Faculty of Engineering at Shoubra

Model No.12
Course Specifications : Selected Topics

University : Benha university

Faculty : Faculty of Engineering - Shoubra

Department : Electrical Engineering Department

1- Course Data

Course Code : ECE٤٤٨ Course Title : Selected Topics Study Year : 4th year communica

Specialization :

Teaching Hours:

Lecture: 3 Tutorial : 2 Practical :

2- Course Aim

For students undertaking this course, the aims are to:

2.1- Explain the basic robot components.

2.2- Explain robot kinematics and dynamic analysis.

2.3- Analyze motion and control of mobile robots.

2.4- Use computer simulation tools to analyze robot systems.

3- Intended Learning Outcomes of Course (ILOS)

a- Knowledge and Understanding

On completing this course, students will be able to:

a- 1- Define concepts and theories of mathematics , appropriate to robotics.(a1)

a- 2- Describe principles of design including elements design, process and/or a system related to robot systems.(a5)

a- 3 -Describe principles of analyzing and design of robot systems.(a19)

b- Intellectual Skills

At the end of this course, the students will be able to.

b- 1- Think in a creative and innovative way in problem solving and robot design.(b4)

b- 2- Plan, conduct and write a report on a project or assignment in how to using sensors in robots.(b15)

b- 3 - Synthesize and integrate electronic systems for sensors and actuators used with robots.(b18)

c- Professional Skills

On completing this course, the students are expected to be able to:

c- 1 - Create and/or re-design a process, component or system, and carry out specialized engineering designs on mobile robot.(c3)

c- 2- Use computational facilities and techniques, measuring instruments, workshops and laboratories equipment to design experiments, collect, analyze, and interpret results.(c5)

d- General Skills

At the end of this course, the students will be able to:

d- 1 - Work in stressful environment and within constraints.(d2)

d- 2- Communicate effectively (d3).

d- 3 - Effectively manage tasks, time, and resources.(d6)

d- 4- Develop skills related to creative and critical thinking as well as problem solving(d12).

4- Course Contents

No.	Topics	No of hours
1	Sensors used with Robot Systems	8
2	Actuators and Drive Systems	4
3	Kinematics of Robots	4
4	Differential Motions and Velocities	4
5	Dynamic Analysis and Forces	4
6	Trajectory Planning	4
7	Mobile Robots	4
8	Flying Robots	4
9	Matlab Robotics Toolbox	8

5- Teaching and Learning Methods

5.1- Modified Lectures

5.2- Class activity

5.3- Assignments

6- Teaching and Learning Methods of Disables

6.1- nothing

7- Student Assessment

a- Student Assessment Methods

1	Assignments to assess knowledge and intellectual and general skills.
2	Quizzes to assess knowledge, intellectual and professional skills.
3	Mid-term exam to assess knowledge, intellectual skills.
4	Final exam to assess knowledge, intellectual skills.

b- Assessment Schedule

No.	Assessment	Week
1	Assessment 1 Assignments	3, 7, 11, 13
2	Assessment 2 Quizzes	4, 6, 10, 12
3	Assessment 3 Mid-term exam	8
4	Assessment 4 Final exam	15

c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	10 %
Final_Term Examination	60 %
Oral Examination	0%
Practical Examination	0 %
Semester work	15 %
Other types of assessment	15 %
Total	100 %

8- List of References

a- Course Notes

1- Course notes prepared by instructor.

b- Books

1- M. Spong, S. Hutchinson and M. Vidyasagar, Robot Modeling and Control, Wiley, 2005.

c- Recommended Books

1- S. Niku, Introduction to Robotics: Analysis, Control, Application, Wiley, 2011.

- Course Coordinator : Dr. Mohamed Hasan Rizk Salem

- Head of Department : Prof. Dr. Sayed Abo-Elsood Ward

Matrix of course content and ILO's

Course Title: Selected Topics **Code**: ECE٤٤٨
Lecture: 3 **Tutorial**: 2 **Practical**: - **Total:** 6
Program on which the course is given: B.Sc. ElectricalEngineering (Communications)
Major or minor element of program: Major
Department offering the program: ElectricalEngineering Department
Department offering the course: Electrical Engineering Department
Academic year / level: **Fourth** Year / **First** Semester 2014-2015
Date of specifications approval: 20/6/2010

Course content	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3	d4
Sensors used with Robot Systems	✓	✓		✓			✓					
Actuators and Drive Systems	✓	✓		✓			✓					
Kinematics of Robots	✓	✓	✓	✓			✓					
Differential Motions and Velocities	✓	✓	✓	✓			✓					
Dynamic Analysis and Forces	✓	✓	✓	✓			✓	✓				
Trajectory Planning	✓	✓		✓		✓	✓	✓				
Mobile Robots	✓	✓	✓	✓		✓	✓	✓				
Flying Robots	✓	✓		✓		✓	✓	✓				
Matlab Robotics Toolbox	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Control on robot motion	✓	✓	✓	✓			✓	✓				

Matrix of course aims and ILO's

Course Title: Selected Topics **Code**: ECE٤٤٨
Lecture: 4 **Tutorial**: 2 **Practical**: - **Total:** 6
Program on which the course is given: B.Sc. ElectricalEngineering (Communications)
Major or minor element of program: Major
Department offering the program: ElectricalEngineering Department
Department offering the course: Electrical Engineering Department
Academic year / level: **Fourth** Year / **First** Semester 2014-2015
Date of specifications approval: 20/6/2010

Course aims	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2	d3	d4
Explain the basic robot components.	✓	✓	✓	✓		✓	✓	✓				
Explain robot kinematics and dynamic analysis.	✓	✓	✓	✓		✓	✓	✓				
Analyze motion and control of mobile robots.	✓	✓	✓	✓		✓	✓	✓				
Use computer simulation tools to analyze robot systems.	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓

Course Instructor:

- Course Coordinator : Dr. Mohamed Hasan Rizk Salem

- Head of Department : Prof. Dr. Sayed Abo -Elsood Ward