C. U. SHAH UNIVERSITY, WADHWAN CITY.

Faculty of: **Science & Life Sciences**
Course: **Bachelor of Science (Physics)**
Semester**: II**
Subject Code**: MAE202-1C**
Subject Name: **Basics of Mathematics-II**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								
									Theory				Tutorial / Practical				Total
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
				Th	Tu	Pr			Marks	Marks	Marks	Duration	Marks	Duration	Marks	Duration	
3	MINOR	MAE202-1C	Basics of Mathematics	3	-	2	5	4	10 10 05	Assignment MCQ Attendance	50	2	25	1	-	-	100

Course Objective :

The main objectives of this course are

- Use finite differences for interpolation, differentiation, etc.
- Methods to solve system of linear equations.
- Methods to solve differential equations.

COURSE CONTENTS

Course Outline for Theory

UNIT	COURSE CONTENT	TEACHING HOURS
I	Curve Tracing in Cartesian Coordinates using Symmetry, Intercepts, Asymptotes and Sign of the Function, Curve Tracing in Parametric Equations using Intercepts, Tangents parallel to axes, Asymptotes parallel to the axes, Oblique Asymptotes and Extent to the Curve; Equations of Tangent and Normal to the Curve at a given point.	**15**
II	First order and First-degree differential equations: basic concepts, Homogeneous and non-Homogeneous Equations, Exact differential equations, Integrating factors, Linear differential equations, Bernoulli equations, Differential equations of the first order and higher degree: Solvable for p, for x and for y, Clairaut's form of differential equations and Lagrange's form of differential equations.	**15**
III	Error in calculation and calculus of finite differences, interpolation. Significant error, Relative error, Estimation of error, Application of error formula. Forward differences, Backward differences, Shift operator, Polynomial in factorial notation.	**15**

Course Outline for Practical

SR. NO	COURSE CONTENT	Lab Hours
1	Problems based on errors	30
2	Sketching of Cartesian curve, Parametric curves, Polar curves and reciprocal curves	
3	Relation between Cartesian, polar, spherical and cylindrical coordinates.	
4	Problems on solution of ODE of order 1 and degree 1-I (Separable variables, homogeneous and non-homogeneous)	
5	Problems on solution of ODE of order 1 and degree 1-II (Linear, Bernoulli and exact ODE)	
6	Problems on solution of ODE of order 1 and degree n	

TEACHING METHODOLOGY:

Conventional method (classroom blackboard teaching)
ICT Techniques
Teaching through the classroom
Variety of learning styles and tools (PowerPoint presentations, audio-visual resources, e-resources, seminars, workshops, models)

LEARNING OUTCOME:

After the successful completion of the course, students will be able to

- Analyse errors and have an understanding of error estimation.
- Graphing and optimization of the functions.
- Imagine three dimensional objects virtually.
- Analyse differential equations.
- Solve first ODES.

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory+ Practical	Theory+ Practical
Unit – 1	15	30	3	1	45 + 30	4
Unit – 2	15					
Unit – 3	15					
TOTAL	45	30	3	1	75	4

Evaluation:

Theory Marks	Practical Marks	Total Marks
75	25	100

REFERENCE BOOKS:

1. Numerical Analysis and Computational Procedures', **S. A. Moolah,***New Central Book Agency (P) Ltd., Calcutta.*
2. 'Elementary Numerical analysis', **S. S. Sastry,** *Prentice Hall, New Delhi.*
3. Analytical solid Geometry', **Shanti Narayan and P. K. Mittal**, *S. Chand and Co.* New Delhi.
4. 'Differential Calculus', **Shanti Narayan and P. K. Mittal**, *S. Chand and Co.* New Delhi.
5. Higher Engineering Mathematics, Thirty-fifth edition', **B. S. Grewal**, *Khanna Publication*.
6. 'The calculus with analytic geometry', **Louis Leithod**, *Harper-Collins Pub.*
7. 'The Elements of Co-ordinate Geometry', **S. L. Loney**, *Mac Milan & Co.*
8. 'A Textbook of Analytical Geometry of three dimensions', **P. K. Jain**, *New Age International.*
9. 'Elementary Treatise on Co-ordinate Geometry of three dimensions', **R. J. T. Bell**, *Mac Milan Co.*