

## **PHYS1.4: OPTICS AND INTRODUCTION TO QUANTUM MECHANICS**

### **I. Course description:**

**1. Credit points:** 2 ECTS

**2. Time commitment:**

Items	Lecture	Tutorial	Practical	Total
No. of hours	15	7	0	22

**3. Prerequisites:** Mathematical analysis, mechanics

**4. Recommended background knowledge:** Basic knowledge in high school level

**5. Subject description:** Optics and Introduction to Quantum mechanics teaches geometrical optics, its applications, wave optics, and the differences between them, which lead to an introduction to quantum mechanics.

### **6. Objectives & Outcome:**

Students revisit the classical optics, which deal with light as a ray. From the simple laws of reflection and refraction, we construct almost all optical instrument surround us, including human eyes. Then it teaches light as a wave, which interfere and diffract. From Huygen's principle, optics can be described using both geometrical and wave approaches. Student will find optics connect with previous course, such as E&M by Maxwell equations. From photoelectric effect, they will learn the duality of light, which lead to quantum mechanics.

### **7. Assessment/ Evaluation:**

Component	Attendance	Exercises	Assignments	Lab-work	Midterm	Final
Percentage %	10	20	0	0	20	50

### **8. Prescribed Textbook(s):**

[1] Halliday, Resnick, and Jearl Walker, Fundamentals of PHYSICS 10th Edition, Wiley, ISBN: 987-1-118-23072-5

[2] F. Pedrotti and L. Pedrotti, Introduction to Optics, 2nd Edition, Prentice Hall International.

[3] Eugene Hecht, Optics, 4th Edition, Addison Wesley, ISBN: 0-321-18878-0.

## **II. Course content & schedule:**

1. Geometrical Optics: theory
2. Geometrical Optics: application
3. Wave and Wave Optics: interference
4. Wave Optics: Diffraction
5. Introduction to quantum mechanics

## **III. Reference Literature:**

- [1] Halliday and Resnick, Fundamentals of PHYSICS 10th Edition, Jearl Walker

