ITU
IoT Skills
Bridging opportunities between students and the digital economy
Cisco Networking Academy
Growing Demand for a Workforce Skilled in IoT ICT and Networking
Digital Transformation across Countries and Companies

Cloud and Services + Platform

- Smart city
- Smart hospital
- Smart highway
- Smart factory
In the News!!!
Why Cybersecurity?

Why Cyber Security Starts At Home

Even the grandmas on Facebook need to know and practice basic security hygiene, because what happens anywhere on the Internet can eventually affect us all.

Cybersecurity skills shortage demands new workforce strategies

The Answer is ...

Information Security Analyst

#5 in Best Technology Jobs

As concern about cybersecurity grows, so does the demand for information security analysts. The BLS predicts employment to ... more

14,800 Projected Jobs | $88,890 Median Salary | 1.4% Unemployment Rate
Digital Transformation Driving Employment Opportunities

Unemployment

Skills Gap

IoT Impact
The Wide Impact of Unemployment

Global Impact
200M people globally
75M young people globally

Impact in Sub-Saharan Africa
29M unemployed in 2017
9/10 people are in informal jobs

Unemployment
$19 Trillion IoT Business Employment Path for Students

People
Connecting people in more relevant, valuable ways

Data
Leveraging data into more useful information for decision making

Process
Delivering the right information to the right person (or machine) at the right time

Things
Physical devices and objects connected to the internet and each other for intelligent decision making (IoT)
Skill Sets for an IoT Professional

- Hardware
- Software
- IoT
- Networking & Security
- Security
Networking Academy Learning Portfolio

**Exploratory**  Consider a career in technology
- Introduction to IoT
- Introduction to Cybersecurity
- Get Connected
- Packet Tracer Tutorials

**Foundational**  Prepare for a technology career
- IT Essentials
- NDG Linux Essentials
- Cybersecurity Essentials*
- Networking Essentials*
- CPA: Programming Essentials C++*
- Mobility Fundamentals
- Entrepreneurship
- Connecting Things*
- Big Data and Analytics*
- Hackathon Playbook*

**Career-Ready**  Step into your technology career
**CCNA Routing & Switching:**
- Introduction to Networks
- Routing & Switching Essentials
- Scaling Networks
- Connecting Networks

**CCNA Security**

**CCNP Routing & Switching:**
- ROUTE
- SWITCH
- TSHOOT

**NDG Linux:**
- Linux I
- Linux II

* To be released within 6 months

**Collaborate for Impact**  Synthesize Your Skills to Solve Real-World Problems
- Packet Tracer Games
- Cisco NetRiders Competition
- NetAcad Advantage
- Internships
- Regional IT Competitions
- Regional Hackathons

* Courses releasing within 6 months
1. **Introduction to IoT**: Explore the introductory concepts and challenges of the digital economy

2. **IoT Fundamentals**:
   1. **IoT Fundamentals: Connecting Things**: Learn to build an IoT solution with electronic prototypes or PT 7.0
   2. **IoT Fundamentals: Big Data & Analytics**: Learn fundamental terminology and data center systems architecture, and perform data analysis activities
   3. **IoT Fundamentals: Hackathon Playbook**: Work as a team to develop a rapid prototype and present a business idea for an IoT solution
Introduction to IoT Course Overview

- **Description**
  Learn the concepts and challenges of the transformational digital economy

- **Overview**
  Pre-requisite for IoT Fundamentals Curriculum
  Appropriate for students familiar with networking technology who are interested in learning about the Internet of Things

- **Length**
  10-15 hours

- **Instructional Methodology**
  Self-paced and instructor-led

- **Entering Knowledge**
  Fundamental knowledge of simple Ethernet networks of routers and switches
  Familiarity with Cisco Packet Tracer – a network and IoT devices simulation application

- **Learning Outcomes**
  Describe the Internet and its evolution to the Internet of Things
  Explain how non-IP-enabled and IP-enabled devices can be connected to a network to communicate in the Internet of Things
  Explain the steps to evaluate and implement an IoT solution
  Describe the interactions of Things in an example of an Healthcare solution model – with hands-on interactive practice
  Explain the concept of prototyping and how this is critical in the nascent IoT market network
IoT Fundamentals: Connecting Things
Course Overview

• **Description**
  Build an IoT Systems solution with electronic prototypes or Packet Tracer

• **Overview**
  Appropriate for students familiar with networking technology and software programming who are interested in using IoT to help solve some of the world’s most challenging problems

• **Length**
  35-40 hours

• **Instructional Methodology**
  Instructor-led only

• **Tools**
  Raspberry Pi, Arduino, Prototyping Lab Cloud and Packet Tracer 7.0

• **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**
  Create circuits and microcontroller programs with the Arduino and a variety of components
  Create Python programs on the Raspberry Pi to provide IoT functionality
  Use Packet Tracer to model Python-based IoT systems
  Diagram a business model using the Business Model Canvas
  Explain how the IoT can be used to provide solutions in healthcare, energy and smart-city
IoT Fundamentals: Big Data and Analytics

