Faculty of Engineering at Shoubra

Model No.12
Course Specifications : Surface Acoustic Wave Device

University : Benha university

Faculty : Faculty of Engineering at Shoubra

Department : Electrical Engineering Department

1- Course Data

Course Code : ECE 446 Course Title : Surface Acoustic Wave Device Study Year : Fourth Year

Specialization :
Teaching Hours:
Lecture : 4 Tutorial : 2 Practical :

2- Course Aim

For students undertaking this course, the aims are to:

2.1- Describe the Basic Information of SAW Devices
2.2- Describe the Design of SAW Devices
2.3- learn modeling and simulation of SAW filters and correlators

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 SAW Devices.(a1)
a- 2 - Demonstrate characteristics of engineering materials related to SAW devices (a4)
a- 3- Define current engineering technologies as related to SAW devices (a9)

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 design.(b4)
b- 2 - Investigate the failure of SAW Devices. (b7)

c- Professional Skills

On completing this course, the students are expected to be able to:
c- 1 - Use computational facilities and techniques, measuring instruments, workshops and laboratories equipment to modeling and simulation of SAW filters and correlators. (c5)
c- 2 - Demonstrate basic organizational and project management skills.(c9)

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)

4- Course Contents

No.	Topics	No of hours
1	Historical Bird's Eye View on SAW devices	4
2	Basic Information of SAW Devices	4
3	Features and Characteristics of SAW Devices	4
4	Merits of Rayleigh Wave Devices	4

5	Design of SAW Devices	4
6	Applications of SAW devices	4
7	Famous SAW Devices	4
8	SAW Delay Lines With Matching Networks	4
9	SAW Amplifiers, Resonators, Oscillators, correlators, and filters	4
10	modeling and simulation of SAW filter	4
11	modeling and simulation of SAW correlators	4
12	Fabrication of SAW devices	4

5- Teaching and Learning Methods

5.1- Modified Lectures
5.2- Class activity

6- Teaching and Learning Methods of Disables

6.1- nothing.

7- Student Assessment

a- Student Assessment Methods

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

b- Assessment Schedule

No.	Assessment	Week
1	Assessment 1 on	2, 5, 9, 11
2	Quizzes on	4, 6, 10, 12
3	Mid-term exam on	8
4	Oral Exam on	14
5	Final exam on	15

c- Weighting of Assessments

Assessment	Weight
Mid_Term Examination	23 %
Final_Term Examination	67 %
Oral Examination	10 %
Practical Examination	0 %
Semester work	0%
Other types of assessment	0 %
Total	100 %

8- List of References

a- Course Notes

1- Course notes prepared by instructor.

b- Books

1- Ken-Ya Hashimoto, "Surface Acoustic Wave Devices in Telecommunications", Springer INC. 2000

- Course Coordinator : Dr. Aly Mohamed Gomaa

- Head of Department : Prof. Dr. SayedAboo-Elsood Ward

Faculty of Engineering at Shoubra

Model No.11A
Course Specifications : Surface Acoustic Wave Device

University : Benha university

Faculty : Faculty of Engineering at Shoubra

Department : Electrical Engineering Department

Matrix of Knowledge and Skills of the course

No.	Topics	week	Basic Knowledge	Intellectual Skills	Professional Skills	General Skills
1	Historical Bird's Eye View on SAW devices	1	a1, a2, a3	b1, b2	c1, c2	
2	Basic Information of SAW Devices	2	a1, a2, a3	b1, b2	c1, c2	
3	Features and Characteristics of SAW Devices	3	a1, a2, a3	b1, b2	c1, c2	
4	Merits of Rayleigh Wave Devices	4	a1, a2, a3	b1, b2	c1, c2	
5	Design of SAW Devices	5	a1, a2, a3	b1, b2	c1, c2	
6	Applications of SAW devices	6	a1, a2, a3	b1, b2	c1, c2	
7	Famous SAW Devices	7	a1, a2, a3	b1, b2	c1, c2	
8	Mid-term exam	8	a1, a2, a3	b1, b2		d1
9	SAW Delay Lines With Matching Networks	9	a1, a2, a3	b1, b2	c1, c2	
10	SAW Delay Lines With Matching Networks	10	a1, a2, a3	b1, b2	c1, c2	
11	modeling and simulation of SAW filter	11	a1, a2, a3	b1, b2	c1, c2	
12	modeling and simulation of SAW correlators	12	a1, a2, a3	b1, b2	c1, c2	
	Oral Exam	13	a1, a2, a3	b1, b2	c1, c2	d1,d2

13	Fabrication of SAW devices	14	a1, a2, a3	b1, b2	c1, c2	
14	Final exam	15	a1, a2, a3	b1, b2		d1

- Course Coordinator : Dr. Aly Mohamed Gomaa

- Head of Department : Prof. Dr. SayedAboo-Elsood Ward

Matrix of course content and ILO's

Course Title: Surface Acoustic Wave Device **Code**: ECE 446
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** Semester2014-2015
Date of specifications approval: 20/6/2010

Course content	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2
Historical Bird's Eye View on SAW devices	✓	✓	✓	✓	✓	✓	✓	✓		
Basic Information of SAW Devices	✓	✓	✓	✓	✓	✓	✓	✓		
Features and Characteristics of SAW Devices	✓	✓	✓	✓	✓	✓	✓	✓		
Merits of Rayleigh Wave Devices	✓	✓	✓	✓	✓	✓	✓	✓		
Design of SAW Devices	✓	✓	✓	✓	✓	✓	✓	✓		
Applications of SAW devices	✓	✓	✓	✓	✓	✓	✓	✓		
Famous SAW Devices	✓	✓	✓	✓	✓	✓	✓	✓		
SAW Delay Lines With Matching Networks	✓	✓	✓	✓	✓	✓	✓	✓		
SAW Amplifiers, Resonators, Oscillators, correlators, and filters	✓	✓	✓	✓	✓	✓	✓	✓		
modeling and simulation of SAW filter	✓	✓	✓	✓	✓	✓	✓	✓		
modeling and simulation of SAW correlators	✓	✓	✓	✓	✓	✓	✓	✓		
Fabrication of SAW devices	✓	✓	✓	✓	✓	✓	✓	✓		

Matrix of course aims and ILO's

Course Title: Surface Acoustic Wave Device **Code**: ECE 446

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Department offering the program: ElectricalEngineering Department
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Course aims	a1	a2	a3	b1	b2	b3	c1	c2	d1	d2
Describe the Basic Information of SAW Devices.	✓	✓	✓	✓	✓	✓	✓	✓		
Describe the Design of SAW Devices.	✓	✓	✓	✓	✓	✓	✓	✓		
learn modeling and simulation of SAW filters and correlators	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Course Instructor:

- Course Coordinator : Dr. Aly Mohamed Gomaa

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