

## LASER PROGRAMME REVIEW    FIRST YEAR

### COURSE SPECIFICATION

This Course Specification provides the main features of the Theory of Mathematics for the students of 1<sup>st</sup> year in Laser and Optoelectronics Engineering. Learning outcomes which gained by this course will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the optoelectronics engineering program specification.

<b>1. Teaching Institution</b>	University of Technology
<b>2. University Department/Centre</b>	College of Laser and optoelectronics Engineering
<b>3. Course title/code</b>	Mathematics(I) / LOPE1201
<b>4. Programme(s) to which it Contributes</b>	Laser and Optoelectronics Engineering Program
<b>5. Modes of Attendance offered</b>	Full Hours
<b>6. Semester/Year</b>	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / year
<b>7. Number of hours tuition (total)</b>	Three Hours / Week (2hours theory ,1 hour tutorial) 3H X30W=90H/Year
<b>8. Date of production/revision of this specification</b>	2/7/2017
<b>9. Aims of the Course</b>	
<p>The aims which can be achieved during teaching this course program are as follows:</p> <ol style="list-style-type: none"> <li>1- Aims of the course are to graduates a qualified engineer's who they have theoretical experience in advanced mathematics in optoelectronics field.</li> <li>2- This unit of study aims to provide theoretical knowledge and principles of advanced Mathematics and the ability to analysis and solve the mathematical problems.</li> <li>3- Illustration and discussion the Main Theoretical Principles of functions &amp; inverse functions with their graphs, limits &amp; continuity, determinates,</li> </ol>	

matrices, polar coordinates, complex number , vectors , techniques of derivative, integration & differential equation with their applications in optoelectronics field.

4- Understanding of different methods to solve the same mathematical problem

## 10• Learning Outcomes, Teaching ,Learning and Assessment Method

### A- Knowledge and Understanding

- A1. Enabling student to get the knowledge and understanding of the theoretical principles of advanced mathematics for different optoelectronics systems.
- A2. Understanding of Ideological philosophy of advanced mathematics and their applications.
- A3. Understanding the knowledge of using mathematics for different methods of solution in optoelectronics applications.
- A4. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory and application of Advanced Engineering Mathematics.

### B. Subject-specific skills

- B1. An ability to analyze the mathematical problems in optoelectronics field.
- B2. An ability to identify, formulates, and solves engineering problems.
- B3. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

### Teaching and Learning Methods

- 1- Lecture notes and classroom discussions.
- 2- Theoretical examples and applications.
- 3- Solving problems, quizzes and assessments. .
- 4- Power point literatures by Data show Reviews.

### Assessment methods

- 1- First semester exam (15%).
- 2- Second semester exam (15%).
- 3- Home work and quizzes (10%).
- 4- Final exam (60%).

### C. Thinking Skills

- C1. An ability to apply knowledge of mathematics, science and engineering comparing then conclusion.
- C2. Investigation in engineering problems and find effective solutions for mathematics problem in optoelectronics field.
- C3. Ability to analysis and decision making for mathematics problem.
- C4. Arranging and classifying.
- C5. Ability to solving problems, survey, work collectively, leadership groups .

### Teaching and Learning Methods

The course in Mathematics is covered by classical lecture and after each topic , sample problem will be provide to the student , and during tutorial hours the

students will be able to apply the theories and principles for solving the mathematical problems in electromechanically field.

#### Assessment methods

- 1- Examinations and questions in the classroom.
- 2- Home works & Quizzes.
- 3- Tutorials and discussions.
- 4- The assessment of this element is by written examination which enables each student to demonstrate ability to analyses and solve new problems

#### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Training on several mathematical methods to solve the same problem.  
 D2. An ability for solving different mathematics problems in Engineering applications.  
 D3. An ability to communicate effectively.  
 D4. Recognition of the need for , and the ability to engage in life-long learning.

