PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS112/II/2025

Quantum Optimization Through QUBO Modelling

Name of the PMRF student

Rupkatha Ghosh

Prerequisites:

1. **Basic Linear Algebra:** Vectors and matrices, Matrix multiplication

2. **Basic Probability & Statistics:** Random variables, Mean, variance, Probability distributions

3. **Optimization:** Objective function, Constrained vs. unconstrained

4. **Basic Programming Skills**

Details of the content of the module

❖ Introduction to quantum computing and optimization

❖ Fundamentals of binary optimization and Quadratic Unconstrained Binary Optimization (QUBO) formulation

❖ Converting real-world problems into QUBO models

❖ Constraint handling methods

❖ QUBO-Ising model mapping for quantum annealing

❖ Applications in scheduling, routing, logistics etc.

Mode: Conceptual lectures, guided problem-solving sessions, hands-on formulation exercises, live demonstrations, and interactive discussions

Schedule of the module

Date: 8th December 2025

Lecture Timings: 3:00 pm – 6:00 pm

Meeting link : Will be shared later

Link

Contact email ID: isss.forum@gmail.com

Registration link:
https://forms.gle/p4RhAkUuGq6tydTg9