وزارة التعليم العالي والبحث العلمي

جهاز الاشراف والتقويم العلمي

دائرة ضمان الجودة والاعتماد الأكاديمي

# استمارة وصف البرنامج الأكاديمي للكليات والمعاهد

للعام الدراسي 2025-2026

الجامعة : العلوم العراقية

الكلية /المعهد : كلية الهندسة

القسم العلمي : هندسة الليزر والالكترونيات البصرية

تاريخ ملء الملف : 4-1-2026

تاريخ ملء الملف : 4-1-2026

## اللجنة المركزية لضمان الجودة لمسار بولونيا

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التاريخ

التوقيع

جامعة العلوم العراقية AL-IRAQIA SCIENCE UNIVERSITY كلية الهندسة

ك. مصادقة العميد

# Course Catalogue | 2025-2026 | دليل المواد الدراسية

جامعة العلوم العراقية

كلية الهندسة

قسم الليزر والالكترونيات البصرية

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## 1. Mission & Vision Statement

***Vision Statement***

The laser engineering academic staff of the laser and optoelectronics engineering College at University of Technology believes that students come to understand the discipline of laser engineering through a combination of course work, laboratory experiences, research, and fieldwork. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by laser engineering to make observations, develop insights and create theories about the laser engineering systems that employ in the different applications and research. Small class sizes within the laser engineering program foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

***Mission Statement***

The laser engineering academic staff pursues a multifaceted charge at University of Technology. The Program seeks to provide all laser engineering students with fundamental knowledge of laser engineering, as well as a deeper understanding of a selected focus area within the laser engineering. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field engineering specializing in laser engineering for several applications, or to pursue advanced degrees in the laser engineering. The laser engineering program also provides the necessary fundamental knowledge of the laser engineering to support the laser engineering degree. In addition, laser engineering courses provide a key laboratory science experience for those students seeking to complete the general engineering requirements.

# 2. Program Specification

| | | | |
|---|---|---|---|
| **Programmed code:** | BSc-LASER Eng. | **ECTS** | 240 |

| **Duration:** | 4 levels, 8 Semesters | **Method of Attendance:** | Full Time |
|---|---|---|---|

Laser technology is a wonderfully wide-ranging subject, and Leeds, with one of Baghdad's largest and most diverse engineering teaching groups, is well equipped to deliver. The emphasis of the program is the whole laser theory and how would the laser beam interact with matter. The degree is popular - for some it's the breadth of the subject that appeals, for others it's a path to specialization.

Level 1 exposes students to the fundamentals of engineering, suitable for progression to all programs within the laser engineering group. program-specific core topics are covered at Level 2 preparing for research-led subject specialist modules at Levels 3 and 4. A Leeds laser engineering graduate is therefore trained to appreciate how research informs teaching, according to the University Mission statements.

At Levels 2, 3 and 4 students are free to choose more than half of their module credits with the proviso a range of modules are selected that reflect the complexity of laser system design, laser applications, bio-medical applications and bio-optics to ensure the breadth of knowledge expected of a graduate with a laser engineering degree. This allows students to develop their own wide-ranging interests in laser systems. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practical's, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3 and 4. At Level 4 all students carry out an independent research project, which may be 7 ECTS credit library or data analysis project, or 7 ECTS credit field or laboratory-based project.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, e.g. library use and presentation skills, followed by assessed exercises, e.g. essays and talks, as opportunities to practice these skills in a subject-specific context. International years and Industrial placements are also offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

# 3. Program Goals

1. To provide a comprehensive education in laser engineering that stresses scientific reasoning and problem solving across the spectrum of disciplines within laser engineering.
2. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry level jobs in any area of laser engineering.
3. To provide extensive hands-on training in electronic technology, statistical analysis, laboratory skills, and field techniques
4. To provide thorough training in written and oral communication of scientific information
5. To enrich students with opportunities for alternative education in the area of laser engineering through undergraduate research, internships, and study-abroad.

# 4. Student Learning Outcomes

LASER stands for “Light Amplification of Stimulated Emission of Radiation”. It studies the principal theory of producing high intensity radiation as well as it’s applications. Graduates obtain information on the fundamental, technical and social aspects of laser technology and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Science in Laser engineering with a concentration in medical applications; engineering optics / laser physics; laser system design / laser tissue interaction/ medical laser systems/ laser applications and a minor in Secondary Education that leads to a Public Instruction License. The laser engineering curriculum and experiences are designed to prepare students, in part, for entry into professional engineers, graduate studies, technical careers and education

**Outcome 1**

*Identification of Complex Relationships*

Ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science, and mathematics.

**Outcome 2**

*Oral and Written Communication*

Graduates will be able to formally communicate the results of engineering investigations using both oral and written communication skills.

**Outcome 3**

*Laboratory and Field Studies*

Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols. In addition, the ability to develop and conduct appropriate experimentation analyzes and interprets data and use engineering judgment to draw conclusions.

**Outcome 4**

*Scientific Knowledge*

Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of science.

**Outcome 5**

*Data Analyses*

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

**Outcome 6**

*Critical Thinking*

Graduates will be able to use critical-thinking and problem solving skills to develop a research project and/or paper. In addition, the ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

**Outcome 7**

*Ethical and professional responsibilities*

The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

# 5. Academic Staff

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# 6. Credits, Grading and GPA

***Credits***

University of technology is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per

semester. 1 ECTS is equivalent to 25 student workload, including structured and unstructured workload.