### 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Theory and discussion	Introduction, Quadratic Formula, Binomial Formula	White board ,Lecture & p.p Show.	Examinations ,Quizzes, and Homework .
2	=	=	Straight Line, Conic Sections (Circle, Parabola, Ellipse, Hyperbola)	=	=
3	=	=	Functions (Inequality, Intervals, Domain & Range )	=	=
4	=	=	Functions (Inverse Functions, Drawing Function, Absolute Value)	=	=
5	=	=	Functions (Trigonometric Functions, Inverse Trigonometric Functions, Logarithmic Function)	=	=
6	=	=	Function( Natural Logarithmic Function, Exponential Function, Hyperbolic Functions)	=	=
7	=	=	Functions (Inverse Hyperbolic Functions)	=	=
8	=	=	Limits & Continuity	=	=
9	=	=	Determinants (Properties, Grammer's	=	=

			Rule, Applications)		
10	=	=	Matrices ( Operations, Inverse of Square Matrix, Eigen Values & Eigen Vectors)	=	=
11	=	=	Polar Coordinates	=	=
12	=	=	Complex Numbers	=	=
13	=	=	Applications of Complex Numbers	=	=
14	=	=	Vectors, Properties of Vectors, Vectors in Free Space	=	=
15	=	=	Applications of Vectors	=	=
16	=	=	Differentiation (Derivative Definition, Techniques of Derivative, Applications)	=	=
17	=	=	Differentiation (Derivative of Trigonometric Functions, Derivative of Inverse Trigonometric Functions ,Chain Rule,)	=	=
18	=	=	Differentiation ( Parametric Equations, Implicit Differentiation)	=	=
19	=	=	Differentiation ( Derivative of Some Functions, Derivative of Hyperbolic Functions, Derivative of Inverse Hyperbolic Functions)	=	=
20	=	=	Integration (Indefinite Integrals & Substitution Rule )	=	=
21	=	=	Integration (Definite Integrals, Properties, Relation Between Indefinite & definite Integrals)	=	=
22	=	=	Forms of Integration (Substitution Methods, By Part, By Tabulate)	=	=
23	=	=	Integration (Partial Fractions For 2nd Equation Degree in Denominator)	=	=
24	=	=	Integration ( Product between Trigonometric Functions, Product Between Hyperbolic Functions)	=	=
25	=	=	Integration (Simple Square Root, Trigonometric Substitutions, Hyperbolic Substitutions)	=	=
26	=	=	Integration of (Irrational Functions, Rational Functions)	=	=
27	=	=	Applications of Definite Integral(Area, Area Under the Curve, Area Between Curve and y-axis, Area Between Two Curves)	=	=
28	=	=	Differential Equations D.E, 1st degree equation: 1-Direct Integration , 2- Variable Separable )	=	=
29	=	=	Differential Equations D.E.(3- Linear Equations,4- Homogeneous,5- Exact )	=	=

30	=	=	Applications of D.E. in Electrical & Mechanical Engineering	=	=
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<b>12. Infrastructure</b>	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Theory of advanced mathematics with application by Thomas Calculus. 2-Books and Literatures in different kinds of Advanced Mathematics
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A
<b>13. Admissions</b>	
Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

## COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Eng . College
3. Course title/code	University physics /LOPE 1202
4. Programme(s) to which it contributes	Laser and Optoelectronics Engineering Program
5. Modes of Attendance offered	Full Time
6. Semester/Year	Annual /Year
7. Number of hours tuition (total)	4 Hours / Week (2hours theory ,2 hour Application) 4H X30W=120H/Year
8. Date of production/revision of this specification	26-6-2017
9. Aims of the Course	
	- Introduction to University physics for students of the first year/Laser and optoelectronic engineering Programs
	-Enable the student to work in the different field.
	- The application of the basic principles of light and material.
10. Learning Outcomes, Teaching ,Learning and Assessment Methode	

A- Knowledge and Understanding

- A1. Know the properties of mirrors and lenses and how form the images.
- A2. Know the meaning of inversion population.
- A3. Know the student what the photoelectric effect.
- A4. Enable the student to study the Bohr Model, the hydrogen atom.
- A5. Enable the student to study the interference and diffraction phenomena.

