AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title		Optics of Thin Films						
Course Code		FZK513		Couse Level		Second Cycle (Master's Degree)		
ECTS Credit	6	Workload	148 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		To provide understanding the general features of the optical behaviour of thin films showed large differences from those the bulk materials, and to give information about investigating techniques.						
Course Content		Propagation of electromagnetic field in layered media, amplitude transmittance and reflectance of layered media, Fresnel coefficients, optical constants of layered media, absorption and dispersion, reflection and transmission by a single film. optical constants of thin films; experimental methods, results on optical constants; metal films, abnormal absorption phenomenon, Maxwell-Garnett theory, dielectric films, metal and semiconductor films, Size effect in optical properties, multilayer optical system.						
Work Placement								
Planned Learning Activities and Teaching Methods			Explanation (Presentation), Discussion, Individual Study					
Name of Lecturer(s)								

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading

1	Optics of Thin Films, Antonin Vasicek, North- Holland Publishing Company, Amsterdam, 1959
2	Basics of Optics of Multılayer systems, Sh. A. Furman, and A. V. Tikhonravov, Fong&Sons Printers Pte. Ltd, 1992
3	Optical Properties of Thin Solid Films, O. S. Heavens, Dover Publications, Inc., New York, 1954
4	The Optical Constants of Bulk Materials and Films (2nd Ed.), L Ward, Institute of Physics Publishing, Bristol-1994
5	Thin film Phenomena, Kasturi L. Chopra, McGraw-Hill, New York, 1969

Week	Weekly Detailed Course Contents	
1	Theoretical	Propagation of electromagnetic field in layered media
	Preparation Work	Basics of Optics of Multılayer systems, Sh. A. Furman, and A. V. Tikhonravov, Fong&Sons Printers Pte. Ltd, 1992, pp.1-9
2	Theoretical	Amplitude transmittance and reflectance of layered media, Frensel coefficients
	Preparation Work	Basics of Optics of Multılayer systems, Sh. A. Furman, and A. V. Tikhonravov, Fong&Sons Printers Pte. Ltd, 1992, pp.9-16
3	Theoretical	Optical constants of layered media
	Preparation Work	Basics of Optics of Multılayer systems, Sh. A. Furman, and A. V. Tikhonravov, Fong&Sons Printers Pte. Ltd, 1992, pp.58-68
4	Theoretical	Absorption and dispersion
	Preparation Work	The Optical Constants of Bulk Materials and Films (2nd Ed.), L Ward, Institute of Physics Publishing, Bristol-1994. pp.8-18
5	Theoretical	Reflection and transmission by a single film
	Preparation Work	Thin film Phenomena, Kasturi L. Chopra, McGraw-Hill, New York, 1969. pp.725-728.
6	Theoretical	Optical constants of thin films; experimental methods
	Preparation Work	Thin film Phenomena, Kasturi L. Chopra, McGraw-Hill, New York, 1969. pp.732-741
7	Theoretical	Results on optical constants; metal films
	Preparation Work	Thin film Phenomena, Kasturi L. Chopra, McGraw-Hill, New York, 1969. pp.741-745.
8	Intermediate Exam	Midterm Exam
9	Theoretical	Abnormal absorption phenomenon
	Preparation Work	Thin film Phenomena, Kasturi L. Chopra, McGraw-Hill, New York, 1969. pp.725-728.
10	Theoretical	Maxwell-Garnett theory
	Preparation Work	The Optical Constants of Bulk Materials and Films(2nd Ed.), L Ward, Institute of Physics Publishing, Bristol-1994. pp.216-218
11	Theoretical	Dielectric films

11	Preparation Work	The Optical Constants of Bulk Materials and Films(2nd Ed.), L Ward, Institute of Physics Publishing, Bristol-1994. pp.206-207.
12	Theoretical	Metal and semiconductor films
	Preparation Work	The Optical Constants of Bulk Materials and Films(2nd Ed.), L Ward, Institute of Physics Publishing, Bristol-1994. pp.207-210.
13	Theoretical	Size effect on optical properties
	Preparation Work	Optical Properties of Thin Solid Films, O. S. Heavens, Dover Publications, Inc., New York, 1954, pp.176-180
14	Theoretical	Multilayer optical stystem
	Preparation Work	Optical Properties of Thin Solid Films, O. S. Heavens, Dover Publications, Inc., New York, 1954, pp.82-89.
15	Theoretical	Practical applications of thin films on optics
	Preparation Work	Optical Properties of Thin Solid Films, O. S. Heavens, Dover Publications, Inc., New York, 1954, pp.207-227.
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	3	2	70
Individual Work	14	2	2	56
Midterm Examination	1	8	2	10
Final Examination	1	10	2	12
			Total Workload (Hours)	148
			[Total Workload (Hours) / 25*] = **ECTS**	6

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To be able to recognize the application fields of the thin films and be aware of their important in technology.
2	To be able to recognize the optical properties of thin films
3	To be able to explain the methods of determination the optical constants of thin films
4	To be able to understand the basic optical properties of metal, insulator and semiconductor thin films
5	To be able to learn the methods that used in the characterization of thin films.

Programme Outcomes *(Physics Master)*

1	The student should conceive the concepts in physics and may apply them on her/his own
2	The student should be able to conceive the relationship between the different physics laws and integrity of them and apply them in solving different physics problems
3	The student should know the basic principles of classical, quantum and relativistic physics and use them in the solutions of problems
4	The student should be able to do research in a specific area of physics
5	The student should be able to prepare reports on papers on the subject of her/his research and present her/his research subject in scientific conferences
6	The student should be able to explain the relationship between complicated problems and basic physics laws.
7	The student should be able to use computers for solving complicated physics problems
8	The student should be able to interrelate between the theory and the experiment. If she/he is experimentalist he/she has to explain the theory behind her/his work. If she /he is a theorist she/he should has to know the experiments in her/his subject.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	1	1	5	5	1
P2	5	2	1	1	1
P3	1	3	2	1	1
P4	1	4	5	4	4
P5	4	2	5	4	5
P6	4	1	2	1	3
P7	1	1	4	1	4
P8	5	5	5	5	5