NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	M.TECH. (WE, IM and MSE)		
Course Title	**Computational Techniques**		
Course Code	MT615	No. of Credits	03
Course Code of Pre-requisite subject(s)	Nil		
Session	Jan 2023	Section (if, applicable)	NA
Name of Faculty	Dr. V. Karthik	Department	MME
Official Email	karthikv@nitt.edu	Telephone No.	9788444987
Name of Course Coordinator(s) (if, applicable)	NA		
E-mail	---	Telephone No.	---
Course Type	☐ Core course	☑ Elective course	

Syllabus (approved in BoS)

Design of Experiments and Analysis: Factorial design, Taguchi Techniques, ANOVA

Artificial Intelligence: Artificial Neural Networks, Fuzzy logic, Genetic Algorithm; Applications in Materials Engg.

Numerical Fluid Flow and Heat Transfer: Classification of PDE, finite differences, Steady and unsteady conduction, explicit and implicit method

Finite Element Methods: Introduction to I-D FEM. Problems in structural mechanics using two dimensional elements; Plane stress, plane strain, axisymmetric analysis; Three dimensional stress analysis

Optimization Methods: Classical optimization methods, unconstrained minimization. Univariate, conjugate direction, gradient and variable metric methods, constrained minimization, feasible direction and projections. Integer and Geometric programming

Reference Books:

1. Douglas C. Montgomery Design and analysis of experiments, 5th ed., John Wiley and Sons, 2005

2. Tirupathi R. Chandrupatla and Ashok D. Belegundu, Introduction to Finite Elements in Engineering, 3rd Ed., Prentice-Hall, 2003

3. B. Yegnanarayana, Artificial Neural Networks, Prentice-Hall of India, 1999

COURSE OBJECTIVES

To become familiar with computational techniques including related mathematical background

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COURSE OUTCOMES (CO)
At the end of the course student will be able to:
1. Understand the capabilities provided by various data
2. Analysis methods and apply the appropriate ones to solve real problems
3. Gain hands-on experience in using data analysis tools

COURSE PLAN – PART II

COURSE OVERVIEW

The course covers various computational techniques including related mathematical background

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	I-III	Design of Experiments	Chalk & Talk, PPTs, videos and hands-on practice on open source software
2	IV-V	Finite Difference Method	
3	VI-VIII	Finite Element Method	
4	IX-X	Traditional optimization techniques	
5	XI-XII	Non-traditional optimization techniques: GA, ANN, Fuzzy	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment	IV-X	--	20
2	Mid Semester Exam	21-24th Mar 2023	60	20
3	Mini-project (Three reviews, report submission and final presentation)	V-XI	--	40
CPA	Compensation Assessment	1st May 2023	60	20
4	End semester Examination	16th May 2023	180	30

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

The exit survey will be assessed based on the questionnaire prepared by the class teacher and expected attainment is 75% on 1-5 scale basis

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

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MODE OF CORRESPONDENCE (email/ phone etc)

Email/Mobile/Whatsapp

COMPENSATION ASSESSMENT POLICY

It will be given during XII week for those who are absent on genuine grounds for Mid Semester Exam.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

> **Institute guidelines will be followed for attendance policy, since the classes are conducted through online video conferencing mode.**

ACADEMIC DISHONESTY & PLAGIARISM

> Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.

> Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

> The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION

The Course faculty is available for consultation at any time (Room No.: MME/NAB/102). Students can also contact at any time through whatsapp or phone call or by mail.

FOR APPROVAL

Course Faculty _____   **CC-Chairperson** _____   **HOD** _____