PMRF-ISSS Teaching Programme

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

Module PMRF-ISSS008/III/2026

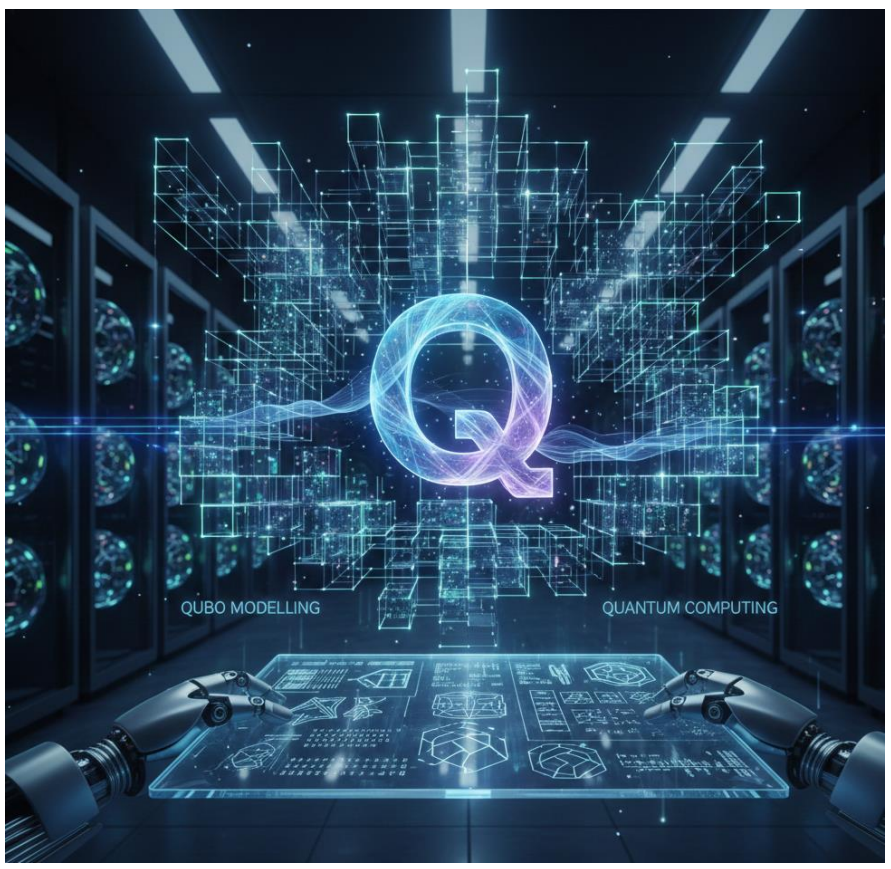
Quantum Approximate Optimization Algorithm (QAOA)

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

- ❖ Fundamentals of the Maths behind Quantum Computing (QC)
- ❖ Introduction to gate-based QC and variational algorithms
- ❖ Formulation of combinatorial optimization problems with Ising/ QUBO Models
- ❖ Principles of QAOA: Mixer and Cost Operators, Circuit Structure, and the Role of Variational Parameters
- ❖ Classical Optimization Loop & Parameter Tuning
- ❖ Implementation Workflow

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

Schedule of the module

Date: 22nd to 28th February 2026

Lecture Timings: 9:00 pm – 11:00 pm

Meeting link : https://teams.microsoft.com/meet/41809134282794?p=Lunv9O98TGMe8oJhJv

Contact email ID: isss.forum@gmail.com

Registration link: https://forms.gle/n4gSDefrdfsYc8WJ7