



Module PMRF-ISSS049/IV/2025

## Formal Analysis and Control of Autonomous Systems

### Name of the PMRF student

Ratnangshu Das

### Required background of the students taught

Introductory level course for students of ME, EE, AE, particularly interested in robotics and control

Prerequisites: Programming in Matlab, Linear Algebra, Calculus.

### Online session coordinator

Will be chosen from the list of registrants

### Details of the content of the module

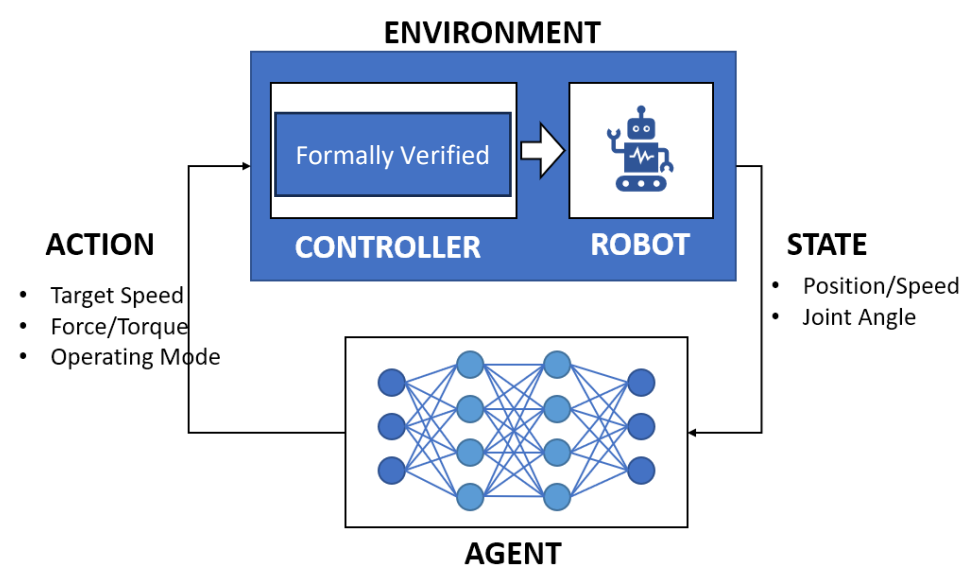
Day 1: Autonomous Systems and Low-Level Specifications: System Modelling, Composition, Stability, Safety, Set-based Constraints, Simulations in MATLAB

Day 2: High-Level Specifications: Temporal logic (LTL, MITL, STL), Automata

Day 3: Formal Verification: Automata Theory, Regular and omega-regular properties, Barrier Certificates

Day 4: Formal Synthesis: Abstraction-based control synthesis, Data-driven control synthesis, Control Barrier Functions

Day 5: Funnel-based Control, Spatiotemporal Tube-based and robust synthesis under uncertainty



### Schedule of the module

Start Date: 8 May, 2025

Live lectures will be conducted (or recorded lectures might be uploaded) daily from 10:00 am to 2:00 pm (5 Lectures)

End Date: Tentatively by end of May 2025

Meeting link: [Formal ISSS | General | Microsoft Teams](#)

Contact email ID: [issf.forum@gmail.com](mailto:issf.forum@gmail.com)

Registration  
link: <https://forms.gle/hMdkbZQPZdGYdpxs9>