

Important Dates

Last date for registration : 18th August 2023
Registration Fee: Rs. 1250 (inclusive of GST)



Modules to be covered

- **Advanced topics in ordinary differential equations and Partial differential equations:** Numerical Analysis of differential equations, Dynamical systems, Nonlinear Partial Differential Equations, Differential equations of a point source disturbance.
- **Introduction to Optimization:** Introduction to Optimization: Basic ideas, Engineering application of optimization, Need for optimization, formulation and statement of an optimization problem, Optimal design concepts: Definition of Global and local optima, graphical method, linear programming problems.
- **Introduction to Design of Experiments (DOE):** Strategy of experimentation, Typical applications, Basic principles, and guidelines for designing experiments. Basic statistical concepts: Descriptive Statistics, Sampling and Sampling Distributions, Tests of Hypotheses.
- **Single Objective Optimization Techniques:** Single factor experiments with Fixed Effects: ANOVA, Model Adequacy Tests, Taguchi Method, Desirability Function Analysis (DFA), Utility Method, Calculus and search-based optimization techniques: Lagrange multiplier method, Hessian matrix test, Kuhn – Tucker conditions, Lattice search method, bisection search method, golden search method, Fibonacci search method.
- **Introduction to Fuzzy sets and Fuzzy Logic:** Introduction to different types of fuzzy sets and fuzzy numbers, Defuzzification methods, introduction to fuzzy logic, Fuzzy inferences, Optimization using fuzzy sets, MCDM techniques using Fuzzy sets.
- **Advanced Methods of Optimization:** Genetic Algorithms (GA), Simulated Annealing (SA), Particle swarm optimization (PSO) algorithm, Application of Neural Network in Optimization: Artificial Neural networks (ANN).
- **Multi Criteria Decision Making (MCDM) Techniques:** Introduction, Challenges, Analytical Hierarchy Process (AHP), TOPSIS, VIKOR, MOORA. Hybrid MCDM methods viz. AHP-MOORA, AHP-TOPSIS, AHP-VIKOR, Fuzzy Embedded MCDM technique, Application of Hybrid MCDM Methods for Manufacturing System Optimization: Issues and Challenges.

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VIT[®]

Vellore Institute of Technology
(Deemed to be University) under section 3 of U.G. Act, 1956

Value added Program on

Advanced Methods of Optimization in Design and Manufacturing

21/08/2023 to 31/08/2023

Online Platform - MS Teams

Resource Persons

Dr. Ajit Kumar, ICT Mumbai

Dr. Ch Srinivasa Rao, IIT Madras

Dr. Parvez Alam, VIT Vellore

Dr. Sanghasri Mukhopadhyay, VIT Vellore

Dr. Akhtar khan, IIITDM Kurnool

Dr. Prabhujit Mohapatra, VIT Vellore

Dr. Vipindas, IIITDM Kurnool

Dr. Rajesh Moharana, VIT Vellore

Dr. Kumar Abhishek, IITRAM, Gujarat

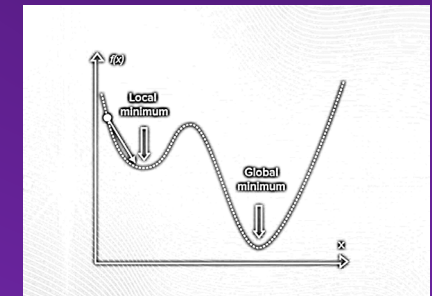
Dr. Dilip Kumar Gupta, IIITDM Kurnool

Dr. Sanjaya Kumar Panda, NIT Warangal

Dr. Debaroti Das, VIT Vellore

Dr. Muvvala Pullarao, IIITDM Kurnool

Dr. Umakant Mishra, VIT Vellore



Organised by
School of Mechanical Engineering
Vellore Institute of Technology, Vellore, India

Vellore Institute of Technology (VIT)

Vellore Institute of Technology was founded in 1984 as Vellore Engineering College by the Founder and Chancellor Dr.G.Viswanathan. University status was conferred in 2001 by MHRD Govt. of India in recognition of its excellence in academics, research and extracurricular initiatives.

