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 fourth
2012 Date of specification approval

A- Basic Information

Title:	**Laser physics (2)**	**Code: L432**
Credit Hours:	**3 h**	**Lecture: 3h**
Tutorial: 00	**Practical: 00**	**Total: 3h**

B- Professional Information

1 – Overall Aims of Course

The course will provide a general overview of some basic physical processes and engineering concepts used in the design of lasers. It will review and concentrate on the main types of lasers and their design, based on physical phenomena. The course will also include a brief overview of the most commonly used nonlinear materials, and methods of frequency shifting and conversion of laser output. Many practical examples relevant to the design and application of solid state, gas, liquid and semiconductor laser systems and laser materials will be included.

2 – Intended Learning Outcomes of Course (ILOs)

a Knowledge and Understanding:

a1- general knowledge about advanced laser systems
a3- frequency doubling
a4- optical parametric oscillators

b-Intellectual Skills

b1- designing and testing of equipments
b2- scientific reports about some points in laser physics
b3- analysis of laser systems

c-Professional and Practical Skills
C1-how to build a dye laser system
c2-obtain a tunable laser system

d-General and Transferable Skills
d1- using computer and internet
d2- team work and discussion

3- Contents

Topic	No. of hours	Lecture	Tutorial/Practical
Dye laser	9	3	0
Diode laser	9	3	0
Frequency doubling	9	3	0
Optical parametric oscillators	9	3	0
Laser Raman spectroscopy	9	3	0

4– Teaching and Learning Methods
4.1-Lecture
4.2-research

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 (mid &final term).	sheet exam	Week 8&16
Assessment 2 (mid &final term).	practical exams	week 8&16
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- "fundamentals of laser systems "

6.2- □ ^ F. P. Schäfer and K. H. Drexhage, *Dye Lasers.*, 2nd rev. ed., vol. 1, Berlin ; New York: Springer-Verlag, 1977

6.3- Jump up ^ F. J. Duarte and L. W. Hillman, *Dye Laser Principles* (Academic, New York, 1990) Chapter 4.

6.4- Jump up ^ T. W. Hänsch, Repetitively Pulsed Tunable Dye Laser for High Resolution Spectroscopy, *Appl. Opt.* 11, 895-898 (1972).

6.5- Jump up ^ I. Shoshan, N. N. Danon, and U. P. Oppenheim, Narrowband operation of a pulsed dye laser without intracavity beam expansion, *J. Appl. Phys.* 48, 4495-4497 (1977).

6.6- Jump up ^ M. G. Littman and H. J. Metcalf, Spectrally narrow pulsed dye laser without beam expander, *Appl. Opt.* 17, 2224-2227 (1978).

7- Facilities Required for Teaching and Learning

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

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Course Coordinator: Dr. Hosam Ahmed Awad
Head of Department: Prof.Dr. Sana Maize
Date : / /