

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 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:

$$\text{GPA} = [(1\text{st module score} \times \text{ECTS}) + (2\text{nd module score} \times \text{ECTS}) + \dots] / 240$$

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 Entrepreneurship	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

8. Contact

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