Course Overview

- **Description**
  Learn the fundamental of a data center systems and perform data analysis activities

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

- **Length**
  25-30 hours

- **Instructional Methodology**
  Instructor-led only

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

- **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 analysis using the RapidMiner and RStudio data analytics tools
IoT Fundamentals: Hackathon Playbook
Course Overview

• **Description**
  Students work as a team to develop a rapid prototype and present a business idea for an IoT solution

• **Overview**
  A set of best practices and lessons-learned collected from the global execution of numerous IoT hackathons
  Appropriate for students familiar with networking technology and software programming who are interested project-based learning based on IoT technology

• **Length**
  24-30 hours

• **Instructional Methodology**
  Instructor-led only

• **Entering Knowledge**
  Fundamental knowledge of basic prototyping techniques
  Fundamental knowledge of Python programming language

• **Learning Outcomes**
  Inspiration: select and present the problem to be solved
  Ideation: present the IoT solution to an experts panel
  Prototyping: create a prototype action plan including objects and visuals
  Testing: present the concept and validate the prototype
  Presentation: present the solution to the judging panel and demo the prototypes
# IoT Fundamentals Packages

<table>
<thead>
<tr>
<th>Package</th>
<th>Key Values</th>
<th>Positioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro to IoT</td>
<td>Learn and practice the prototyping, data analysis and business development of an IoT systems solution</td>
<td>Minimize instructional effort in adopting the IoT emerging technology by leveraging NetAcad content, training, tools and platform</td>
</tr>
<tr>
<td>Big Data &amp; Analytics</td>
<td>Design and build a full end-to-end IoT solution prototype including electronic prototyping with embedded programming</td>
<td>Fast way to infuse contemporary IoT device digitization concepts into courses that already incorporate: Electronics, Programming, Prototyping, and Robotics/Control</td>
</tr>
<tr>
<td>Intro to IoT</td>
<td>Perform data-analysis using descriptive, predictive, and prescriptive methodologies</td>
<td>Introduce “big-data” concepts and skills for engineering and non-engineering students in the merging IoT business environment</td>
</tr>
<tr>
<td>Big Data &amp; Analytics</td>
<td>Complete recipe/script for successful multidisciplinary hackathon event</td>
<td>Jump-start a multi-disciplinary senior/capstone events where students learn by defining, designing, prototyping and promoting an IoT solution to a panel of industry experts or peers</td>
</tr>
</tbody>
</table>
# IoT Fundamentals Market Segmentation

<table>
<thead>
<tr>
<th>Package</th>
<th>Educational Level</th>
<th>Departments</th>
<th>Learning Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Applicable to most departments</td>
<td>Applicable to most learning tracks</td>
</tr>
<tr>
<td><strong>Intro to IoT</strong></td>
<td></td>
<td>· IT, Networking</td>
<td>· Computer Science, Programming (Python, HTML, C, C++, etc.)</td>
</tr>
<tr>
<td><strong>Big Data &amp; Analytics</strong></td>
<td></td>
<td>· Science, Engineering</td>
<td>· Electronics/Electronic prototyping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· Industrial Arts (e.g. electronic shop, maker’s laboratory)</td>
<td>· Engineering, Physics, Robotics/Control Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>· STEM (STEAM) programs (Varied)*</td>
</tr>
<tr>
<td><strong>Intro to IoT</strong></td>
<td></td>
<td>· Business, Economics</td>
<td>· Statistics, Applied social research</td>
</tr>
<tr>
<td></td>
<td></td>
<td>· Mathematics, Sociology</td>
<td>· Business analytics, Predictive analytics,</td>
</tr>
<tr>
<td><strong>Hackathon Playbook</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Intro to IoT**          |                   | · Presence, Interconnection                                                  | · CAPSTONE, multi-disciplinary/department senior projects                      |
| **Big Data & Analytics** |                   |                                                                             |                                                                                |
| **Hackathon Playbook**   |                   |                                                                             |                                                                                |
# IoT Fundamentals Value Proposition