B. Subject-specific skills

- B1. Find solutions to the problems of the images in mirrors and lenses.
- B2 Calculate the wavelength and index of refraction and the intensity distributed for interference and diffraction pattern.
- B3. Explain the concept of the physical equation and how derivation.
- B4. Know

Teaching and Learning Methods

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the (Unvi. physics).

Assessment methods

- Classroom discussions and to identify the potential of the student to analyze problems.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Lab. Examinations.

C. Thinking Skills

- C1.
- C2.
- C3.
- C4.

Teaching and Learning Methods

D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	8	The nature of light and propagation	Light sources Wave, wavefront, rays Speed of light Reflection and refraction laws Index of refraction	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
5-8	8	Reflection and refraction in plane surface	Huygens's principle Derive refraction law from Huygens's principle Reflection internal total Refraction in prism dispersion	=	=
9-13	10	Image Formation by a Plane Mirror	Reflection in plane mirror reflection in spherical mirror  graphical method refraction in plane surface	=	=
14-17	8	Lenses and optical instrument	Thin lenses Divergence lenses Graphical method Image formation in lenses Thick lenses Lenses aberration The eye The amplifier The camera The microscope The telescope	=	=
18-22	10	Interference and diffraction	Interference principle Young's experimental Interference in thin film Thin coating on glass Mickelson interference Frenal diffraction faranhofer diffraction in single slit X-ray diffraction Resolving power	=	=
23-26	8	polarization	Polarization Polarization by reflection	=	=



			Double refraction Polarization by double refraction Scattering of light Circular and elliptical polarization Formation colors in light polarized Study of crystals convergent to light polarized		
27-30	8	Atoms, electrons and photons	Condition in gases Thermionic emission Photoelectric effect Line spectra Bohr atom Wave mechanism Absorption spectra The laser x-ray tube x-ray spectra	=	=

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	University physics/ Code LOPE 1202
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the <a href="http://www.uotechnology.edu.iq/dep-MechanicsandEquipment/index.htm">http://www.uotechnology.edu.iq/dep-MechanicsandEquipment/index.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting seminars.

## 13. Admissions

Pre-requisites	
Minimum number of students	No identification.
Maximum number of students	No identification.

## PROGRAMME REVIEW English language for 1<sup>st</sup> year

### COURSE SPECIFICATION

This course will improve the ability of the students to understand, speak, read and write English as a second language with some technical texts. It is also intended to teach them, how to use technical English effectively as a language of instruction, Lab. Experiments and Exercises, examples, using Technical Terminologies as close as possible to the lectures they receive during their study.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and optoelectronics Engineering College
3. Course title/code	English Language/LOPE1103
4. Programme(s) to which it contributes	Laser and Optoelectronics Engineering Programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters/Year
7. Number of hours tuition (total)	Two Hours / Week 2H X30W=60H/Year
8. Date of production/revision of this specification	4/7/2017
9. Aims of the Course	
<p>The aims which can be achieved during teaching this course program are as follows:</p> <ol style="list-style-type: none"><li>1. Proceeding to the Student the benefits of studying English Language as Second language.</li><li>2. Giving Knowledge about using the Technical Terminologies in their studies.</li><li>3. Understanding of using the scientific English language in the Academic Program.</li><li>4. Giving Knowledge of how to write ,describe , typing the reports in English.</li></ol>	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### B- Knowledge and Understanding

- A1. Enabling student to get the knowledge and understanding of the theoretical principles of using Scientific English language.
- A2. Proceeding the understanding the and Ideological philosophy of learning a second language besides the native language .
- A3. Proceeding knowledge and understanding of English applications in writing technical reports ,descriptions .

### B. Subject-specific skills

- B1. Literatures
- B2. Tutorials
- B3. Conversation

### Teaching and Learning Methods

- 5- Tutorials
- 6- Power point literatures by Data show Reviews.

### Assessment methods

- 5- Examinations.
- 6- Quizzes.
- 7- Home works.
- 8- Tutorials and discussions.

