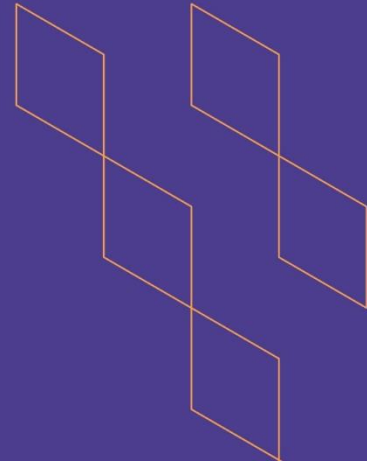




T-104
2022

Course Specification



Course Title: Internet of Things
Course Code: IT11101
Program: Information Technology
Department: Information Technology
College: College of Computer Science and Information Technology
Institution: Al Baha University
Version: 01
Last Revision Date: 30-3-2023



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A. General information about the course:

Course Identification

1. Credit hours: 3

2. Course type

a. University College Department Track Others

b. Required Elective

3. Level/year at which this course is offered:

12th Level / 4th Year

4. Course general Description

This course aims at preparing students to the IoT market in Saudi Arabia, given the increasing demand for engineers on this hot emerging area. The course presents the latest technologies, architecture, communication protocols and trends that are contributing to the evolution of the Internet-of-Things (IoT). It will provide an overview of IoT applications and its impact on the world economy. The course will also cover the technologies and cyber-physical platforms that transform the physical world into digital data thus allowing to connect physical things to the Internet. We will also cover networking and communication protocols that represent the major actors in the IoT ecosystem and the IoT streaming applications used in IoT will be reviewed such as Apache Kafka and MQTT protocol. A major part of the course will deal with developing real-world applications prototypes for the Internet-of-Things from the sensor design to the end-user applications to solve existing problems in the society. At the end of this course, the student will be ready to enter the IoT market or making his own startup.

5. Pre-requirements for this course (if any): None

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

Upon successful completion of the course, the student will be able to:

- Understand the IoT systems, techniques, applications and challenges
- Recognize the digital interfacing with the IoT sensors
- Identify the IoT devices (sensors, actuators, data devices, etc.)
- Recognize the IoT networking and protocols.
- Analyze the IoT security and IoT systems performance.
- Commit to work independently and collaboratively in a small group



1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	33	100%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	33
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	33



B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Describe the IoT systems, techniques, applications, architectures and challenges.	K.1	Lectures Discussions	Homework Quiz Final exam
1.2	Recognize the digital interfacing with the IoT sensors	K.1	Lectures Discussions	Homework Midterm exam Final exam
2.0	Skills			
2.1	Identify the IoT devices (sensors, actuators, data devices, etc.)	S.2	Lectures Discussions	Homework Midterm Exam Project (Rubric) Final exam
2.2	Recognize the IoT networking and protocols.	S.2	Lectures Discussions	Homework Course Project (Rubric) Final exam
2.3	Analyze the IoT security and IoT systems performance.	S.3	Lectures Discussions	Homework Course Project (Rubric) Final exam
3.0	Values, autonomy, and responsibility			
3.1	Commit to work independently and collaboratively in a small group	V.1	Assignments Oral Presentation	Course Project (Rubric)

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to IoT systems & techniques, and applications	6
2.	IoT systems architectures	6
3.	Sensors, actuators and data devices	3
3.	IoT networking	6
4.	IoT protocols	6
5.	IoT security	3
6.	Performance analysis of IoT systems	3
Total		33



D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework	Week 5,9	10%
2.	Quiz	Week 4	10%
3.	Midterm Exam	Week 6	20%
4.	Course Project	Week 11	10%
5.	Final Exam	Week 12-13	50%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)





E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	<ul style="list-style-type: none"> Vlasios et al., Internet of Things: Technologies and Applications for a New Age of Intelligence, Academic Press , 2nd Edition., 2018. ISBN-9780128144367
Supportive References	<ul style="list-style-type: none"> Simone Cirani, Gianluigi Ferrari, Marco Picone, Luca Veltri. Internet of Things: Architectures, Protocols and Standards. Wiley, 2019. p.383. ISBN 9781119359678. Perry Xiao. Designing Embedded Systems and the Internet of Things (IoT) with the ARM® Mbed™. Wiley, 2019. p.316. ISBN 9781119363996.
Electronic Materials	<ul style="list-style-type: none"> Access to the Saudi Digital Library (SDL). Using the learning management system of the university – Rafid System (https://lms.bu.edu.sa/).
Other Learning Materials	<ul style="list-style-type: none"> ACM (Association for Computer Machinery) Curricula Recommendations 2017 – https://www.acm.org/binaries/content/assets/education/curricula-recommendations/it2017.pdf

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classrooms or lecture hall with whiteboards for 20-25 students.
Technology equipment (projector, smart board, software)	Projectors, smartboards.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Teaching	<ul style="list-style-type: none"> Students Faculty Peer Reviewers Program Leader Course Coordinator 	<ul style="list-style-type: none"> Surveys (indirect). Direct feedback from students. Course evaluation by Peer Reviewers (indirect). Class visit by Program Leader (indirect) Comprehensive Course report (where we can find information about teaching difficulties and action plan, ...)



Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Assessment	<ul style="list-style-type: none"> • Students • Faculty • Peer Reviewers • Course Coordinator • Exam Evaluation Committee • Course Coordinator 	<ul style="list-style-type: none"> • Surveys (indirect). • Direct feedback from students. • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about assessment difficulties and action plan, ...) • Exam evaluation by the Exam Evaluation Committee (indirect)
Extent of achievement of course learning outcomes	<ul style="list-style-type: none"> • Faculty • Program Leader • Course Coordinator 	<ul style="list-style-type: none"> • Student Results (direct) • Comprehensive Course report (where we can find the CLO assessment results)
Quality of learning resources	<ul style="list-style-type: none"> • Students • Faculty • Peer Reviewers • Course Coordinator 	<ul style="list-style-type: none"> • Surveys (indirect) • Course evaluation by Peer Reviewers (indirect). • Comprehensive Course report (where we can find information about difficulties and challenges about learning resources as well as consequences and action plan, ...)

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	IT DEPRTMENT CUNCIL
REFERENCE NO.	
DATE	30-03-2023

