Career Options & Skillset Requirement for ECE Students
Career paths in Control Systems

*Career Path*: Control Systems

*Faculty in Department:*

Dr. Priya Ranjan
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Who Requires Control Systems Engineer?

- Automobiles
- Aerospace
- Defense
- Robotics
- Biomechanical Control
- Economics Control Systems
- Population Control Systems
- Almost all Industries
Skill set required

Requirements

Academic Preparations

Tools

Programmable Logic Controller (PLC)

Human Machine Interface (HMI)

Robot Operating System (ROS)

SCADA

Programming Skills

C/C++, Python, R

LabView

MATLAB

Lisp

Ladder Logic

Network Programming
Academic Preparations

Control Systems (Primary Importance)
- Classical Control Systems
- Modern Control Systems
- Distributed Control Systems

Mathematics (Primary Importance)
- Differential Systems
- Linear Algebra
- Probability and Statistics
- Numerical Methods
- Complex Numbers

Other Primary Importance
- Analog and Digital Electronics
- Wireless Sensor Networks
- Computer Networks
- IoT

Secondary Importance
- Signals and Systems
- Communication Systems
- Digital Signal Processing
- Biomedical Instrumentation
- Non-Linear Control System
- AI/ML
- Mechatronics
Career Paths in Embedded

- Hardware Design Engineer
- Embedded Software Developer
- Automotive Software Engineer
- Firmware Developer
- Test Engineer
- Assembly Level Language
Embedded Software Engineer

Skill Set
- C, C++, Python
- Linux
- QT
- Operating Systems
- RTOS

Tools Required
- Microsoft Visual Studio
- Eclipse
- Intel Parallel Studio
- Verification and Validation
- Xilinx

Job Titles
- Application Software Engineer
- System Software Engineer

Project Domains
- Automotive
- Aero
- Medical Electronics
- Consumer Electronics
- Military and Defence
- Scientific Applications
Automotive Software Engineer

Skill Set
- C, C++, Matlab
- Linux
- Protocols: I2C, SPI, CAN, LIN
- Operating Systems

Tools Required
- Keil uVision
- IAR EWB
- Vector Tools: CANoe, CANalyzer
- MATLAB, Stateflow, Simulink

Job Titles
- Software Developer
- System Software Developer
- Unit Testing
- Model Based Developer

Project Domains
- Automotive
- Aero
- Military
- Space
- Bio Medical
Firmware Developer

Skill Set
- Embedded C, C++
- Linux
- Microcontrollers: ARM MCUs from STM, TI, Renesas
- Device Drivers

Tools Required
- Keil uVision
- IAR EWB
- Open Source Tools: GCC, Cross Compilers

Job Titles
- Firmware Engineer
- System Engineer

Project Domains
- Automotive
- Aero
- Medical
- Consumer
- Military and Defense
- Telecom
Career Paths in Signal Processing and Computer vision (Industry)
**Career Path:** Signal Processing and Computer Vision

**Faculty in Department:**
Dr. Karthikeyan
Dr. Uday Shankar
List of Public Sector unit (PSU) companies

1. ISRO
2. DRDO
3. National Thermal Power Corporation (NTPC)
4. Oil and Natural Gas Corporation (ONGC)
5. Steel Authority of India Limited (SAIL)
6. Bharat Heavy Electricals Limited (BHEL)
7. Indian Oil Corporation Limited (IOCL)
8. Hindustan Petroleum Corporation Limited (HPCL)
9. Coal India Limited (CIL)
10. Gas Authority of India Limited (GAIL)
11. Bharat Petroleum Corporation Limited (BPCL)
12. Power Grid Corporation of India (POWERGRID)
13. Bharat Electronics Limited (BEL)
14. Engineers India Limited (EIL)
15. Hindustan Aeronautics Limited (HAL)
16. Mahanagar Telephone Nigam Limited (MTNL)
17. Neyveli Lignite Corporation Limited (NLCIL)
18. Oil India Limited (OIL)
19. Power Finance Corporation (PFC)
20. Rural Electrification Corporation (REC)
21. Shipping Corporation of India (SCI)
22. Airports Authority of India (AAI)
23. Bharat Sanchar Nigam Limited (BSNL)
24. Central Warehousing Corporation
25. Central Coalfields Limited
26. Chennai Petroleum Corporation (CPCL)
27. Cochin Shipyard (CSL)
28. Educational Consultants India (EDCIL)
29. Garden Reach Shipbuilders & Engineers (GRSE)
30. Goa Shipyard (GSL)
31. India Tourism Development Corporation (ITDC)
32. Mazagon Dock Limited
33. Mahanadi Coalfields (MCL)
34. National Small Industries Corporation Limited
35. Northern Coalfields (NCL)
36. North Eastern Electric Power Corporation Limited (NEEPCL)
37. ONGC
38. Projects and Development India Limited (PDIL)
39. RailTel Corporation of India
40. South Eastern Coalfields (SECL)
41. State Trading Corporation of India
42. Telecommunications Consultants India (TCIL)
43. Mineral Exploration Corporation Limited
44. Ministry of new and renewable energy (MNRE)
45. Solar Energy Corporation of India Ltd (SECI)
Career Paths in VLSI (Industry)