### C. Thinking Skills

- C1. Ability of speaking.
- C2. Certain discussion and conversation .
- C3. General information collection for different sources relating to the language teaching methods.
- C4. collection of data

### Teaching and Learning Methods

- 1- Literatures.
- 2- Tutorials.

### Assessment methods

- 1- Test 1
- 2- Test 2.
- 3- Quizzes and Assignments.
- 4- Final Examination

### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Different group conversations.
- D2. new learning methods.
- D3.
- D4.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2	Literature	Introduction to English language as second language	Lecture & p.p Show.	Examinations ,Quizzes,.
3-7	=	=	English study and learning skills	=	=
8-12	=	=	The seven habits of highly effective readers.	=	=
13-20	=	=	7 Rules to learn excellent real English language .	=	=
21-24	=	=	How to improve your English conversation ability.	=	=
25-27	=	=	How to Write an outline of Technical English report.	=	=
28-30	=	=	What is the TOEFL. (Important steps to know).	=	=

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Literatures in different learning skills for English language.
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

**PROGRAMME REVIEW Electrical circuit analysis 1<sup>st</sup> year**

This Course Specification provides the main features of the Theory of Fundamental of Electric Engineering for the students of first year in laser & optoelectronic engineering Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programme specification as laser & optoelectronic engineering systems Engineering.

1. Teaching Institution	University of Technology
2. University Department/Centre	laser & optoelectronic Engineering Dept.
3. Course title/code	Electrical D.C circuits
4. Programmers(s) to which it contributes	Optoelectronics Engineering
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Theoretical : 2hrs/w Practical : 2 hr/w 4H X30W=120H/Year
8. Date of production/revision of this specification	20/6/2017

**9. Aims of the Course**

The aims which can be achieved during teaching this course program are as follows:

- 1- Illustration and discussion the fundamental of Electrical DC circuit and definition.
- 2- Proceeding to the Student the DC Electrical Circuits ,series, parallel, series-parallel.
- 3- Identify the equations voltages & current for circuits above.
- 4- illustration and discussion the analysis methods of the above Circuits, delta-star, Branch, loop, nodal.
- 5- Illustrations and discussion the Network theorems super position, Thévenin's theorem, Norton theorem & "maximum power transfer; millman, reciprocity, substitution" theorems.
- 6- Illustration and discussion the Magnetic Circuits.
- 7- Illustration and discussion the fundamental of capacitor and inductor.

## 10- Learning Outcomes, Teaching ,Learning and Assessment Method

### A- Knowledge and Understanding

- A1. Enabling student to get the knowledge and understanding the fundamental of DC Electrical Circuits for different circuits.
- A2. Enabling student to analysis different DC electrical circuits by analysis methods.
- A3. Enabling student to get the knowledge and understanding the network methods for different DC electrical circuits.
- A4. Enabling student to get the knowledge and understanding the fundamental of Magnetic Circuits
- A5. Enabling student to get the knowledge and understanding the fundamental of capacitor and inductor operation
- A6. Enabling student to get the knowledge and understanding the connection Of capacitor & conductor in the electric circuit.

### B. Subject-specific skills

- B1. Literatures
- B3. Laboratory and performing some Experiments.

#### Teaching and Learning Methods

- 1- Practical experiments.
- 2- Simulation and Innovation.
- 3- pdf literatures by Data show Reviews.

#### Assessment methods

- 1- Examinations.
- 2- Quizzes.
- 3- Home works.
- 4- Tutorials and discussions.

### C. Thinking Skills

- C1. Reports.
- C2. Certain DC Electrical Circuits problem analysis.
- C3. Technical information collection for DC Electrical Circuits problem.
- C4. Research and collection data.

#### Teaching and Learning Methods

- 1- Literatures.
- 2- Tutorials.
- 3- Experiments.

#### Assessment methods

- 1- Test 1
- 2- Test 2.
- 3- Quizzes and Assignments.

