



**Networking  
Academy**

**AT Computer Solution Limited**

*- Affordable High Quality Training*

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# 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

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# Perfect Storm

Massive Youth  
Unemployment

Growing  
Skills Shortage

Unprecedented  
Opportunity

74M

Unemployed Youth

McKinsey Center for Government,  
Education to Employment

63%

of CEOs see lack of skills  
as a serious concern

PWC, 17<sup>th</sup> Annual  
Global CEO Survey

\$11.1T

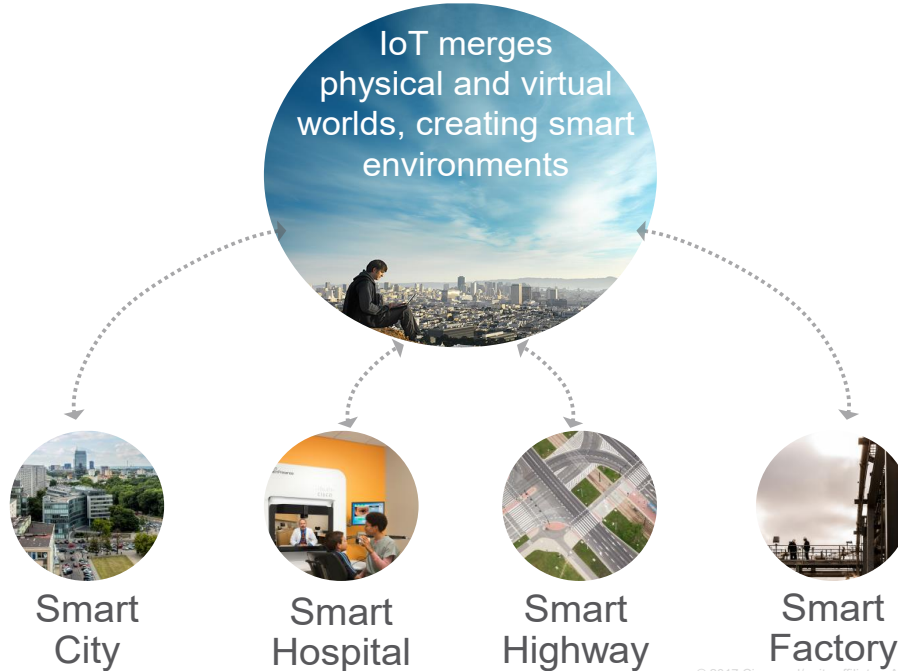
Economic Value  
Add by 2025

McKinsey Global Institute; IoT: Mapping  
the Value Beyond the Hype



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# Digital Transformation across Countries and Companies



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# 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

Process Control  
Engineering



Energy  
Management



Industrial  
Automation



Transportation  
Engineering



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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:

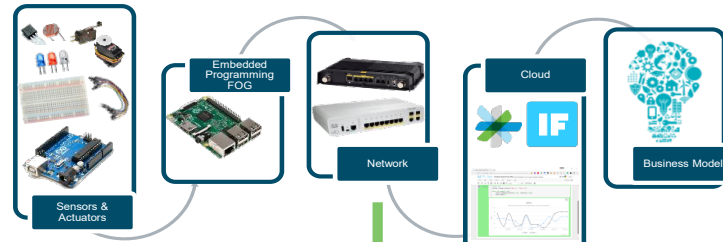
- 21st Century Skills such as Creativity, Critical thinking, Collaboration and Communication
- Rapid prototyping with Sensors, Electronics and Arduino
- Use visual programming or Python to program a Raspberry Pi
- Connect with Cloud Services using RESTful APIs
- Collect, store and visualize data from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



