

**Sensors/
Devices**



3GIRPS
INSTITUTE OF RESEARCH & POLICY STUDIES
BUILD INDIA TO SERVE THE WORLD

Connectivity

**3G INSTITUTE OF RESEARCH AND POLICY STUDIES
PRESENTS**

90+ HOURS INTERNET OF THINGS

**Data
Processing**

**User
Interface**

**Venue: IIT Madras Research Park
admin@3girps.org | www.3girps.org | + 91 99624 30308**



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INTERNET OF THINGS

1. Introduction- IoT (15+ Hrs)

- 1.1. Internet of Things introduction Scope Of IoT
- 1.2. IoT Architecture and Core IoT Modules
- 1.3. IoT networking data messaging protocols
- 1.4. IoT Analytics for the cloud
- 1.5. Cloud services model
- 1.6. Data Science for IoT Analytics
- 1.7. Trends in the Adoption of IoT
- 1.8. IoT Is Powerful and Pervasive
- 1.9. Societal Benefits of IoT
- 1.10. Risks, Privacy, and Security

2. Microcontroller and Microprocessor (15+ Hrs)

- 2.1. Introduction to Microcontroller and Microprocessor
- 2.2. Architecture involved
- 2.3. Pin diagram
- 2.4. Peripheral devices
- 2.5. Difference between microcontroller and microprocessor
- 2.6. Applications of the Microcontroller and Microprocessor
- 2.7. Basic Electronics
 - 2.7.1. Introduction
 - 2.7.2. Basic Electronics Components
- 2.8. Basic Computer System
 - 2.8.1. Memory
 - 2.8.2. RAM
 - 2.8.3. ROM
 - 2.8.4. Flash
 - 2.8.5. Input/output devices

3. Advanced / Embedded C Programming (10+ Hrs)

- 3.1. Basics of C:
 - 3.1.1. Operators
 - 3.1.2. Conditionals
 - 3.1.3. Arrays
 - 3.1.4. Functions
- 3.2. Advanced of C Programming
 - 3.2.1. Structures
 - 3.2.2. Unions
 - 3.2.3. Files
 - 3.2.4. Deep dive into pointers
 - 3.2.5. Pre-processor directives
 - 3.2.6. Recursion
- 3.3. Project environment - Creating & Building a project, Makefiles
- 3.4. Deep dive - Logic to program translation, Creating your own library, Dry-run
- 3.5. Introduction to Data Structures

4. Arduino UNO (10+ Hrs)

- 4.1. Introduction
- 4.2. Pin Description
- 4.3. Power (USB / Barrel Jack)
- 4.4. Pins (5V, 3.3V, GND, Analog, Digital, PWM, AREF)
- 4.5. Reset Button
- 4.6. Power LED Indicator
- 4.7. TXX LEDs
- 4.8. Main IC
- 4.9. Voltage Regulator
- 4.10. The Arduino Family
- 4.11. Arduino Uno Technical Specifications
- 4.12. ATmega168/328P-Arduino Pin Mapping

5. Arduino Programming (10+ Hrs)

- 5.1. Arduino Integrated Development Environment (IDE)
- 5.2. Installing Arduino IDE on Your Computer
- 5.3. For Installing on Windows
- 5.4. The programming cycle on Arduino
 - 5.4.1. Arduino Sketches Classes
 - 5.4.2. Sketch Structure
 - 5.4.3. Pins
 - 5.4.4. Arduino Shields
- 5.5. Basic Structure and commands
- 5.6. Milestone Project

6. Sensors Introduction (5+ Hrs)

- 6.1. Introduction to Sensors
- 6.2. Classification of Sensors
- 6.3. Types of Sensors

7. Sensors and Actuators interfacing (20+ Hrs)

- 7.1. Introduction
- 7.2. DHT11/DHT22 Humidity and Temperature Sensor
- 7.3. The MQ-2 Gas Sensor
- 7.4. Ultrasonic Sensor HC-SR04 with Arduino
- 7.5. Rain Sensor FC-37
- 7.6. Soil Moisture Sensor YL-69 or HL-69
- 7.7. PIR Motion Sensor
- 7.8. BMP180 Barometric Sensor
- 7.9. The Sound Sensor
- 7.10. Introduction to Actuators
- 7.11. Differences between Sensors and Actuators
- 7.12. Electric Motor
- 7.13. Motor Driver
- 7.14. Milestone Project

8. Programming with Python (5+ Hrs)

- 8.1. Overview of Programming with Python
- 8.2. Native Datatypes and Operators
- 8.3. Python Statements and Conditionals
- 8.4. Functions
- 8.5. Strings
- 8.6. Object oriented programming with Python
- 8.7. Errors and Exception Handling
- 8.8. File handling
- 8.9. Regular expression
- 8.10. Modules and Packages
- 8.11. Milestone Project

9. IoT Cloud Infrastructure (8+ Hrs)

- 9.1. IoT cloud building blocks
- 9.2. Using the platform specific dashboards
- 9.3. Device configuration and addressing
- 9.4. IoT Platforms in detail
- 9.5. MQTT Server
- 9.6. Injection Engine
- 9.7. Time Series database
- 9.8. Rules Engine
- 9.9. Data monitoring, visualization and IoT Analytics
- 9.10. Application Service
- 9.11. Milestone Project

10. Module (10+ Hrs)

- 10.1. Career assistance
 - 10.1.1. Resume building
 - 10.1.2. Internship
 - 10.1.3. Interview preparation
 - 10.1.4. Complete career guidance
- 10.2. Capstone Project
- 10.3. Hackathon
- 10.4. Scholarship
- 10.5. Awards and rewards

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admin@3girps.org | www.3girps.org | + 91 70101 52153

HeadQuarters : IIT Madras Research Park, A Block, 6th floor, Kanagam
Road, 32, Tharamani, Chennai, Tamil Nadu 600113

Course Offered

- Internship
- Google AI
- Python
- Ethical Hacking
- Machine Learning - Deep Learning Workshop

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