FMCC 503 MathematicalModelling and Simulation(3-1-0)

Module-1(14 Hours)

What is Modeling-Model and reality ,Properties of Models ,Building a Model, Elementary Methods-Arguments from scales ,Dimension Analysis, Graphical methods –Mathematical Modeling through Graphs: Solutions that can be Modeled Through Graphs – Mathematical Modeling in Terms ofDirected Graphs, Signed Graphs, Weighted Digraphs and Un-oriented Graphs.

Module-2 (14 Hours)

Mathematical Modeling through Ordinary Differential Equations of First order :Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamic problems – Geometrical problems. Mathematical Modeling through Ordinary Differential Equations of Second Order :Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modeling through Linear Differential Equations of Second Order – Miscellaneous Mathematical Models

Module-3(12 Hours)

Mathematical Modeling through Difference Equations: Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory

Text Books:

1. J.N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Delhi,Edward A. Bender.. An Introduction to Mathematical Modeling,S.M. Ross ..Simulation, India Elsevier Publication.

Reference Books:

1. **A. C. Fowler**, Mathematical Models in Applied Sciences, Cambridge University Press.
2. **A.M.Law and W.D.Kelton** , Simulation Modeling and Analysis, T.M.H. Edition.
3. **SankarSengupta,** System Simulation and Modeling , Pearson