INTERNET OF THINGS FOUNDATION

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Syllabus

CLOUD CREDENTIAL COUNCIL

Version 2.0.0
May 2021

CCC Internet of Things FOUNDATION Certified by EXIN

RELEASE	VERSION	DATE
Previous	1.0.0	August 2016
Current	2.0.0	September 2020

Scope and Purpose of this Document

The purpose of this document is to inform all parties interested in the Internet of Things Foundation course of the areas covered in the course.

Internet of Things Foundation

Welcome to the era of Digital Revolution (the last known Industrial Revolution took place centuries ago) where, today, the Internet of Things (IoT) is one of the most critical components for the rapid digitization of businesses across the world.

The Internet of Things is gaining immense popularity owing to the business acumen it offers. Companies across multiple industries are recognizing the need of connectivity and the potential transformation it can bring. As more and more objects get embedded with sensors and start communicating, the new information network will create new business models, impact existing business models, improve business processes, and shrink costs.

This course offers understanding of the IoT concepts and technology and provides a detailed glimpse on the business potential it currently offers. The course has essential components which can enable and support the decision- making process for executives and users alike. This will allow them to analyze the future strategy and align themselves to match or get ahead of the competition. A special focus of the course includes the opportunities and benefits that arise from the combination of IoT with emerging technologies such as Cloud, Big Data Analytics, AI/ML, Blockchain, Immersive technologies (AR/VR), 5G, Digital Twins, Robotic Process Automation (RPA), Additive Manufacturing (3-D Printing) and others.

Target Audience

The Internet of Things (IoT) Foundation course audience includes all teams across the Management and Business functions, including:

- C - Level Executives and Senior Management
- General Managers including Business Development Managers (Marketing, Sales)
- IT Project & Programme Management, Risk Management and IT Service Management
- Business Analysts, Marketing and Sales Executives
- Entrepreneurs and Investors
- Consultants, Professionals in IT service-related fields

Course Requirements

The participants attending the Internet of Things Foundation course are expected to possess the basic knowledge of Internet, Cloud Computing, Big Data, and Networking concepts. It is also recommended that the participants have attained the Cloud Technology Associate Certification or Big Data Foundation certification. Basic familiarity with Agile, Scrum, Lean, and ITSM principles is also beneficial.

Certification Requirements

You will receive the required certification from EXIN on successful completion of the Internet of Things – Foundation (IOTF) exam.

Learning Level of the Syllabus

The modern version of Bloom's taxonomy of learning is a widely used classification framework for course syllabi and assessments for certification. The taxonomy classifies learning into six ascending levels.

Level 1- the Knowledge Level: Exhibit memory of previously learned materials by recalling facts, terms, basic concepts and answers.

Level 2 - the Comprehensive Level: Demonstrative understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.

Level 3 - the Application Level: Using new knowledge. Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.

Level 4 - the Analysis Level: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalization.

Level 5 - the Evaluate Level: Present and defend opinions by making judgements about information, validity of ideas or quality of work based on a set of criteria.

Level 6 - the Creation Level: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions

The level of this course is level 1-2 (Knowledge and comprehensive)

Course Outline

Module 1: Course Introduction

- Internet of Things (IoT) Overview
- Course Overview
- Course Learning Objectives
- Course Agenda
- Course Components
- Type of Activities
- Exam
- Note

Module 2: Internet of Things – Fundamental Concepts

In this module, the following topics will be covered:

- Fundamental Concepts of IoT
- Evolution and Types of IoT

In this module, the following objectives will be covered:

- Understand the basic concepts of the Internet of Things (IoT).
- Explain the terms Machine-to-Machine (M2M) and Internet of Everything (IoE).
- Compare the terms - M2M, IoT and IoE.
- Explain the evolution of IoT.
- Compare the two types of IoT - Industrial IoT (IIoT) and Consumer IoT (CIoT).
- Explain the various benefits of IoT.
- Explain the business applications used in IoT.

Module 3: Business Orientation

In this module, the following topics will be covered:

- Drivers of IoT
- Benefits of a Connected World
- IoT Business: Opportunities and Maturity Model
- IoT Monetization Strategies and Models

In this module, the following objectives will be covered:

- List the key drivers for the evolution of IoT and their significance.
- Understand the benefits and capabilities of a smart and connected world.
- Identity IoT opportunities for manufacturers, developers, analytics, and business organizations.
- Understand the Industrial IoT (IIoT) maturity model.
- Examine monetization opportunities, monetization strategies, and monetization models arising out of IoT.
- Describe the applicability of monetization models.

