

Kurdistan Region Government

Ministry of Higher Education and Scientific Research

Erbil Polytechnic University

**Module (Course Syllabus) Catalogue**

**2023-2024**

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| **College/ Institute**  | **Erbil technical medical institue** |
| **Department** | **Optometry**  |
| **Module Name** | **Medical Optical Physics**  |
| **Module Code** |  |
| **Degree** | **Technical Diploma Bachler High Diploma Master PhD**\* |
| **Semester** | **Second** |
| **Qualification** | **PhD Alexandria University** |
| **Scientific Title**  | **Lecturer** |
| **ECTS (Credits)** | **3.9 ECTS** |
| **Module type** | **Prerequisite Core Assist.**\* |
| **Weekly hours** | **6 hours** |  |
| **Weekly hours (Theory)** | **( 2 )hr Class** |  |
| **Number of Weeks** | **12** |
| **Lecturer (Theory)** | **Dr. Israa Akram Saleem** |
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| **Websites**  | [**https://academicstaff.epu.edu.iq/faculty/Israa.saleem**](https://academicstaff.epu.edu.iq/faculty/Israa.saleem) |

**Course Book**

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| **Course Description** | This course discusses everything related to light, its most important sources and properties, learning about the electromagnetic spectrum, and how to calculate wavelength through exercises and examples. The course also includes learning about the phenomenon of reflection and refraction of light so that it enables the student to know the calculation of focal length and refractive index by applying the laws of reflection and refraction. This course also enables practical applications of experiments in medical physics.. |
| **Course objectives** | The student is able to know:1-Llight ,its theories, properties and sources2- Electromagnetic spectrum and its types3- Reflection and its types in flat and spherical mirrors and solve problems4- Refraction - Snell’s law –refractive index-and solve problems |
| **Student's obligation** | All students must attend and prepare themselves during the weekly hours of the course. So that they will be ready for the quizzes, seminars and face to face ativities.They should take all the quizzes and complete both main exams, assignment of weekly homework. Practically, a weekly experiment must be conducted, result and question must be discussed in groups, and submit a weekly report about their trails.  |
| **Required Learning Materials**  | lecture halls with data show equipment for lecture presentations, white board, overhead projector, posters .Different methods and tools to be used in this course. Theory: lecture, group discussion, seminar, pair work, group work, role play. |
| **Evaluation** | ‌ **Task** | **Weight (Marks)** | **Due Week** | **Relevant Learning Outcome** |
| Assignments | Homework | 5 | 2 | Preliminery  |
| Class Activity | 5 | 3 | professional |
| Seminar | 5 | 5 | advanced |
| Essay | 5 | 6 | prliminery |
| Quiz | 10 | 7 and 8 | Advanced  |
| Midterm Exam | 30 | 9 and 10 | Passed  |
| Final Exam | 40 |  11 and 12 | Passed  |
| Total | 100 | 12 | Passsed  |
| **Specific learning outcome:** | At the end of the course , the student will be able to understand optical phenomena in physics. |
| **Course References‌:** | **Reading Text :*** Book Nature and Properties of Light

 • Chapter one - The Nature and Propagation of Light**Recommended Reading:**• Wikipedia  • Text books of Medical Optical Physics |
| **Course topics (Theory)** | **Week** | **Learning Outcome** |
| Light-Light theories-Light sources- Light properties | 1 |  Priliminery  |
| Light speed-Wavelength | 2 | Introduction  |
| Electromagnetic spectrum-The units that used for measuring the wavelength  | 3 | Introduction |
| Examples  | 4 | Introduction |
| Reflection and its types and its definition-Total internal reflection  | 5 | Advanced  |
| The reflection in plane mirrors, The reflection in spherical mirrors | 6 | Advanced |
| The reflection in plane mirrors | 7 | Advanced |
| Mid term exam | 8 | Advanced |
| Gausses’ law and Amplification law for spherical mirrors, Examples | 9 | Advanced |
| Refraction-Snell’s law | 10 | Advanced |
| Refraction coefficient-Its relation of light Gausses’ law-Amplification law | 11 | Advanced |
| Final exam | 12 | Advanced |
|  Week | Outline | Number of hours |
| 1 | Plane mirrors | 2 |
| 2 | Finding the focal length of convex mirror by using convex lens | 2 |
| 3 | A general review of the chapter | 2 |
| 4 | Refraction, refraction basics, refraction laws, prism, critical angle, total internal reflection. | 2 |
| 5 | Investigate Snell’s law | 2 |
| 6 | Total internal reflection | 2 |
| 7 | Finding the surface tension of liquid by using capillary tube | 2 |
| 8 | A general review of the chapter | 2 |
| 9 | Lenses | 2 |
| 10 | Finding the focal length of convex lens by using displacement method | 2 |
| 11 | Finding the focal length of convex lens by using graphical method | 2 |
| 12 | Simenars | 2 |
| Questions Example Design:Theoretical Exams• **Q1) Chose the correct answer for the following sentences:** 1- Which of the following properties is the same for all electromagnetic waves in vacuum?  A. amplitude B. frequency C. speed D. wavelength  2- We see things because they -------- in to our eyes A. reflected B. refracted C. separated D. All Q2) **Define the fowling:**1. Reflection of light 2-Focal length 3-Magnification 4-Index of Refraction

Q3) **)  A beam of light of wavelength 589 nm in the vacuum passes through a piece of Silicon of the index of refraction n=3.5:**  (1) How fast does light travel in Silicon? (2) How does the wavelength of light change in Silicon? (3) What is the frequency of light in Silicon?  |
|  **Extra notes:****An advance course of training will accelerate the understanding of this course to the students.** |
| **External Evaluator**Dr. Rozhhalat Xizir JarjisAssistant professors |