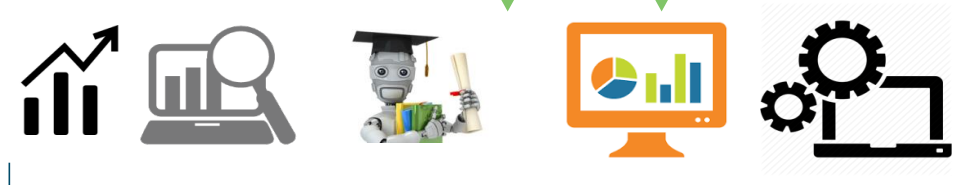
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# IoT Fundamentals Visual Summary

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

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# A New Hands-On Experience

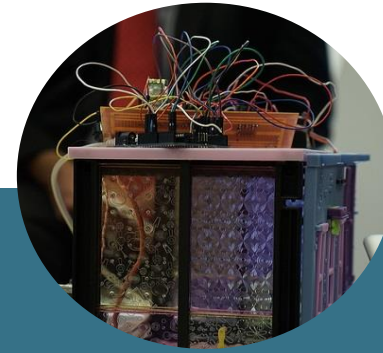
IoT Fundamentals | Lab Experiences



Analyze the Problem  
with User Focus



Hands-on Design and  
Maker Ethos



Rapid Prototyping, Iterating,  
Presenting





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# IoT Fundamentals Approach



A Interdisciplinary Digital Foundation

...For Many IoT Career-Ready Pathways

## IoT Fundamentals



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

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

and many others



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# 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: Big Data & Analytics

## Course Overview

Students will learn how to use Python data libraries to create a pipeline to acquire, transform and visualize data collected from IoT sensors and machines.

## Benefits

The transformative element of any IoT system is the data that can be collected from it. Thus the ability to extract data and using data analytics techniques to gain insights increases employability.

## Learning Components

- Use Python to read data from sensors and store data in a SQL data base.
- Use Python Data Analysis library to clean, manipulate, integrate data sets.
- Use Python Visualization Libraries to visualize real-time data and explore acquired data sets.
- Explain the fundamental principles of a modern scalable Big Data platforms like Hadoop.
- Use storytelling to present the insights gained from extracted data.



## Features

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

**Prerequisites:** IoT Fundamentals: Connecting Things

**Instructor Training Requirement:** Yes

**Languages:** English

**Course Delivery:** Instructor-led

**Estimated Time to Complete:** 40-50 hours

**Recommended Next Course:** IoT Fundamentals: Hackathon Playbook



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# IoT Fundamentals: Big Data & Analytics

## Course Details

### Target Audience

Appropriate for students familiar with software programming who are interested in hands-on experience of manipulating descriptive, predictive and prescriptive data-analysis methodologies

### Entering Knowledge

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

Familiar with the design, implementation and debug of simple programs

### Learning Outcomes

Describe the various systems that support a typical data center

Explain how server virtualization consolidates idle resources, reduces cost and provide better services to the business

Explain how the Software Defined Networking (SDN) framework plays the key role in data center virtualization

Understand the steps of the Data Analysis Lifecycle and perform these tasks in 4 different labs using the RapidMiner and RStudio data analytics tools





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# Big Data & Analytics Course Outline

Chapter	Big Data & Analytics	Summary Description
1	Data and the Internet of Things	Understand the concepts of Big Data & Analytics, and the role of Big Data in IoT systems.
2	Fundamentals of Data Analysis	Learn the basics of descriptive statistics, the practical aspects in acquiring data from a sensor and how to create visual representations of the data.
3	Data Analysis	Explore data using statistics and visualization to extract information and create hypotheses.
4	Advanced Data Analytics and Machine Learning	Learn about predictive analytics, the supervised and unsupervised approaches to machine learning and how to apply models to make predictions from the data.
5	Storytelling with Data	Learn how to transform analytics results into a clear and convincing narrative and visual communication.
6	Architecture for Big Data and Data Engineering	Learn the basic principles behind the most important scalable solutions for Big Data such as Apache Hadoop and the related ecosystem of technologies.

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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.





Networking  
Academy



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