Course Specifications

Programme(s) on which the course is given: Physics & Laser
Major or Minor element of program   Physics
Department offering the program   Physics
Department offering the course   Physics
Academic year / Level   third
Date of specification approval   2012

A- Basic Information

Title	Laser application (1)	Code: L3310
Credit Hours	3 h	Lecture:3h
Tutorial: 00	Practicals:00	Total: 3h

B- Professional Information

1 – Overall Aims of Course

basic principles of laser   Biomedical applications of lasers through giving an
Introduction to tissue optics : Biological medium: Introduction to techniques for filtering
out multiply scattered light (Tradeoff between depth of imaging and resolution), Optical
coherence tomography (Basic principle, instrumentations and applications),
Laser Material Processing (LMP)
Laser Material Interaction: Laser power coupling, Interaction phenomena, Significance
of coupling and interaction phenomena in laser material processing.Lasers for LMP :Solid State Nd:YAG
Laser,CO2 laser, Diode laser, Fiber Laser,Comparison & Economics, Laser safety.
Laser Material Processing: Laser cutting, drilling, welding, surface hardening, surface
alloying, surface cladding, metal forming, and laser rapid prototyping: their Principles, process
characteristics, processing parameters, advantages & disadvantages, Industrial applications.

2 – Intended Learning Outcomes of Course (ILOs)

a Knowledge and Understanding:

After completing the course the student will be able to

a1- explain the general knowledge about Biomedical applications of lasers

a2- Illustrate Laser Material Interaction: Laser power coupling, Interaction

a3- display knowledge about Laser Material Interaction: Laser power , coupling, Interaction phenomena, Significance

of coupling and interaction phenomena in laser material

processing.Lasers for LMP :Solid State Nd:YAG Laser,CO2

laser, Diode laser, Fiber Laser, Comparison & Economics

phenomena, Significance

b-Intellectual Skills

b1- knowledge about the new ideas in laser applications

b2- scientific reports about some points in laser applications

c-Professional and Practical Skills

C1-how to use a laser in different fields

d-General and Transferable Skills

d1- using computer and internet

3- Contents

Topic	No. of hours	Lecture	Tutorial/Practical
Biomedical applications of lasers	3	1	0

Introduction to techniques for filtering	**3**	**2**	**0**
coherence tomography (Basic principle, instrumentations and applications),	**3**	**3**	**0**
Laser Material Processing (LMP)	**3**	**4**	**0**
Laser Material Interaction	**3**	**6**	**0**
Laser power coupling	**3**	**7**	**0**
Laser cutting, drilling, welding, surface hardening, surface	**3**	**8**	**0**

4– Teaching and Learning Methods
   4.1-Lecture
   4.2- discussion
5- Student Assessment Methods

   5.1 oral to assess understanding
   5.2-written exams to assess investigation, and derivations.
   5.3 report to assess scientific review.

   ## Assessment Schedule

   Assessment 1   sheet exam   Week 8&16 (mid &final term).
   Assessment 2 practical exams week 8&16 (mid &final term).
   Assessment 3 oral exams   Week

every week		
Assessment 4 reaserch projects	Week	
final		

Weighting of Assessments

20	Mid-Term Examination %	
	Final-term Examination %	60
	Oral Examination. %	10
	Semester Work %	10
100	Total %	

6- List of References

6.1- ''laser and nonlinear optics''

6.2- Majumder, S. K, Uppal, A, and Gupta, P.K, Cun. Sci., 1996,70,833-836.

6.3-. Majumder, S. K., and Gupta, P. K., in''Optical Diagnosrics of Biological Fluids III'', (ed. Priezzhev,A V.), Proc. Soc.Phoro-Opt. Instrum. Eng., 1998, 3252, pp. 169-178.

6.4-. Majumder, S. K., and Gupta, P. K, Lasers LifeSci., 2000, 9, 143-152

7- Facilities Required for Teaching and Learning

Data show – lab top computer - pens – blackboard - ...etc.

Course Coordinator: Dr.Entsar El Masde
Head of Department: Prof.Dr. Sana Maize
Date: / /