<table>
<thead>
<tr>
<th>Audience</th>
<th>Desire</th>
<th>Value Proposition</th>
</tr>
</thead>
</table>
| **Student** | • Employment  
• Rich, fun, and effective learning experiences aligned with career objectives  
• Completing required credits for minimal cost and time | • Enhances employability in understanding how IoT influences business and product development outcomes  
• Provides experience and strengthens hands-on prototyping and data analysis skills with real world case studies  
• Develops preference and focus on the path to become an IoT specialist: networking, data engineering, business analyst, etc. |
| **Instructor** | • Current, cutting edge, up-to-date curriculum  
• Rich, fun, and effective learning experiences for students  
• Minimal instructional design effort | • Accommodates students’ desire to enhance their employability by teaching the emerging IoT technology  
• Resonates better with students using effective, rich and fun constructivist, multi-disciplinary instructional techniques  
• Minimizes instructional design effort by leveraging NetAcad content training, tools and platform |
| **Academy** | • Curriculum aligned with industry requirements  
• Enhances technology reputation  
• Leverages cutting edge technology to increase student enrollment | • Aligns curriculum with industry requirements sought by students  
• Strengthens reputation as a leader in teaching emerging and cutting-edge technology  
• Increases fun and exciting learning options for students in all existing technical and non-technical learning tracks |
How to Get Involved

• Start building the pipeline of needed IoT professionals with Cisco Networking Academy courses at your campus or organization

• Help your students prepare for entry-level career opportunities, continuing education, industry-recognized certifications, and career advancement

• For more information, visit www.NetAcad.com
IoT Skills Development
# IoT Fundamentals Value Proposition

## Device Connectivity Package

### Audience  |  Desire  |  Value Proposition

**Student**
- Employment
- Rich, fun, and effective learning experiences aligned with career objectives
- Completing required credits for minimal cost and time

**Value Proposition**
- Demonstrates the ability to prototype IoT solutions with multi-disciplinary skillsets
- Provides experience and strengthen hands-on prototyping skills in real world case studies
- Develops preference and focus on the path to become an IoT connectivity specialist: IoT networking, IoT field engineering, etc.

**Instructor**
- Current, cutting edge, up-to-date curriculum
- Rich, fun, and effective learning experiences for students
- Minimal instructional design effort

**Value Proposition**
- Enhances students’ employability by teaching cutting edge technology and multi-disciplinary skillsets
- Resonates better with students using effective, rich and fun constructivist, multi-disciplinary instructional techniques
- Minimizes instructional design effort by leveraging NetAcad content training, tools and platform

**Academy**
- Curriculum aligned with industry requirements
- Enhances technology reputation
- Leverages cutting edge technology to increase student enrollment

**Value Proposition**
- Aligns curriculum with industry requirements sought by students
- Strengthens reputation as a leader in teaching emerging and cutting-edge technology
- Increases fun and exciting learning options for students in all existing technical and non-technical learning tracks
# IoT Fundamentals Value Proposition

## Data Analysis Package

<table>
<thead>
<tr>
<th>Audience</th>
<th>Desire</th>
<th>Value Proposition</th>
</tr>
</thead>
</table>
| **Student** | - Employment  
- Rich, fun, and effective learning experiences aligned with career objectives  
- Completing required credits for minimal cost and time | - Enhances employability in understanding and communicating how big-data and analytics influences business and product development outcomes  
- Provides experience and strengthens hands-on data analysis skills within real world case studies  
- Develops preference and focus on the path to become an IoT data engineering |
| **Instructor** | - Current, cutting edge, up-to-date curriculum  
- Rich, fun, and effective learning experiences for students  
- Minimal instructional design effort | - Integrates IoT big-data concepts and skills to both technical and non-technical learning tracks  
- Resonates better with students using effective, rich and fun constructivist, multi-disciplinary instructional techniques  
- Minimizes instructional design effort by leveraging NetAcad content training, tools and platform |
| **Academy** | - Curriculum aligned with industry requirements  
- Enhances technology reputation  
- Leverages cutting edge technology to increase student enrollment | - Aligns curriculum with industry requirements sought by students  
- Strengthens reputation as a leader in teaching emerging and cutting-edge technology  
- Increases fun and exciting learning options for students in existing technical and non-technical learning tracks |
## IoT Fundamentals Value Proposition

### Hackathon Playbook

<table>
<thead>
<tr>
<th>Audience</th>
<th>Desire</th>
<th>Value Proposition</th>
</tr>
</thead>
</table>
| **Student** | • Employment  
• Rich, fun, and effective learning experiences aligned with career objectives  
• Completing required credits for minimal cost and time | • Validates learning by defining, designing, prototyping and promoting an IoT solution to a panel of industry experts or peers |
| **Instructor** | • Current, cutting edge, up-to-date curriculum  
• Rich, fun, and effective learning experiences for students  
• Minimal instructional design effort | • Quickly jump-starts multi-disciplinary senior/capstone events, anytime  
• Resonates better with students using effective, rich and fun constructivist, multi-disciplinary instructional techniques  
• Minimizes instructional design effort by leveraging NetAcad content training, tools and platform |
| **Academy** | • Curriculum aligned with industry requirements  
• Enhances technology reputation  
• Leverages cutting edge technology to increase student enrollment | • Aligns curriculum with industry requirements sought by students  
• Inspires recruitment and student enrollment at institution by promoting hackathon events |