# Course Description Form

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| 1. Course Name: |
| **Laser 1** |
| 2. Course Code: |
| PHY– |
| 3. Semester / Year: |
| First / 2024–2025 |
| 4. Description Preparation Date: |
| 26/9/2024 |
| 5. Available Attendance Forms: |
| Attendance |
| 6. Number of Credit Hours (Total) / Number of Units (Total) |
| 30/30 |
| 7. Course administrator's name (mention all, if more than one name) |
| Name: Dr. Maher Khaleel Ibrahim<br>Email: mkibrahim@uoanbar.edu.iq |

| 8. Course Objectives | |
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| **Course Objectives** | Knowledge of basic laser concepts.<br>Basic knowledge of the ways radiation interacts with matter and the extent to which students understand it. That the student understands the changes occurring in the scientific field he is studying (such as physical, optical, etc.) The first chapter (basic concepts in lasers, the interaction of radiation with matter, the laser spectrum, and wavelengths), spontaneous and stimulated emission processes, and the absorption process. The second chapter, inverse qualification, the black body and its advantage the mathematical relationships related to it, the resonator, and learning about its type |

| 9. Teaching and Learning Strategies | |
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| **Strategy** | Conducting a mixed of three common learning stratiges Learning Competitive Learning Individualistic –3 Cooperative learning |

## 10. Course Structure

| Week | Hours | Required Learning Outcomes | Unit or subject name | Learning method | Evaluation method |
|---|---|---|---|---|---|
| 1 | 2 | | **Introduction of Laser** | | |
| 2 | 2 | | **Interaction of radiation witl matter** | | |
| 3 | 2 | | **Black Body Radiation** | | |
| 4 | 2 | | **Boltzmann distribution function** | | |
| 5 | 2 | | **Spontaneous emission** | | |
| 6 | 2 | | **Allowed and prohibited transfers** | | |
| 7 | 2 | | **Spectral line exposure mechanics** | | |
| 8 | 2 | | **First month test** | | |
| 9 | 2 | | **Masers and lasers** | | |
| 10 | 2 | | **Basics of laser work** | | |
| 11 | 2 | | **Pumping plans** | | |
| 12 | 2 | | **Pumping methods** | | |
| 13 | 2 | | **Optical resonator** | | |
| 14 | 2 | | **Second month exam** | | |
| 15 | 2 | | **Full review** | | |

## 11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

Daily exams 5% Attendance 5% Monthly exams 40% Final exam 50%

| 12. Learning and Teaching Resources | |
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| Required textbooks (curricular books, if any) | |
| Main references (sources) | -Optics and photonics an introduction by F. Graham Smith, Terry A. King, Dan Wilkins (z-lib.org)<br>-Optics-hecht-4th-ed-2003<br>Dr.. Siham Afif Qandala, laser physics and some pract applications |
| Recommended books and references (scientific journals, reports…) | Dr. Saud bin Humaid Al-Lahyani, Laser and applications, Umm Al-Qura University |
| Electronic References, Websites | |