. Solution of equations
- (b) Understand the algebra of matrices, basic concept of Statistics, computing descriptive statistics.
- (c) Understand the concept of Integration and differentiation for future need.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
Lecture	Tutorial	Credit	Theory			Total
			University Assessment	Continuous Assessment	Internal Assessment	
2	-	2	35	5	10	50

### Detailed Syllabus:

Sr. No.	Unit details	Contact hours	Approx. Weightage %
1.	<p><b>Partial fraction:</b> Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics</p> <p><b>Logarithms:</b> Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.</p> <p><b>Function:</b> Real Valued function, Classification of real valued functions,</p> <p><b>Limits and continuity :</b> Introduction, Limit of a function, Definition of limit of a function (<math>\epsilon - \delta</math> definition), <math>\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}</math>, <math>\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1</math>,</p>	6 hours	20%

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2.	<p><b>Matrices and Determinant:</b> 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 adjugated 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, Application of Matrices in solving Pharmacokinetic equations</p>	6 hours	20%
3.	<p><b>Calculus:</b> 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 <math>x^n</math> w. r. <math>x</math>, where <math>n</math> is any rational number, Derivative of <math>e^x</math>, Derivative of <math>\log_e x</math> , Derivative of <math>a^x</math>, Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application</p>	6 hours	20%
4.	<p><b>Analytical Geometry:</b> 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</p>	6 hours	20%
5.	<p><b>Differential Equations :</b> Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations. <b>Laplace Transform :</b> Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential</p>	6 hours	20%

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	equations, Application in solving Chemical kinetics and Pharmacokinetics equations		
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**Recommended study materials:**

1. Kreyszig, Erwin. Advanced engineering mathematics. John Wiley & Sons, 2010.
2. Stewart, James. "Calculus: Early Transcendentals, 6E." Belmont, CA: Thompson Brooks/Cole (2006).
3. Wylie, C. R., and L. C. Barrett. "Advanced Engineering Mathematics." McGraw-Hill, 1982
4. Greenberg, Michael D. Advanced engineering mathematics. Prentice-Hall, 1988.
5. Thomas, G. B., and R. L. Finney. "Calculus with Analytic Geometry ( 9<sup>th</sup> Edition), 1996.", AddisonWesley Publishing.
6. Stewart, James, Lothar Redlin, and Saleem Watson. Algebra and trigonometry. Nelson Education, 2015.
7. Differential Calculus by Shanthinarayan
8. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
9. Integral Calculus by Shanthinarayan
10. Higher Engineering Mathematics by Dr. B. S. Grewal