Cisco Networking Academy IoT Fundamentals

Curriculum Overview

9 October 2017

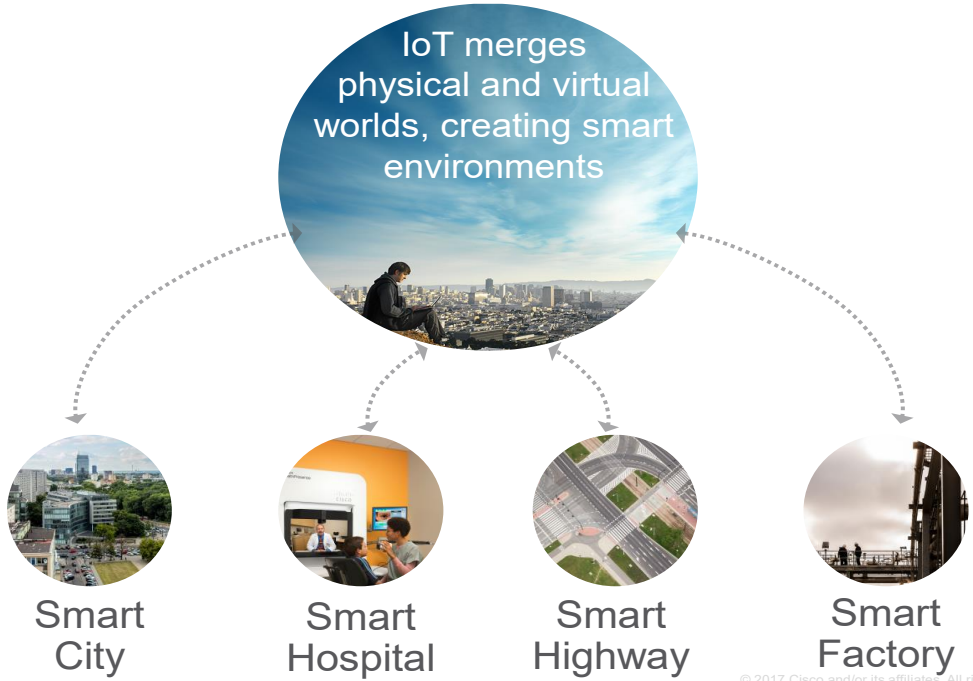
Agenda

1. Emerging Technologies and NetAcad
2. IoT Fundamentals Learning Pathways
3. Getting Ready for IoT Fundamentals
4. IoT Fundamentals Details
5. IoT Fundamentals Learning Tools

Perfect Storm

Massive Youth Unemployment	Growing Skills Shortage	Unprecedented Opportunity
74M	63%	$11.1T
Unemployed Youth	of CEOs see lack of skills as a serious concern	Economic Value Add by 2025
McKinsey Center for Government, Education to Employment	PWC, 17th Annual Global CEO Survey	McKinsey Global Institute; IoT: Mapping the Value Beyond the Hype

Digital Transformation across Countries and Companies



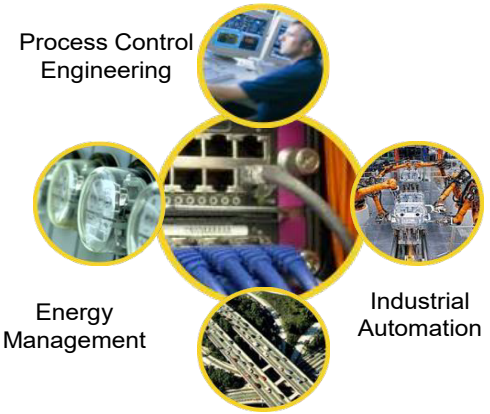
New Opportunities = Employment Paths for Students

Existing Networking Academies

Information Technology

1M Students
20K Instructors
9K Academies

New Academies and/or New Departments at Existing Academies



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IoT Fundamentals Curriculum

Overview

IoT Fundamentals is a multi-disciplinary hands-on curriculum teaching **how to ideate, prototype and articulate the business value of an "end-to-end IoT Solution".** The curriculum provides a strong skills and design-thinking foundation for IoT job families that exist today and in the future.

Career Prep

The skills developed in the curriculum is the starting point to prepare for **employer-validated** entry-level job families like:

- IoT Device Management
- IoT Product Manager
- IoT Data Analytics

Learning Components

- Connecting Things course
- Big Data & Analytics course
- Hackathon Playbook
- Cisco Prototyping Lab
- Cisco Packet Tracer

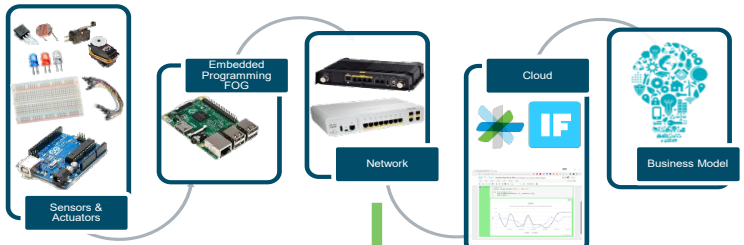
Features

Develop entrepreneurial and social impact mindset through highly engaging hands-on and simulated learning activities including Prototyping Lab and Packet Tracer to develop:

- 21st Century Skills such as Creativity, Critical thinking, Collaboration and Communication
- Rapid prototyping with Sensors, Electronics and Arduino
- Use visual programming or Python to program a Raspberry Pi
- Connect with Cloud Services using RESTful APIs
- Collect, store and visualize data from sensors in real time
- Apply analytics to gain insights from data
- Present IoT solutions and their business value