- 4- Laboratory.
- 5-Final Examination

**D. General and Transferable Skills (other skills relevant to employability and personal development)**

- D1. Solution of different circuits of DC Electrical circuit.
- D2. Analysis of different circuits of DC Electrical circuit by analysis methods.
- D3. Solution of different circuits of DC Electrical circuit by network theorems.
- D4. Simulation of different system of DC Electrical circuit methods.
- D5. Analysis of magnetic circuit
- D6. Solution of different circuits of inductor and capacitor

**11. Course Structure(first semester)**

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-5	2+2	Literature , Experimental, Tutorial	Basics of Electrical Ohm's Circuits Law, Resistance in series ,KVL, Voltage divider Rule,... Resistance in parallel ,KCL, current divider Rule , Series parallel Circuits ,	Lecture & pdf Show.	Examinations ,Quizzes, and Reports.
6-10	=	=	Current Sources, Star and delta analysis , branch analysis, Loop current method ,nodal voltage	=	=
11-15	=	=	Network theorems, super position, Thévenin's theorem, Norton theorem .maximum power transfer.	=	=

11. Course Structure(second semester)					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
15-20	2+2	Literature , Experimental , Tutorial	“millman,resprocity,substitution” theorems	Lecture & pdf Show.	Examinati ons ,Quizzes, and Reports.
20-25	=	=	MAGNETIC FIELDS FLUX DENSITY PERMEABILITY RELUCTANCE OHM’S LAW FOR MAGNETIC CIRCUITS MAGNETIZING FORCE AMPÈRE’S CIRCUITAL LAW THE FLUX $\Phi$	=	=
25-30	=	=	THE ELECTRIC FIELD CAPACITOR CHARGING OF CAPACITANCE CAPACITORS IN SERIES CAPACITORS IN PARALLEL Series and parallel combinations INDUCTOR (L) SELF-INDUCTANCE INDUCED VOLTAGE INDUCTOR IN SERIES INDUCTORS IN PARALLEL POWER & ENERGY STORED BY AN INDUCTOR	=	=



12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Literatures in different kinds of DC Electrical circuit 2.Introductory circuit Analysis; by Robert L. Boylestad . 3-Basic Electrical Engineering science; by Mckenzie smith and K.T. Hosie
Special requirements (include for example workshops, periodicals, IT software, websites)	-
Community-based facilities (include for example, guest Lectures , internship , field studies)	-

13. Admissions	
Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

#### COURSE SPECIFICATION

This Course Specification provides the main features of the statics , dynamics, thermodynamics & fluid mechanics for the students of 1<sup>st</sup> year in Laser & Optoelectronics Engineering. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programme specification as Laser & Optoelectronics Engineering .

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser & Optoelectronics Eng. Dept.
3. Course title/code	Engineering Mechanics, LOPE 1205
4. Programme(s) to which it contributes	Applied Mechanical Engineering
5. Modes of Attendance offered	Full time- 2hr/week
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semester/ 1 <sup>st</sup> year
7. Number of hours tuition (total)	60 hours
8. Date of production/revision of this specification	26-6-2017
9. Aims of the Course	
<ul style="list-style-type: none"> <li>-Aims of the course are to graduates a qualified engineer's who they have theoretical experience in statics and Dynamics in engineering mechanics field.</li> <li>- This unit of study aims to provide theoretical knowledge and principles of statics and Dynamics and the ability to analysis and solve the Engineering mechanics problems.</li> <li>- Illustration and discussion the Main Theoretical Principles and improve the ability for team work.</li> <li>- Understanding of using different methods to solve the same problem</li> <li>- assure the accuracy in solving problems with out any approximation.</li> </ul>	

10. Learning Outcomes, Teaching ,Learning and Assessment Methode
<p>A- Knowledge and Understanding</p> <p>A1.Enabling student to get the knowledge and understanding of the theoretical principles of Engineering Mechanics.</p> <p>A2. Understanding of Ideological philosophy of Engineering Mechanics and their applications.</p> <p>A3. Understanding the knowledge of using Engineering Mechanics for different methods of solution in engineering applications.</p> <p>A4. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory and application of Engineering Mechanics.</p> <p>B. Subject-specific skills</p> <p>B1.An ability to analyze the Engineering Mechanics problems in engineering field.</p> <p>B2. An ability to identify, formulates, and solve Engineering Mechanics problems.</p>

B3. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

#### Teaching and Learning Methods

1-Lecture notes and classroom discussions.

