The aim

Samsung Innovation Campus - Smart Things Edition aims to empower a generation of problem solvers by equipping them with future-proof skills and giving them practical understanding of the technologies that will shape their future and enrich sustainable growth of the world.
Samsung Innovation Campus - Smart Things Edition is an educational path developed by Samsung in partnership with some of the best Italian public universities aimed at providing students of technical-scientific paths with the AI, IoT, and soft skills necessary to drive the digital transformation that is revolutionizing the production and organizational dynamics of companies.

The course trains on the application of IoT and AI technologies in the Consumer Electronics product market, transfers skills of ideation, project management and problem solving and prepares for professional placement.

The course includes 100 hours of digital learning, 49 hours of in-class lectures held by Samsung and University professors and 80 hours of teamwork in which students develop their own project.
Target and selection process

Target Students

- Bachelor students enrolled in the third year and first year out of course from:
  - Departments of Computer Science
  - Departments of Information Engineering

Admission criteria

- Admission test on programming logic and basic AI and IoT knowledge
- Motivational Interview
- Students’ university career (exams grades)

Max 25 students admitted
Learning path

In-class lectures

The course consists of 49 hours of in-class or virtual lessons in which Samsung and University teachers lecture students on various topics (see slide 6 for details).

Online materials

In-class (or virtual) lessons are supported by 100+ hours of online preparatory materials.

Project Work

At the end of in-class lessons students are divided in groups of 5 and asked to work on a AI application case supervised by Samsung and University tutors.
Online materials

1. IoT Introduction UNIVERSITY
2. IoT Devices UNIVERSITY
3. Application Protocols for IoT UNIVERSITY
4. SmartThings & IoT Market SAMSUNG
5. AI Introduction SAMSUNG
6. Machine Learning UNIVERSITY
7. Cyber-security SAMSUNG
8. Starting an AI Project SAMSUNG

Extra Materials

TOTAL 100+ hours

In BLUE topic ownership
0. Course Introduction

1. IoT Introduction
   1. IoT Overview
      1.1 The 4th Industrial Revolution
      1.2 Definition of IoT
      1.3 M2M (Machine to Machine)
      1.4 Background of IoT's Emergence
   2. IoT Application
      2.1 IoT Technology and Evolution
      2.2 Smart Healthcare
      2.3 Smart Home
      2.4 Smart City
      2.5 Smart Logistics
      2.6 Smart Factory
      2.7 Smart Farm
      2.8 Connected Car
      2.9 Smart Energy
      2.10 IoT Major Services
   3. IoT Components
      3.1 IoT Environment
      3.2 Cloud Computing
   4. IoT Network
      4.1 IoT Network Overview
      4.2 IoT Short-range Communication Technology
      4.3 LPWA
   5. Application Protocols for IoT
      5.1 IoT Platforms
      5.2 Basic Structure of the IoT Platform
      5.3 IoT Platform Technology
      5.4 Examples of IoT Platform
      5.5 IoT Open Platform: OCEAN
   6. Devices
      6.1 IoT Devices Introduction
      6.2 Sensor and Actuator
      6.3 Open source HW
      6.4 5G Network
   7. Home Assistant
      7.1 Background of Home Assistant
      7.2 Home Assistant Overview
      7.3 Home Assistant Example
   8. SmartThings
      8.1 Innovation & IoT
      8.2 Innovation: Internet of Things
      8.3 Innovation: A.I. and Big Data
      8.4 Innovation: 5G
      8.5 Innovation: Services & Devices
      8.6 The SmartThings Ecosystem
      8.7 Smart Home
      8.8 The SmartThings Ecosystem
      8.9 SmartThings Architecture
      8.10 SmartThings API
   9. SmartApp
      9.1 Basics
      9.2 Cloud-Connected
      9.3 Directly Connected
      9.4 Hub-Connected
   10. Certification
      10.1 Publishing a Device
      10.2 Certified Devices
      10.3 Compatible Devices
   11. Machine Learning
      11.1 Machine Learning
      11.2 Supervised Learning
      11.3 Unsupervised Learning
      11.4 Reinforcement
      11.5 Cross Validation
      11.6 Workflow
      11.7 Deep Learning

