GUJARAT TECHNOLOGICAL UNIVERSITY

CHEMICAL ENGINEERING (COMPUTER AIDED PROCESS DESIGN) (16)
ADVANCED COMPUTATIONAL TECHNIQUES FOR RESEARCH LAB
SUBJECT CODE: 2711604
SEMESTER: I

Type of course: Major Elective-I (M.E.CAPD)

Prerequisite: --

Rationale: --

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks		Practical Marks				
				ESE (E)	PA (M)	PA (V)		PA (I)		
						ESE	OEP	PA	RP	
0	0	4	2	0	0	50	30	20	0	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Algebraic Equation Solver.	7	8
2	Differential Algebraic Equation Solver (DAE).	7	8
3	Partial Differential Equation Solver (PDE).	7	8
4	Use of Fortran Solver in C/C++ Environment.	7	8
5	Mat lab/ MathCAD for solution of set of equation/ Algebraic Equation/ Differential Algebraic Equation/ Partial Differential Equation.	8	8
6	Genetic Algorithm.	8	8
7	Artificial Neural network.	7	8
8	Simulated Annealing.	7	8
9	Data reconciliation.	7	8
10	Solution of Algebraic Equation using Optimization methods like Pattern Search, Box Complex etc.	7	8

Course Outcome:
After learning the course the students should be able to:

1. Solve Algebraic Equation &Differential Algebraic Equation & Partial Differential Equation.
2. Learn the use of Fortran Solver in C/C++ Environment.
3. Use Mat Lab & MathCAD for Solution of Algebraic Equation &Differential Algebraic Equation & Partial Differential Equation.
4. Learn & Develop the Genetic Algorithm & its application for Chemical Engineering.
5. Learn & Develop the Artificial Neural network & its application for Chemical Engineering.
6. Solution of Algebraic Equation using Optimization methods like Pattern Search, Box Complex etc.
7. Learn about Simulated Annealing & Data reconciliation .

List of Experiments:

Practicals based on above topics.

Open Ended Problems:

1. Genetic Algorithm Application in chemical Engineering.
2. Application of Artificial Neural Network in Chemical Engineering.
3. Multi Objective Optimization in Chemical Engineering

Major Equipments:

Different Softwares

List of Open Source Software/learning website:

- www.marblesoftwaresolutions.com/AlgebraSolver/
- www.mathworks.in/products/matlab
- software.ncsu.edu/vendor/mathworks-matlab/package/matlab
- www.ptc.com/product/**mathcad**/
- www.sigma-research.com/bookshelf/rtthinks.htm
- www.cs.cmu.edu/afs/cs/project/ai-repository/ai/areas/**genetic**/.../0.html
- www.mathworks.in/discovery/**simulated-annealing**.html