Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Department of Mathematics (GE for UG Students)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
MAUGGE08	DC	**Mathematical Modelling**	60	20	20	0	0	3	0	0	3

Course Objective

To introduce the students with the concept of Mathematical Modelling.

Course Outcomes

After the successful completion of this course students will be able to:

1. *understand and apply the basics of the Mathematical Modelling*
2. *construct the mathematical model on real-life situations*
3. *analyse the limits of Mathematical Models*
4. *identify the role of Eigenvalues in Mathematical Modelling*
5. *create and examine the solutions of Mathematical Models based on Single-Species and Epidemiology.*

Course Content:

UNIT – I
Introduction to mathematical modelling, what is mathematical modelling, steps involved in mathematical modelling, why mathematical modelling, principles of mathematical modelling, limitations of mathematical modelling.
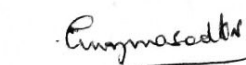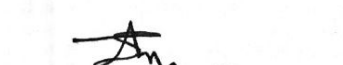
UNIT – II
Mathematical modelling: techniques, classifications, characteristics, through geometry, through algebra, through trigonometry, through calculus, and simple illustrations.
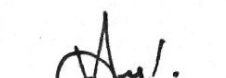
UNIT – III
Stability Analysis, Role of Eigen Values, Nature of Critical Points.

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UNIT – IV

Single-Species models: Exponential Growth Model - Formation of the Model, Solution and Interpretation, Logistic Growth Model - Formation of the Model, Solution and Interpretation.
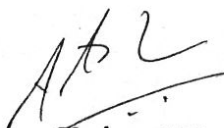
UNIT – V

Mathematical Models in Epidemiology: SI Model - Formation of the Model, Solution and Interpretation, SIS Model with constant coefficient - Formation of the Model, Solution and Interpretation.
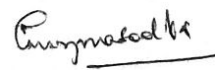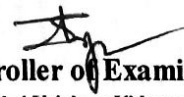
Texts:

1. Mathematical Modelling by J.N. Kapur, New Age International Publishers
2. M.M. Gibbons: A concrete approach to Mathematical modeling, John Wiley and sons, 1995.
3. Linear Models in Biology by M.R. Cullen, Ellis Horwood Ltd.

References:

1. Mathematical Models in Biology and Medicines by J.N. Kapur, EWP
2. Introduction to Mathematical Biology by S.I. Rubinow, John Wiley & Sons. 1975.
3. Mathematical Biology (Biomathematics, Volume 19) by J.D. Murray, Springer Verlag.

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