

## Course Specifications

Programme(s) on which the course is given	Physics &
Laser Science	
Major or Minor element of program	Major
Department offering the program	Physics
Department offering the course	Physics
Academic year / Level	4
Date of specification approval	2012

### A- Basic Information

<b>Title:</b>	<b>Laser Lab.</b>	<b>Code: L437</b>
<b>Credit Hours:</b>	<b>4 h</b>	<b>Lecture: - h</b>
<b>Tutorial:</b>	<b>0</b>	<b>Practical:8 h</b>

### B- Professional Information

#### 1 – Overall Aims of Course

satisfactorily on the use of various laser equipment, and hands on laser with different fiberoptics and free beam lasers, used in industry, medicine, and academy trend. Use of laser through different delivery systems. Practical Knowledge of setting and adjusting the parameters of laser for different applications. Generation of the second harmonic by frequency doubling.

Mechanical Q-switching and passive Q-switching of CO<sub>2</sub> lasers. Laser induced plasma.  
Holography & Image processing. High vacuum techniques.  
Interaction of laser with gases liquids and solids. Evaluation includes oral laboratory examination.

## **2 – Intended Learning Outcomes of Course (ILOs)**

### **a Knowledge and Understanding:**

**a1- Generation of laser beam.**

**a2- Generation of the second harmonic by frequency doubling.**

**a3-Studying the interaction of laser with gases liquids and solids.**

### **b- Intellectual Skills**

**b1- How to use the various laser types in industry, medicine, and academic trend in the laser laboratory.**

**b2- In each experiment of laser system. We must identify problem and its solving.**

**b3- Analytical treatment for each experiment of laser system.**

### **c Professional and Practical Skills**

**c1- How to vary a various parameters to get good data**

**c2- How to measure and investigate properties of the detected materials used in the experiment.**

**c3-Student opinion on developing of a new methods to obtain a good results.**

### **d General and Transferable Skills**

**d1- Team work.**

**d2- Doing experiments**

### **3- Contents**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
<b>Gas discharge exp.</b>	<b>8</b>	<b>-</b>	<b>8</b>

<b>N<sub>2</sub> -Laser experiment</b>	<b>16</b>	<b>-</b>	<b>24</b>
<b>Co<sub>2</sub> laser exp.</b>	<b>16</b>	<b>-</b>	<b>24</b>
<b>He-Ne laser exp.</b>	<b>16</b>	<b>-</b>	<b>16</b>
<b>Nd-YAG exp.</b>	<b>16</b>	<b>-</b>	<b>16</b>
<b>Frequency doubling exp.</b>	<b>8</b>	<b>-</b>	<b>8</b>
<b>Scanning Fabry- pero interferometer exp</b>	<b>8</b>	<b>-</b>	<b>8</b>
<b>Helography exp.</b>	<b>16</b>	<b>-</b>	<b>24</b>
<b>Interaction of laser with gases liquids and solids.</b>	<b>16</b>	<b>-</b>	<b>16</b>
<b>Fiber optics exp.</b>	<b>8</b>	<b>-</b>	<b>8</b>

#### **4- Teaching and Learning Methods**

- 4.1- One session per week,**
- 4.2- Discussion sessions during the time of Lab,**
- 4.3- Scientific reports for each exp. and discussions,**
- 4.4- Practical in laser Lab. and visits to research centers.**

#### **5- Student Assessment Methods**

- 5.1-Mid-term Exam to assess for understanding experiments**
- 5.2- End of term Exam to assess for understanding all experiments**
- 5.3- Class activities and reports to assess for responding and collection of information from different sources**
- 5.4- Oral to assess for responding and problem solving instantaneously.**

#### **Assessment Schedule**

<b>Assessment 1:</b>	<b>7</b>
<b>Week</b>	
<b>Assessment 2:</b>	<b>16</b>
<b>Week</b>	
<b>Assessment 3:</b>	<b>1-</b>
<b>14 Week</b>	
<b>Assessment 4:</b>	<b>1-</b>
<b>15 Week</b>	

### **Weighting of Assessments**

<b>Mid-Term Examination</b>	<b>20</b>	<b>%</b>
<b>Final-term Examination</b>	<b>30</b>	<b>%</b>
<b>Oral Examination.</b>	<b>10</b>	<b>%</b>
<b>Practical Examination</b>	<b>30</b>	<b>%</b>
<b>Semester Work</b>	<b>10</b>	<b>%</b>
<b>Other types of assessment</b>		
<b>100 %</b>	<b>Total</b>	

### **6- List of References**

**6.1- "fundamental of laser systems"**

**6.2- recommended books.**

**6.3-Course Notes**

**experimental physics ,department of physics,2005.**

**6.4- Essential Books (Text Books)**

**Physics ,Haliday**

**6.5- Periodicals, Web Sites, ... etc**

## **7- Facilities Required for Teaching and Learning**

**Data show – lab top computer –experimental instruments-  
suitable laboratory - pens – blackboard - ...etc.**

**Course Coordinator: Prof.Dr.  
Ibrahim Hager  
Head of Department: Prof.Dr. Sana  
Maize**

**Date: / /**