- Digital Design and Verification
- Design for Testability
- System Validation or Testing
- Analog/Mixed Signal IC Designer
- Layout Design/Physical Design
- MEMS/VLSI Fabrication/Process/Compact Modeling
- PCB Design/CAD Methodologies
- R and D
Career Path: VLSI Logic Design

Faculty in Department:
Dr. Ramesh
Dr. Pradyut
Dr. Siva
Dr. Sujit
Career Path: Validation
Faculty in Department: Dr. Ramesh
Dr. Pradyut
Verification

Skill Set
- Verilog HDL & VHDL
- System Verilog, System C
- Specman / e-Language
- Vera
- VMM/UVM/OVM
- Advanced Algebra
- Compiler

Tools Required
- Xilinx
- Altera
- Cadence
- Synopsys
- Mentor

Jobs
- ASIC Verification Engineer
- Verification Engineer
- Application Engineer
- Design Intent Verification
- Formal Verification
- Mixed Signal Design Verification
- Verification of Automotive / Embedded Systems and Interfaces

Project Domains
- Design Intent Verification
- Verification Engineer
- Application Engineer
- Formal Verification
- Mixed Signal Design Verification
- Verification of Automotive / Embedded Systems and Interfaces
VLSI Testing

Skill Set
- ATPG, Fault Simulation, At-Speed Testing & Scan Compression
- Boundary Scan, Memory Testing (MBIST)
- Logical BIST, Low Power Test, IDDQ Test

Tools Required
- Mentor Graphics: DFT Advisor, Fast Scan, Flex Test, TestKompress, BSD Architect, MBIST Architect
- Synopsys: DFT Max, DFT Compiler, TetraMAX, Prime Time, BSD Compiler
- Cadence: RTL Compiler, Encounter Test

Jobs
- DFT Engineer
- Mixed Signal DFT Engineer

Project Domains
- Digital DFT, ATPG & BIST
- Memory Testing & Boundary Scan
- Scan Compression, Low Power Test, IDDQ Test
MEMS/VLSI fabrication/Process

Skill Set
- MEMS fundamental concepts
- Litho basics
- VLSI Fabrication, process flow
- Device modeling, Compact model development
- Understanding of Emerging Device structures like FinFET, Nanowire
- Fundamentals of THz

Tools Required
- Coventorware
- Intellisuite
- COMSOL
- Synopsys Device, Process simulators/TCAD tools

Jobs
- MEMS FOUNDRY DESIGN Engineer
- Process Engineer
- Compact Device Modeling Engineer

Project Domains
- SENSORS DESIGN
  - Actuator design
  - RF components design
- Device modeling, Compact model development of Post-CMOS Devices
- Circuit Design with Post-CMOS devices
Career Paths in Wireless Communication

- Wireless Communication Engineer
- Wireless system development Engineer
- RF and Broadband Testing engineer
- Wireless system Engineer
- Wireless Embedded Software developer
- Wireless Architect
- LTE eNB developers
- Communication Specialist, broadband Technician
- Wi-Fi Application Developer
- Wireless-Lead
- Bluetooth RF design
Career Path: Test Engineer

Faculty in Department:
Dr. Sunil Chinnadurai
Dr. Anirban Ghosh
Dr. Uday Shankar