

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Thin Film Technology
Course number	PHYS4344
Faculty	
Department	
Course type	College Needs
Course level	4
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - Provide the students with the basic concepts of thin solid films, detailed description of their preparation methods, and applications of thin films such as thin-film solar cells and micro-batteries
- 2 - Provide the students with the phenomena associated with thin films
- 3 - Attract outstanding students to study in an intellectually stimulating environment to develop their skills

Intended Learning Outcomes

Knowledge and Understanding	<ul style="list-style-type: none"> * Define the concept of thin film * Explain the fundamentals of thin films and methods of preparation * Describe the fabrication methods of thin films and the recent techniques used for preparation of the thin solid films * Mention the tools used for thickness measurements, the structure and different properties of films * Mention the applications of thin films and superconducting materials
Intellectual Skills	<ul style="list-style-type: none"> * Compare among the different preparation methods of thin films and among the different methods for thickness measurements * Analyze the physical system components * Interpret the basic ideas of applying the thin films in producing photovoltaic and solar cells
Professional Skills	<ul style="list-style-type: none"> * Solve the problems on the thin films preparation methods and the different applications * Dissect the physical properties, magnetic properties and optical properties of thin films
General Skill	<ul style="list-style-type: none"> * Write scientific reports on the methods of thin film preparation using the different means of searching * Apply the scientific basis to think for using the thin solid films in different applications * Search for information about thin films

Course Contents

- 1 - Concept of thin films and defects in solids
- 2 - Physical properties of thin films: condensation and growth and composition of films
- 3 - Fabrication methods of thin films & flash evaporation method
- 4 - Chemical deposition methods & Chemical vapor deposition & Plasma enhanced CVD
- 5 - Physical deposition & Pulsed laser deposition
- 6 - Tools for thickness measurements
- 7 - Methods for measuring the structure and properties of films
- 8 - Techniques for measuring the electrical properties
- 9 - Measurement of the optical properties of thin films using the spectrometer
- 10 - Thin films applications: thin-film photovoltaic cells

Teaching and Learning Methods

- 1 - Lectures
- 2 - Discussions
- 3 - Class activity
- 4 - Inquiry
- 5 - Problem solving
- 6 - Presentations

Teaching and Learning Methods for the Disabled Students

- 1 - Over head projector
- 2 - Student oral presentations

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
semester work	1-10 weeks	5
Presentation	5 week	5
First Mid Term Examination	6 week	20
Second Mid-term Examination	10 week	20
Final exam	week 16	50

Books and References

Course note	Lecturer private notes Eckertova, L. Physics of Thin Films
Essential books	The Materials Science of Thin Films" M. Ohring, 1992
Recommended books	D. Smith, Thin-Film Deposition: Principles and Practice, McGraw Hill Professional, 1995 A.A.R. Elshabini-Riad and F.D. Barlow, Thin Film Technology Handbook , McGraw Hill Professional, 1998 A. Goswami, Thin Film Fundamentals , New Age International, 1996
Other References (Periodical, web sites, etc.)	http://www.uccs.edu/tchriste/courses/PHYS549/549lectures/ http://www.splung.com http://hyperphysics.phy-astr.gsu.edu/hbase/hph.html http://www.physicstoday.org/