Ranking & Accreditation

Vellore Institute of Technology (VIT) has emerged as one of the best institutes of India and is aspiring to become a global leader. Quality in teaching-learning, research and innovation makes VIT unique.

- ❖ Engineering and Technology subject areas of VIT are the 240th best in the World and the 9th best in India, 8 subjects of VIT are within the top 500 in the world (as per QS World University Rankings by Subject 2023).
- ❖ NAAC Accreditation with A++ grade in the 4th cycle.
- ❖ Ranked among the top 601 - 700 Universities of the world and one among the Top 3 institutions in India (Shanghai ARWU Ranking 2022).
- ❖ The 8th best University, the 11th best Research institution and the 11th best Engineering institution in India (NIRF Ranking, Govt. of India 2023).
- ❖ Ranked within the top 200 in Asia (QS - Asia University Rankings 2023).



School of Mechanical Engineering (SMEC)

The School of Mechanical Engineering is one of the oldest and most prestigious schools of VIT. This school started functioning right from 1984, the year in which our institution began. The School of Mechanical Engineering offers 3 undergraduate and 6 post-graduate programs. The school has a team of highly qualified faculty members, many holding PhDs from elite institutes across the globe, to teach and train this country's best minds. The pride of the school lies in the significant research funding received from several National and International agencies such as DST, DRDO, MNRE, CSIT, CVRDE, CPDO, IE, AR&DB, BRNS, ISRO, UGC, NRB, Royal Academy of Engineering etc. The Department of Science and Technology, Govt. of India has recognized the school for its research activities and supported it in 2003, 2010 and 2022 under the FIST scheme. The school has modern facilities, enabling cutting-edge research in a wide spectrum of niche technological areas. The school is ranked 501-600 in the World as per THE World University Subject Ranking in 2021. Mechanical and Manufacturing Engineering is ranked within the top 10 in India and top 251-300 in the world as per QS World University Rankings by Subject 2023.

Course Objectives

- To gain knowledge about mathematical modelling for Design and Manufacturing problems.
- To solve design and manufacturing problems using ordinary and partial differential equations.
- To learn and apply various modern optimization techniques.
- To apply Fuzzy set theory and Fuzzy logic, AI.

August 21 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Ajit Kumar
- Session 2 (11:30 AM – 1:30 PM) Dr. Ch Srinivasa Rao
- Session 3 (3:00 pm – 5:00 pm) Dr. Parvez Alam

August 22 2023

- Session 1 (9 AM– 11:00 AM) Dr. Sanghasri Mukhopadhyay
- Session 2 (11:30 AM – 1:30 PM) Dr. Akhtar khan
- Session 3 (3:00 pm – 5:00 pm) Dr.Prabhujit Mohapatra

August 23 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Vipindas
- Session 2 (11:30 AM – 1:30 PM) Dr. Rajesh Moharana
- Session 3 (3:00 pm – 5:00 pm) Dr. Rajesh Moharana

August 24 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Kumar Abhishek
- Session 2 (11:30 AM – 1:30 PM) Dr. Kumar Abhishek
- Session 3 (3:00 pm – 5:00 pm) Dr. Dilip Kumar Gupta

August 25 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Sanjaya K. Panda
- Session 2 (11:30 AM – 1:30 PM) Dr. Sanjaya K. Panda
- Session 3 (3:00 pm – 5:00 pm) Dr. Debaroti Das

August 28 2023

- Session 1 (9:00 AM– 11:00 AM) Dr.Muvvala Pullarao
- Session 2 (11:30 AM – 1:30 PM) Dr. Muvvala Pullarao
- Session 3 (3:00 pm – 5:00 pm) Dr. Debaroti Das

August 30 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Umakant Mishra
- Session 2 (11:30 AM – 1:30 PM) Dr. Akhtar khan
- Session 3 (3:00 pm – 5:00 pm) Dr. Akhtar khan

August 31 2023

- Session 1 (9:00 AM– 11:00 AM) Dr. Akhtar khan
- Session 2 (11:30 AM – 1:30 PM) Dr. Debaroti Das
- Session 3 (3:00 PM – 5:00 PM) Dr. Muvvala Pullarao