Module 4: Basic Building Blocks of IoT Architecture

In this module, the following topics will be covered:

- Architecture of IoT components
- Edge and Fog Computing

In this module, the following objectives will be covered:

- Explain the basic building blocks of IoT including Sensors, Processors, Gateways, and Applications.
- Distinguish between Sensors and Actuators.
- Relate to the generic factors of Sensors.
- Explain each of the architectural layers of IoT and the working of IoT.
- Explain the IoT and Microservices architecture structure.
- Explain the concepts, advantages and use cases of Edge and Fog Computing.
- Identify some of the companies working on Fog Computing development.

Module 5: IoT Protocol Stack and Network Protocols

In this module, the following topics will be covered:

- IoT Communications
- IoT Protocol Stack
- IoT Networks – Proximity
- IoT Networks – WPAN
- IoT Networks – WLAN and WNAN
- IoT Networks – WWAN (Cellular and LPWAN)

In this module, the following objectives will be covered:

- Understand the basics of communication models.
- Describe the IoT protocol stack.
- Explain the IoT Proximity network types.
- Explain the IoT Wireless Personal Area Network (WPAN) network types.
- Explain the IoT Wireless Local Area Network (WLAN) network types.
- Explain the IoT Wireless Neighborhood Area Network (WNAN) network types.
- Explain the IoT Wireless Wide Area Network (WWAN) network types.

Module 6: IoT and Digital Transformative Technologies

In this module, the following topics will be covered:

- IoT and Cloud, Fog and Edge Computing
- IoT and Big Data Analytics
- IoT and Artificial Intelligence (AI), Robotics, and Drones
- IoT and Emerging Technologies
- IoT Simulated Hands-on-Labs

In this module, the following objectives will be covered:

- Relate to the digital transformative (emerging/enabling) technologies that combine with IoT to provide extensive business benefits and value to organizations.
    - IoT and Mobility
    - IoT and Cloud, Fog and Edge Computing
    - IoT and Big Data Analytics
    - IoT and Artificial Intelligence (AI), Robotics, and Drones
    - IoT and Emerging Technologies:
        - ❖ Serverless Computing
        - ❖ Blockchain
        - ❖ Immersive Technologies - Augmented Reality (AR)/Virtual Reality (VR)
        - ❖ 5G
        - ❖ Digital Twin
        - ❖ Robotic Process Automation (RPA)
        - ❖ Quantum Computing
        - ❖ Additive manufacturing (3-D Printing)
        - ❖ Cybersecurity

Module 7: IoT Security

In this module, the following topics will be covered:

- IoT Security Challenges
- OWASP IoT Top 10 Precautions
- Real-life IoT Security and Privacy Breaches
- IoT Security Measures

In this module, the following objectives will be covered:

- Describe the main obstacles of IoT.
- Examine the risks related to IoT.
- Recognize OWASP IoT Top 10 precautions (things to avoid) when dealing with IoT Security.
- Examine the real-life scenarios of IoT security and privacy breaches.
- State recommended and best practices for securing IoT.
- Understand the IoT governance practices.

Module 8: IoT Case Studies and Future Predictions

In this module, the following topics will be covered:

- IoT Usage Scenarios and Case Studies
- IoT Growth Perspectives
- IoT Future Predictions

In this module, the following sub-topics will be covered:

- Describe the typical usage scenarios and case studies of IoT.
- Recognize the growth perspectives of IoT.
- Observe future predictions for IoT

Certification

Cloud Credential Council® (CCC) is the accreditor of this course. The CCC intends to accelerate successful cloud adoption and digital transformation through training and certification. In line with this, the CCC aims to provide the most comprehensive in-depth cloud training and certification program in the world.

The CCC Certification Program is a vendor-neutral certification program in the cloud computing domain. The program has been developed by cloud experts that work at leading organizations such as IBM, Microsoft, VMWare, Cisco, EMC, HP, and ING, and aligns to NIST definitions and terminology.

Certification scheme

The CCC certifications are vendor-neutral and provide excellent, vendor-specific cloud training and certification programs. They also add value to the career development of business and technology professionals, as the certifications are built with cloud experts from leading organizations.

Certification Value

The Internet of Things is gaining immense popularity owing to the business acumen it offers. CCC's Internet of Things Foundation certification is a globally recognized certification for associates.

Enhance your career by earning this certification from CCC, globally known as the standard of achievement for associates involved with IoT, Cloud and other emerging technologies.

