

Branch Name:	Environment Engineering
Program Code:	ET212
Subject Title:	Environmental Modelling and Computational Methods
Subject Code:	2ET2120202T
Pre-requisite Subject:	-

Course Objective:

- Understand the idea, methodology, and basic tools of environmental modeling
- Understand the different modeling approaches, their scope and limitations
- Apply the Knowledge of computing techniques in environmental engineering

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents				
Sr. No	Topic	Total Hours	Weightage (%)	
1	Introduction: Mathematical Modeling: Scope and problem definition, Defining Systems and its component, types of model and their application, Basic and fundamental of simulation	10	14	
2.	Environmental Modelling-Applications: Water quality modeling: Surface water quality modeling, rivers and streams, ground water pollution modeling, Air quality modeling, box model, Gaussian plume model, point source, Line source, Area Source	20	50	
3.	Introduction to Soft Computing Techniques: Analytical Hierarchy Process, Fuzzy set theory, Neural Network, Application of GIS and RS in Environmental Engineering	12	36	

Reference Books:

1. Ramaswami A., Milford J.B., Small M.J., Integrated Environmental Modeling – Pollutant Transport, Fate, and Risk in the Environment John Wiley & Sons, 2005.
2. Chapra S.C., Surface Water Quality Modeling, McGraw-Hill, Inc., New York, 1997.
3. Benarie M.M.(1980) Urban Air Pollution Modelling, Cambridge, MA: The MIT Press.
4. Schnelle K.B. and Dey P.R.(1999) Atmospheric Dispersion Modelling Complainece Guide, MCgraw Hill.
5. Zannetti P.(1990) Air Pollution Modelling, Theories, Computational Methods and Available Software, Van Nostrand Reinhold, New York.

List of Open Source Software/learning website:

- _ <http://nptel.ac.in/>
- _ <http://elearning.vtu.ac.in/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO-1	Understand the idea, methodology and basic tools of environmental modeling	L-2
CLO-2	Understand the different modeling approaches, their scope and limitations	L-2
CLO-3	Apply the Knowledge of computing techniques in environmental engineering.	L-3

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
Course Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	M	M		M	M				M				M	M	
CLO2	M	M		M	M				M				M	M	
CLO3	M	M	M	M					M				M	M	

H: High, M: Medium, L: Low