The Hashemite University
Faculty of Engineering
Course Syllabus
Spring (2nd) Semester, Academic Year 2020-2021

Course Title:	Building Automation	**Course Number:**	110405546
Department:	Department of Mechatronics Engineering	**Designation:**	Elective
Prerequisite(s):	Transducers and Interfacing (110405431)		
Instructors:	Dr. Sa'ed Alajlouni (سعد العجلوني)	**Instructors' Office:**	E3093
E-mail:	saed@hu.edu.jo		
Office Hours:	[by prior request only, at least one day ahead] Mondays and Wednesdays from 12:30AM-01:30PM (or by other appointment)		
[via MS Teams]			
Class Time:	11:00AM – 12:30PM (Mon, Wed)	**Classroom:**	Teams meeting

Course Description:

Introduction to building automation, Control signals, devices, and strategies, HVAC principles, HVAC control devices, lighting control systems, Fire alarm systems, Video Surveillance systems, Voice-Data-Video systems, Access control systems, Data Networks and networks integration, building management systems, building automation protocols, Smart buildings and building systems integration, Energy and sustainability in automated buildings, Other building systems (elevators, electric power).

Textbook(s):

"Building Automation: Control Devices and Application" In Partnership with NJATC, American Technical Pub, 1st edition, 2008.

Other references:

1- J. Sinopoli, "Smart Building Systems for Architects, Owners, and Builders", 1st edition, Elsevier Butterworth-Heinemann, 2010.
2- J. Sinopoli, "Smart Buildings: A Handbook for the Design and Operation of Building Technology Systems", Spicewood Publishing. 2006.
3- In Partnership with NJATC, "Building Automation: Integration with Open Protocols", American Technical Publishers, 2009.
4- S Wang, "Intelligent Buildings and Building Automation", Spon Press, 2010.

Important material:

- ***The SYLLABYS is very important. Study it. It is a contract between the two of us. Classes and important announcements are streamed via MS Teams.***
- Moodle website will be used for sharing important material (***always check the Moodle site for updates. Also each student must update his/her Moodle email address***).

Course objectives:

The student shall be able to:

1- Identify the ways in which building automation can improve building efficiency.
2- Differentiate between different types of HVAC systems and control devices within each.
3- Understand how a refrigeration cycle works including basic fluid dynamics principles.
4- Differentiate between various methods of lighting system control.

5- Compare the different types of fire alarm signals and explain how each is triggered.
6- Describe the primary functions of security and access control systems.
7- Understand devices and basic operation of elevator systems.

Topics covered (in the presented order):

1- Introduction to building automation (Chapter 1)
2- Electrical systems (Chapter 2)
3- Lighting systems (Chapter 3)
4- HVAC systems (Chapter 4)

5- Refrigeration Cycle
6- HVAC Applications (Chapter 5)
7- Elevator systems (Chapter 11)
8- Fire protection systems (Chapter 7)

9- Security systems (Chapter 8)
10- [time-permitting] Access control systems (Chapter 9)

Grading Plan:

midterm	35%to40%	**TBD**
Other (attendance/ presentation/ adherence to classroom's code of conduct/ participation)	20%to25% presentation + 0%to5% other	
Final Exam	35%to40%	Will be announced by the registrar

General Notes: Attendance is mandatory (absence of more than 15% results in prohibition from taking final exam).

Course contribution:

Professional Component	Course Contribution
General Education	None
Basic Science and Mathematics	Basic formulation of mathematical equations and solving them.
Engineering Science	Basic operation of sensors and analysis of signal conditioning units. Study efficiency of building systems.
Engineering Design	Revise current design to reveal efficient building systems.

Relationship to program outcomes:

ABET (a-k)		Mechatronics Program Outcomes
a	10	ability to apply knowledge of math engineering and science
b		ability to design and conduct experiments and ability to analyze and interpret data
c	10	ability to design system components or process to meet a need
d	20	ability to function in multidisciplinary teams

e		ability to identify, formulate and solve engineering problems
f	10	understanding professional and ethical responsibility
g	10	ability to communicate effectively
h	10	Broad education to understand the impact of engineering solutions in a global and societal context
i	10	recognition of need and ability to engage in lifelong learning
J	10	knowledge of contemporary issues
k	10	ability to use techniques, skills and tools in engineering practice

You should expect me:

- To treat you professionally and equally.
- To assign homeworks/quizzes that adequately covers the material and meets the learning objectives of the course while adhering to the time expectations for the course.
- To give exams that accurately reflect the material covered in class and homeworks/quizzes.

I expect from you (code of conduct):

- To treat me professionally.
- To come to class on time.
- To be attentive and engaged in class.
- To refrain from using laptops, cell phones and other electronic devices during class.
- To refrain from talking to your classmates during class session.
- To spend an adequate amount of time on the homework each week, making an effort to solve and understand each problem.
- To engage with both the abstract and computational sides of the material.
- To seek help when appropriate.
- *No student may record any classroom activity without express written consent from me.*

An absence is excused if:

-You are required to participate in an official University activity (documentation required)

-You are hospitalized (documentation required)

-You are granted a leave of absence from University for reasonable cause by an academic dean (documentation required)

- **There will be no makeup exams. If you miss an exam (or an assignment deadline), you will get a zero**.

A cheated homework answer or assignment will get zero grade