The Republic of Iraq
Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority

**University: Shatt Al-Arab University**
**College:** College of technical Engineering

**Department Laser and Optoelectronics Engineering Technology**
**The First stage**
**Lecturer Name: Alaa Naser Khraibet**
**Academic qualification**
**Place of work: Shatt Al-Arab University**

# weekly lesson schedule

| | |
|---|---|
| **Course Lecturer** | **Alaa Naser Khraibet** |
| **e-mail** | |
| **Title** | Laser principles |
| **Course Coordinator** | |
| **Course Objectives** | • **This includes understanding the principles of stimulated light emission, forming a coherent laser beam, and determining its properties (wavelength, power).** |
| **Course Description** | This course provides a comprehensive introduction to the basic principles of lasers. This understanding focuses on how lasers are produced, how their properties are controlled, and how they interact with different materials. It also includes a study of the principles of stimulated emission, the formation of laser beams, and their unique properties (coherence, collimation, monochromaticity, and directivity). The study includes learning about the different types of lasers, such as solid-state lasers, gas lasers, liquid lasers, and semiconductor lasers, with an understanding of the working mechanism of each type. Students are trained to use different laser devices, understand how they work, and perform basic maintenance. Students are trained to use different laser devices, understand how they work, and perform basic maintenance.<br>. |
| **Textbooks** | 1. *Principles of Lasers*, by O. Svelto.<br>*2-Laser Fundamentals* by W. T. Silfvast<br>**Lasers, by A. Siegman**<br>**Lasers fundamentals and applications by K. Thyagarajan, A. Ghatak** |

| **final exam 50** | **project** | **Assignment** | **daily exams** | **lab** | **Midterm Exam** |
|---|---|---|---|---|---|
| | **10** | **10** | **10** | **10** | **10** |
| **General Notes** | | | | | |

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## weekly lesson schedule

| Week | Date | Topics Covered | Number of Hours | Notes |
|---|---|---|---|---|
| ١ | **13-11-2024** | The electromagnetic spectrum , units | | |
| ٢ | **20-11-2024** | Laser process | | |
| ٣ | **27-11-2024** | Absorption of electromagnetic Radiation | | |
| ٤ | **4-12-2024** | Population inversion | | |
| ٥ | **11-12-2024** | Einstein Coefficients. Lasing Processes , Three- and Four-Level Lasers | | |
| ٧-٦ | **18-11-2024**<br>**25-11-2024** | The Optical Resonator, Basic components of a Laser system | | |
| ٩-٨ | **8-1-2025-** | Light and Blackbody Emission , Energy Levels, Radiative and Nonradiative Transitions in Molecules | | |
| ١٢-١١-١٠ | **15-1-2025**<br>**22-1-2025** | Properties of Laser Radiation . Laser Gain. Linewidth. Thresholds for Lasing. Calculating Threshold Gain. Selective Pumping.. CW Lasing Action. Thermal Population Effects. | | |
| ١٤-١٣ | **29-1-2025**<br>**5-2-2025** | **Solid-State, Dye, and Semiconductor Lasers** | | |
| ١٥ | **12-2-2025** | **Gas, Chemical, Free Electron, and X-Ray Lasers** | | |

**lecturers signature:** **Head of Department signature:**