

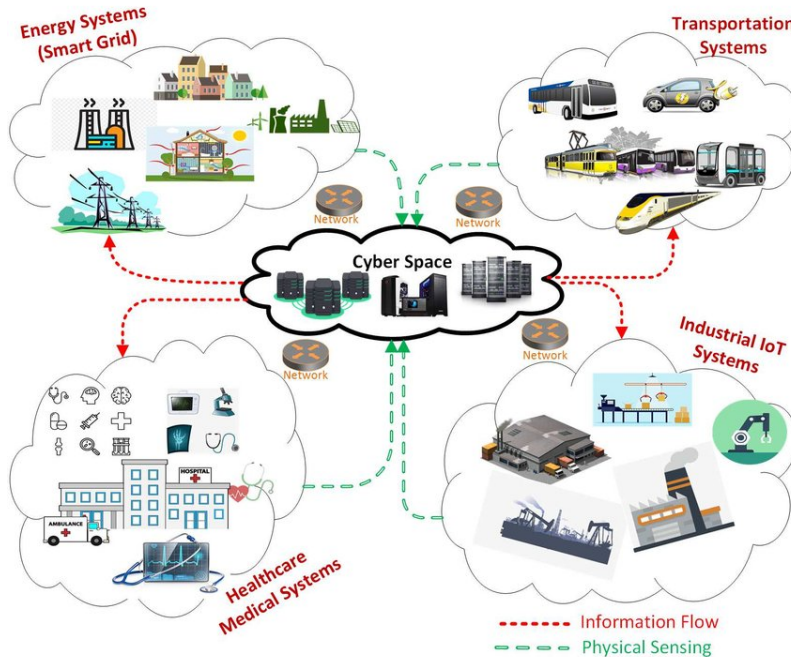


Embedded Controls and Software: Modeling & Design

Microspecialization
from ATDC

Starting Autumn
2020

WHAT IS INTERESTING ABOUT THIS MICROSPECIALIZATION?



Our world is increasingly becoming automated, through the ubiquitous presence and coordinated involvement of embedded systems, controls and software. Multiparametric decision support system with real time rapid automation through secured process is increasingly demanding across the fields from medical devices to transportation (ships, railways, cars, aerospace, etc.), or security systems to process industries, with the incorporation and advancement of embedded systems, controls and software. Phenomenal shift of requirements of the global industry clearly experiencing a sharp increase in the demand for advanced and skilled workforce who have a combined expertise in the areas of embedded systems, controls and software, resulting in a more complex and multidisciplinary field.

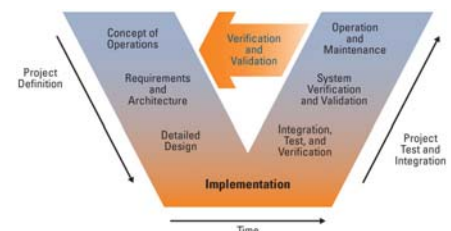


BENEFITS TO STUDENTS

Microspecialization offered by ATDC will provide state of the art knowledge in all three domains, namely, 'Embedded Systems', 'Controls' and 'Software' in a combined and coordinated manner to meet present industrial needs.

Salient features of the course that today's complex CPS/IoT based industries demands are :

- ⇒ Operational control logic is mostly incorporated in an embedded system which communicates with the external world via sensor/actuator based interfaces.
- ⇒ Their designs not only require a high level of integration, but may also be marked by other constraints related to limited compute power/memory, reliability/security and timeliness demands; bounds on cost, energy dissipation, space, weight etc.
- ⇒ Such designs need understanding of multi-disciplinary concepts.
- ⇒ Contemporary CPSs, such as those in automotive/avionic systems, smart power grids and medical systems, are often distributed and consist of several homogeneous/heterogeneous embedded systems interacting over networks.
- ⇒ Multidisciplinary information exchange protocol through distributed homogeneous/heterogeneous embedded system networks in contemporary CPS/IoTs, such as those in automotive/avionic systems, smart power grids and medical systems.
- ⇒ Knowledge dissemination in the field of Controls, network architecture, intelligent sensing/actuation, protocols and their imposed latencies, integrated scheduling of computation and messaging, consistency, synchronization etc.



