

One Day Pre-Workshop to ICBAI-2025 on
Introduction to MIP Modeling in Python and Performance Tuning for Large-Scale Optimization

Resource Person Bio: Dr. Alok Patel is the Founder and Principal Operations Research Scientist at DecisionOpt, a firm specializing in advanced optimization and operations research solutions. He holds a Ph.D. in Operations Research from the Industrial Engineering and Operations Research (IEOR) Department at IIT Bombay. Dr. Patel has led optimization engagements across logistics, manufacturing, and energy sectors, and regularly conducts industry workshops on mathematical programming, solver performance, and scalable OR implementations.

Venue: Dr APJ Abdul Kalam Arangam, Madurai Kamaraj University, Madurai

Date: 14th December 2025 (Sunday)

Registration Fee: Rs. 1000/- [include 2 times Coffee/Tea with Snacks and Lunch]

A Brief Summary:

This full-day workshop is designed to provide participants with both foundational knowledge and advanced strategies for solving real-world optimization problems using Mixed-Integer Programming (MIP). The program is structured in multiple sessions to systematically build modeling skills in Python and to introduce practical techniques for enhancing solver efficiency. The sessions will include lectures, hands-on implementation, and interactive discussion.

The workshop is particularly relevant for researchers, graduate students, and practitioners working in operations research, supply chain, logistics, and other data-driven decision-making domains.

Schedule:

Session 1 (9:30 AM – 11:00 AM) - Introduction to MIP Modeling in Python

Introduction to MIP formulation using Python libraries such as PuLP and GurobiPy. Topics include model structure, variables, constraints, and solving basic optimization problems.

Coffee Break (11:00 AM – 11:30 AM)

Session 2 (11:30 AM – 1:00 PM) - Hands-On Implementation with PuLP & GurobiPy

Participants will work on live coding examples involving real-world optimization problems. (Participants are requested to bring their own laptops with Python and PyCharm (Community Edition) pre-installed)

Lunck Break (1:00 PM – 2:30 PM)

Session 3 (2:30 PM – 4:00 PM) - Advanced Solver Tuning and Performance Optimization

Topics include:

- Reading and interpreting Gurobi solver logs
- Identifying and addressing modeling inefficiencies
- Reformulations to strengthen LP relaxations
- Warm-start strategies and leveraging problem structure
- Gurobi parameter tuning for runtime and numerical stability

Coffee Break (4:00 PM – 4:30 PM)

Session 4 (4:30 PM – 5:30 PM) - Q&A and Open Discussion

An open forum for participants to discuss modeling challenges, solver behavior, and application-specific issues. Individual feedback will be provided where feasible.