Exam details

Exam grid

Modules	Topics	Learning Objectives	Weightage	No. of Questions
Module 1: Course Introduction	NA	NA	NA	NA
Module 2: Internet of Things: Concepts and Types	• Fundamental Concepts of IoT • Evolution and IoT Types	• Understand the basic concepts of the Internet of Things (IoT). • Explain the terms Machine- to-Machine (M2M) and Internet of Everything (IoE). • Compare the terms - M2M, IoT and IoE. • Explain the evolution of IoT. • Compare the two types of IoT - Industrial IoT (IIoT) and Consumer IoT (CIoT). • Explain the various benefits of IoT. • Explain the business applications used in IoT.	7%	3
Module 3: Business Orientation	• Drivers of IoT • Benefits of a Connected World • IoT Business: Opportunities and Maturity Model • IoT Monetization Strategies and Models	• List the key drivers for the evolution of IoT and their significance. • Understand the benefits and capabilities of a smart and connected world. • Identity IoT opportunities for manufacturers, developers, analytics, and business organizations. • Understand the Industrial IoT (IIoT) maturity model. • Examine monetization opportunities, monetization strategies, and monetization models arising out of IoT. • Describe the applicability of monetization models.	12%	5

Modules	Topics	Learning Objectives	Weightage	No. of Questions
Module 4: Basic Building Blocks of IoT Architecture	• Architecture of IoT Components • Edge and Fog Computing	• Explain the basic building blocks of IoT including Sensors, Processors, Gateways, and Applications. • Distinguish between Sensors and Actuators. • Relate to the generic factors of Sensors. • Explain each of the architectural layers of IoT and the working of IoT. • Explain the IoT and Microservices architecture structure. • Explain the concepts, advantages and use cases of Edge and Fog Computing. • Identify some of the companies working on Fog Computing development.	18%	7
Module 5: IoT Protocol Stack and Network Connectivity Protocols	• IoT Communications • IoT Protocol Stack • IoT Networks - Proximity • IoT Networks - WPAN • IoT Networks - WLAN and WNAN • IoT Networks - WWAN (Cellular and LPWAN)	• Understand the basics of communication models. • Describe the IoT protocol stack. • Explain the IoT Proximity network types. • Explain the IoT Wireless Personal Area Network (WPAN) network types. • Explain the IoT Wireless Local Area Network (WLAN) network types. • Explain the IoT Wireless Neighborhood Area Network (WNAN) network types. • Explain the IoT Wireless Wide Area Network (WWAN) network types.	20%	8

Modules	Topics	Learning Objectives	Weightage	No. of Questions
Module 6: IoT and Digital Transformative Technologies	• IoT and Cloud, Fog and Edge Computing • IoT and Big Data Analytics • IoT and Artificial Intelligence (AI), Robotics, and Drones • IoT and Emerging Technologies	• Relate to the digital transformative (emerging/ enabling) technologies that combine with IoT to provide extensive business benefits and value to organizations. ◊ IoT and Mobility ◊ IoT and Cloud, Fog and Edge Computing ◊ IoT and Big Data Analytics ◊ IoT and Artificial Intelligence (AI), Robotics, and Drones ◊ IoT and Emerging Technologies: ● Serverless Computing ● Blockchain ● Immersive Technologies - Augmented Reality (AR)/Virtual Reality (VR) ● 5G ● Digital Twin ● Robotic Process Automation (RPA) ● Quantum Computing ● Additive manufacturing (3-D Printing) ● Cybersecurity	18%	7

Modules	Topics	Learning Objectives	Weightage	No. of Questions
Module 7: IoT Security	• IoT Security Challenges • OWASP IoT Top 10 Precautions • Real-life IoT Security and Privacy breaches • IoT Security Measures • •	• Describe the main obstacles of IoT. • Examine the risks related to IoT. • Recognize OWASP IoT Top 10 precautions (things to avoid) when dealing with IoT Security. • Examine the real-life scenarios of IoT security and privacy breaches. • State recommended and best practices for securing IoT. • Understand the IoT governance practices.	18%	7
Module 8: IoT Case Studies and Future Predictions	• IoT Usage Scenarios and Case Studies • IoT Growth Perspectives • IoT Future Predictions	• Describe the typical usage scenarios and case studies of IoT. • Recognize the growth perspectives of IoT. • Observe future predictions for IoT.	7%	3
Total No. of questions			100%	40

Note: The number of questions proposed for the respective modules are as per the concepts covered for that module.

Exam Format

Prerequisites	There are no formal prerequisites. However, it is recommended that you attain the Cloud Technology Associate Certification (or its equivalent) from the Cloud Credential Council, and/or that you are conversant with the Internet, Cloud Computing, Big Data, and Networking concepts.
Supervised	In class/Webcam Proctored
Exam Type	Paper-based/Web-based (Online)
Exam Duration	60 minutes (Additional 15 minutes for non-native English speakers)
Number of Questions	40 Multiple-Choice Questions (MCQs) of 1 mark each
Pass Score	65% (Need to earn minimum 26 points or marks out of 40)
Open Book	No

Question formats

The exam questions will be multiple choice consisting of four options: A, B, C, and D. Out of the four options, only one will be correct.

Scoring System

For multiple-choice questions, the score is based on the correct answer or incorrect answer. For each correct answer, you will get 1 mark (or point), and 0 point for an incorrect answer.