Salient Facets to Note

- **Truly Interdisciplinary**
- **Exposure to Cyber-Physical Systems:** Modeling, Controls, Real Time systems, IoT, Instrumentation, Security, with hands on training
- **Job Prospects:** Automotive, Medical Devices, Consumer electronics, Process Industries, VLSI, IoT Design

New cohort of students in the streams of EE, ECE, CSE, QEDM, ME, CH, AE will be educated to meet the challenges and demands of today's smart CPS/IoT driven industries through unique multi-disciplinary competencies developed through the ECS micro-specialization course



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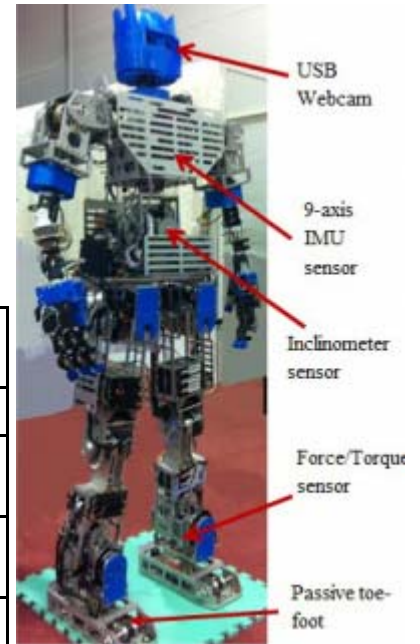
Microspecialization: Overview of Contents

A. COMPONENT I: MANDATORY REQUIREMENT: (3 credits)

Sub no.	Sub Name	LTP	Credits	Offering Semester
AT30001	Fundamentals of Embedded Control and Software	3-0-0	3	Autumn

B. COMPONENT- II: ANY TWO ELECTIVES(3/4 credits each) :

Sub no.	Sub Name	LTP	Credits	Offering Semester
AT60001	Embedded Control System	4-0-0	4	Autumn
AT60002	Principles of Automotive Dynamics & Control	3-0-0	3	Spring
AT60003	Embedded Software Design and Validation	4-0-0	4	Autumn
AT60004	Security Aware IoT and CPS Design	3-0-0	3	Spring
AT60006	Embedded Sensing, Actuation and Interfacing System	4-0-0	4	Spring
AT60008	Embedded Communication Networks	3-0-0	3	Spring
CS61063	Computational Foundations of Cyber Physical Systems	3-1-0	4	Autumn

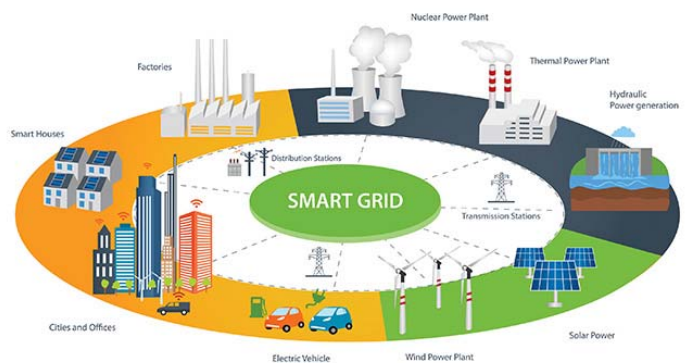


C. COMPONENT- III: PROJECT (4 credits) OR AN ELECTIVE (4 credits)

Sub no.	Sub Name	LTP	Credits	Offering Semester
AT67005	Project	0-0-6	4	Both semesters

Offered to the Following Departments:

- Aerospace Engineering.
- Computer Science and Engineering.
- Electrical Engineering.
- Electronics and Electrical Communication Engg.
- Industrial and Systems Engineering.
- Mechanical Engineering
- Chemical Engineering



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