1. Introduction

2. IoT Overview

3. The 4th Industrial Revolution

4. Definition of IoT

5. M2M (Machine to Machine)

6. Background of IoT's Emergence

7. IoT Application

8. IoT Technology and Evolution

9. Smart Healthcare

10. Smart Home

11. Smart City

12. Smart Logistics

13. Smart Factory

14. Smart Farm

15. Connected Car

16. Smart Energy

17. IoT Major Services

18. IoT Components

19. IoT Environment

20. Cloud Computing

21. IoT Network

22. IoT Network Overview

23. IoT Short-range Communication Technology

24. LPWA

25. Devices

26. IoT Devices Introduction

27. Sensor and Actuator

28. Open source HW

29. 5G Network

30. Home Assistant

31. Background of Home Assistant

32. Home Assistant Overview

33. Home Assistant Example

34. SmartThings

35. Innovation & IoT

36. Internet of Things

37. A.I. and Big Data

38. 5G

39. Services & Devices

40. The SmartThings Ecosystem

41. Smart Home

42. The SmartThings Ecosystem

43. SmartThings Architecture

44. SmartThings API

45. SmartApp

46. Basics

47. Cloud-Connected

48. Directly Connected

49. Hub-Connected

50. Certification

51. Publishing a Device

52. Certified Devices

53. Compatible Devices

54. Machine Learning

55. Supervised Learning

56. Unsupervised Learning

57. Reinforcement

58. Cross Validation

59. Workflow

60. Deep Learning
8. Cybersecurity

1. Cyber Resilienza
   1.1 Introduzione
   1.2 Security by Design
   1.3 Detection e Remediation
   1.4 Il contesto delle reti 5G
   1.5 Sicurezza di dispositivi e apparati
   1.6 Strategia OEM (Original Equipment Manufacturer)

2. Il Fattore Umano
   2.1 Introduzione
   2.2 Lo Scenario nel Mondo Aziendale
   2.3 Lo Scenario nel Mondo Consumer
   2.4 L'Ingegneria Sociale

9. Starting an AI Project

1. Design Thinking
   1.1. What is Design Thinking and Why?
   1.2. Characteristics of Design Thinking

Extra materials Part I

1. Understanding of Probability
   1.1. Probability Theory
   1.2. Probability Rules
   1.3. Random Variable
   1.4. Discrete Probability Distribution

2. Understanding of Statistics I
   2.1. Continuous Probability Density
   2.2. Conjoint Probability

3. Understanding of Statistics II
   3.1. Descriptive Statistics
   3.2. Central Limit Theorem
   3.3. Estimation Theory

4. Statistical Hypothesis Testing
   4.1. Principles of Hypothesis Testing
   4.2. Hypothesis Testing in Action

5. Node-RED
   5.1 Introduction to Node-RED
   5.2 Standalone Installation
   5.3 Fundamentals
   5.4 Docker Installation
   5.5 Configuration
   5.6 Understanding Node Structure, Developing and Testing

6. OpenHAB (Open Home Automation Bus)
   6.1 OpenHAB Overview

7. Data Analysis & Visualization
   7.1 Matrix collection tools: Graphite
   7.2 Open source visualization tools: Grafana
   7.3 R Programming

Extra materials Part II

1. IoT Device and Software
   1.1 IoT Device
   1.2 IoT Software

2. How to run Raspberry Pi
   2.1 Raspberry Pi Overview
   2.2 Getting Started with Raspberry Pi

2.3 Practice Environment Configuration

3. Sensor Device II
   3.1 Basics of Electronics
   3.2 Types of Electronic Parts
   3.3 Interpretation of Circuit Diagram

4. Sensor DeVide III
   4.1 Digital Input and Electric Circuit
   4.2 LED
   4.3 Ultrasonic Sensor
   4.4 7-Segment(4 Digit LED)
   4.5 Temperature-Humidity Sensor
   4.6 Primary Control Programming
   4.7 UART Communication
   4.8 Making Device

5. Node-RED
   5.1 Introduction to Node-RED
   5.2 Standalone Installation
   5.3 Fundamentals
   5.4 Docker Installation
   5.5 Configuration
   5.6 Understanding Node Structure, Developing and Testing

6. OpenHAB (Open Home Automation Bus)
   6.1 OpenHAB Overview

6.2 OpenHAB Installation & Demonstration
   6.3 Configuring OpenHAB for MQTT Binding

7. Data Analysis & Visualization
   7.1 Matrix collection tools: Graphite
   7.2 Open source visualization tools: Grafana
   7.3 R Programming

8. Project Preparation
   8.1 Project Planification
   8.2 Searching for Project Ideas

Online materials detail
Project work

- AI-IoT Project Work based on Bixby technology
  - Students will develop the Project Work in groups of five components
  - Project work will be evaluated by Samsung and University

- Final Test on lectures contents

TOTAL: 80 hours
Samsung Innovation Campus
Smart Things Edition

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