***Grading***

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

| GRADING SCHEME<br>مخطط الدرجات | | | | |
|---|---|---|---|---|
| **Group** | **Grade** | التقدير | **Marks (%)** | **Definition** |
| **Success Group (50 - 100)** | A - Excellent | امتياز | 90 - 100 | Outstanding Performance |
| | B - Very Good | جيد جدا | 80 - 89 | Above average with some errors |
| | C - Good | جيد | 70 - 79 | Sound work with notable errors |
| | D - Satisfactory | متوسط | 60 - 69 | Fair but with major shortcomings |
| | E - Sufficient | مقبول | 50 - 59 | Work meets minimum criteria |
| **Fail Group (0 – 49)** | FX – Fail | مقبول بقرار | (45-49) | More work required but credit awarded |
| | F – Fail | راسب | (0-44) | Considerable amount of work required |
| | | | | |
| Note: | | | | |
| NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above. | | | | |

***Calculation of the Grade Point Average (GPA)***

1. The GPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   GPA of 4-year B.Sc. degrees:

   GPA = [ (1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

# 7. Curriculum/Modules

**Semester 1 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LOEC111 | Electrical Circuits I | 93 | 82 | 7.00 | C | None |
| LOEC112 | Engineering Physics | 78 | 97 | 7.00 | S | None |
| LOEC113 | Mathematics I | 33 | 67 | 4.00 | S | None |
| LOEC114 | Chemistry | 33 | 67 | 4.00 | S | None |
| WSHE106 | Workshops | 90 | 10 | 4.00 | B | None |
| ENLA107 | English Language | 33 | 17 | 2.00 | B | None |
| DEHR105 | Democracy and Human Rights | 33 | 17 | 2.00 | B | None |

**Semester 2 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LOEC121 | Engineering Drawing | 48 | 52 | 4.00 | C | None |
| LOEC122 | Mathematics II | 33 | 67 | 4.00 | S | None |
| LOEC123 | Medical Physics | 63 | 62 | 5.00 | S | None |
| COMP108 | Computer | 48 | 27 | 3.00 | B | None |
| LOEC125 | Engineering Mechanics | 48 | 52 | 4.00 | C | None |
| LOEC126 | Electrical Circuits II | 63 | 87 | 6.00 | C | None |
| WSHE106 | Workshops | 90 | 10 | 4.00 | B | None |

**Semester 3 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LOEC211 | Electronic Circuits I | 93 | 82 | 7.00 | C | None |
| LOEC212 | Engineering Optics | 78 | 72 | 6.00 | C | None |
| LOEC213 | Mathematics III | 48 | 52 | 4.00 | S | None |
| LOEC214 | Biology | 33 | 67 | 4.00 | S | None |
| LOEC215 | Digital Electronic | 63 | 37 | 4.00 | C | None |
| LOEC216 | Computer Applications and Artificial intelligence | 33 | 42 | 3.00 | S | None |

| | | | | | | |
|---|---|---|---|---|---|---|
| CBRI201 | Crimes of Baath Regime in Iraq | 33 | 17 | 2.00 | B | None |

**Semester 4 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LOEC221 | Electronic Circuits II | 108 | 67 | 7.00 | C | None |
| LOEC222 | Laser Physics | 108 | 92 | 8.00 | C | None |
| LOEC223 | Electromagnetic Fields | 48 | 77 | 5.00 | C | None |
| LOEC224 | Probability and Statistic | 33 | 42 | 3.00 | S | None |
| LOEC225 | Heat Transfer | 33 | 42 | 3.00 | S | None |
| ARLA204 | Arabic language | 33 | 17 | 2.00 | B | None |
| ENLA207 | English Language | 33 | 17 | 2.00 | B | None |

**Semester 5 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LASE311 | Engineering Analysis I | 59 | 91 | 6.00 | C | None |
| LASE312 | Power Electronics | 101 | 49 | 6.00 | C | None |
| LASE313 | Solid State Lasers | 73 | 77 | 6.00 | C | None |
| LASE314 | Gas Lasers | 31 | 119 | 6.00 | C | None |
| LASE315 | Laser Spectroscopy | 31 | 119 | 6.00 | C | None |

**Semester 6 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LASE321 | Engineering Analysis II | 59 | 66 | 5.00 | C | None |
| LASE322 | Optical Fiber Technology | 87 | 63 | 6.00 | C | None |
| LASE323 | Semiconductor Devices | 31 | 94 | 5.00 | S | None |
| LASE324 | Laser Power Supplies | 59 | 91 | 6.00 | C | None |
| LASE325 | Laser Tissue Interaction | 31 | 119 | 6.00 | C | None |
| ARLA304 | Arabic Language | 31 | 19 | 2.00 | B | None |

**Semester 7 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LASE411 | Laser Systems Design | 87 | 88 | 7.00 | C | None |
| LASE412 | Industrial Laser applications | 87 | 113 | 8.00 | C | None |
| LASE413 | Final Year Project | 58 | 117 | 7.00 | C | None |
| LASE414 | Medical Laser Systems | 31 | 119 | 6.00 | C | None |
| PREE411 | Professional Ethics and Enterpreneurship | 31 | 19 | 2.00 | B | None |

**Semester 8 | 30 ECTS**

| Code | Module | SSWL | USSWL | ECTS | Type | Pre-request |
|---|---|---|---|---|---|---|
| LASE421 | Medical Laser Applications | 31 | 119 | 6.00 | C | None |
| LASE422 | Microcontroller Applications | 87 | 88 | 7.00 | S | None |
| LASE423 | Final Year Project | 58 | 117 | 7.00 | C | None |
| LASE424 | Optical communication Systems | 87 | 88 | 7.00 | C | None |
| COMP408 | Computer | 31 | 44 | 3.00 | B | None |

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