IoT Fundamentals Visual Summary

Connecting Things



Big Data & Analytics

Hackathon Playbook

Build an End-to-End IoT Prototype

↓

Produce data

↓

Analyze and tell the story from the data

↓

Ideate, design, prototype & present an IoT solution

IoT Fundamentals Approach

A Interdisciplinary Digital Foundation

IoT Fundamentals

Electronics
Programming
Networking
Data Analytics
Cybersecurity
Problem solving
Design thinking
Soft skills

…For Many IoT Career-Ready Pathways

- **IoT Data Analyst**
- **IoT Product Manager**
- **IoT Device Management**
- **IoT Security**

and many others

IoT Fundamentals Value Proposition

Student

- Recognize and understand the concepts and challenges of the **transformational IoT economy**
- Gain hands-on experience with IoT technology and **rapid prototyping**
- Gain **"IoT generalists"** knowledge in a few verticals: Manufacturing, Energy, Healthcare, etc.
- Leverage networking expertise to **broaden knowledge base** with IoT technology
- Consider learning path to **become an "IoT specialist"**
- **Enhance employability** in both IT and non-IT fields

Instructor

- A **comprehensive, hands-on curriculum** in a fast-changing emerging technology domain.
- **Broaden expertise** to include both networking and IoT technology
- **Strengthen multi-disciplinary experiences** in learning and teaching at your institution
- Align with institution's desire to be a **world-class organization**
- Support students' efforts to increase their **employability**

Academy

- Strengthen institution's reputation as a **leader in teaching emerging and cutting-edge technology**
- Strengthen relationship with national and local **employers**
- Strengthen ability to **recruit students**
- Enhance **students' employability**

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IoT Fundamentals: Connecting Things

Course Overview

In Connecting Things, students learn how to securely interconnect sensors, actuators, microcontrollers, single-board computers, and cloud services over IP networks to create an end-to-end IoT system.

Benefits

Students will develop the interdisciplinary skillsets required to prototype an IoT solution for a specific business case with a strong focus on the security considerations for emerging technologies.

Learning Components

- Understand and explain the concepts, opportunities and challenges of digital transformation using IoT.
- Interconnect sensors/actuators, microcontrollers (Arduino), Single Board Computers (Raspberry Pi) and cloud services (Cisco Spark restful API) to create an end-to-end IoT system.
- Understand the relevant aspects of cybersecurity and privacy for an IoT solution.
- Understand how digitalization is changing vertical markets such as manufacturing, energy, and smart cars.
- Use simulation tools (Packet Tracer) to create end-to-end IoT system.

Features

Target Audience: Secondary, Vocational, 2-year and 4-year College, 4-Year University students

Prerequisites: Basic programming, networking and electronics

Instructor Training Requirement: Yes

Languages: English

Course Delivery: Instructor-led

Estimated Time to Complete: 40-50 hours

Recommended Next Course: IoT Fundamentals: Big Data & Analytics or Hackathon Playbook

IoT Fundamentals: Connecting Things Course Details

Target Audience

Appropriate for students familiar with networking technology and software programming who are interested in using digitization to help solve some of the world's most challenging problems

Entering Knowledge

Fundamental knowledge of any programming language with exposure to variables, arithmetic, logic, loops, and functions

Fundamental knowledge of physics covering current, voltage, resistance, and power

Learning Outcomes

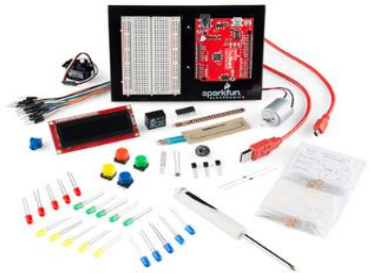
Learn basic prototyping techniques

Learn basic Python programming

Build an end-to-end prototype

Build an IoT Systems solution

Diagram a business model for a given business or social endeavor using the Business Model Canvas



Tools:

Raspberry Pi

Arduino

Prototyping Lab

Packet Tracer

Connecting Things Course Outline

Chapter	Chapter Titles	Summary Description
1	Things and Connections	Understand the building blocks, the interconnections and the information flow of an IoT System.
2	Sensors, Actuators and microcontrollers	Use sensors and an Arduino microcontroller to read data from physical world and control actuators.
3	Software is Everywhere	Use Python to program a Single Board Computer (Raspberry Pi) to perform more complex embedded program.
4	Fog Networks and Cloud Computing	Learn the principal IoT Networking Protocols. Learn how an IoT system distributes computing between Fog and Cloud networks. Learn how to interconnect systems using RESTful APIs.
5	IoT Applications in Business	Learn how IoT technologies are applied in diverse vertical markets: Healthcare, Smart Cities, Smart Grid, Manufacturing.
6	Create an IoT Solution	End-to-End case study on how to create an IoT Prototype.

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Packet Tracer

Tool Overview

Packet Tracer is an innovative simulation and visualization tool used for lectures, labs, games, homework, assessments, and competitions. It is embedded in these courses:

- CCNA Routing and Switching
- CCNA Security
- IT Essentials
- Intro to the Internet of Things
- Mobility Fundamentals

Career Prep

The Packet Tracer simulation-based learning environment promotes the development of essential career skills ranging from teamwork and critical thinking to creative problem solving.

Learning Components

- Cisco Packet Tracer (PT)
- PT Mobile Android
- PT Mobile iOS
- PT Games

Features

As an integral part of the Networking Academy learning experience, Packet Tracer provides

- Simulation
- Visualization
- Authoring
- Assessment
- Collaboration capabilities and facilitates the teaching and learning of complex technology concepts.

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