2-Theoretical examples and applications.

3-Solving problems, quizzes and assessments.

#### Assessment methods

#### C. Thinking Skills

C1. An ability to apply knowledge of Engineering Mechanics.

C2. Investigation in engineering problems and find effective solutions for Engineering Mechanics problem.

C3. Ability to analysis and decision making for Engineering Mechanics problem.

C4. Arranging and classifying.

C5. Ability to solving problems, survey, work collectively, leadership groups.

#### Teaching and Learning Methods

1-Examinations and questions in the classroom.

2- Home works & Quizzes.

3-Tutorials and discussions.

4- The assessment of this element is by written examination which enables each student to demonstrate ability to analyses and solve new problems

#### Assessment methods

Test

Quizzes

Home work

D. General and Transferable Skills (other skills relevant to employability and personal development)

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Training on several Engineering Mechanics methods to solve the same problem.

D2. An ability for solving different Engineering Mechanics problems in work field.

D3. An ability to communicate effectively.

D4. Recognition of the need for , and the ability to engage in life-long learning.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2hr	Theory ,Tutorial & discussion.	Introduction to Static	lecture	Feed back ,quizzes homework
2	2hr	=	Scalar & vector quantities	lecture	=
3	2hr	=	resolution of force into components.	lecture	=
4	2hr	=	Moment of a force about point	lecture	=
5	2hr	=	Location of a resultant	lecture	=
6	2hr	=	Couples	lecture	=
7	2hr	=	Centroid & center of area	lecture	=
8	2hr	=	Center of gravity	lecture	=
9	2hr	=	Equilibrium	lecture	=
10	2hr	=	Free body diagram	lecture	=
11	2hr	=	Moment of inertia	lecture	=
12	2hr	=	friction	lecture	=
13	2hr	=	Introduction to dynamics	lecture	=
14	2hr	=	equations of linear motion	lecture	=
15	2hr	=	Displacement ,velocity & acceleration	lecture	=
16	2hr	=	Motion of projectile	lecture	=
17	2hr	=	Introduction to thermodynamics	lecture	=
18	2hr	=	1 <sup>st</sup> law of thermodynamics	lecture	=
19	2hr	=	2 <sup>nd</sup> law of thermodynamics	lecture	=
20	2hr	=	Types of processes	lecture	=
21	2hr	=	Types of processes	lecture	=
22	2hr	=	Types of energy	lecture	=
23	2hr	=	Heat balance	lecture	=
24	2hr	=	Introduction to fluid mechanics	lecture	=
25	2hr	=	Ideal gas	lecture	=
26	2hr	=	Euler equation	lecture	=
27	2hr	=	Bernoulli equation	lecture	=
28	2hr	=	Momentum equation	lecture	=

29	2hr	=	Force exerted by flowing fluid on a pipe-bend.	lecture	=
30	2hr	=	Exam.	-	

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Engineering Mechanics, Volume 1, Statics & Dynamics, Fifth Edition by J.L. Meriam & L.G. Kraige 2-Engineering Mechanics, Singer. 3-Lecture notes.
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites
Community-based facilities (include for example, guest Lectures, internship, field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit
Maximum number of students	No limit

## TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course provides a basic principle of engineering drawing including word and numbering drawing, dimensions, sections, projections and isometric drawing

1. Teaching Institution	University of Technology
2. University Department/Centre	Dep. of Laser and optoelectronics Engineering
3. Course title/code	Engineering drawing /LEOP1206
4. Programme(s) to which it contributes	Laser and optoelectronics Eng. Programs
5. Modes of Attendance offered	Full Time
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters/ year
7. Number of hours tuition (total)	3hours/week 3H*30W=90H/Year
8. Date of production/revision of this specification	4-7-2017
9. Aims of the Course	
- Introduction of Engineering drawing for students of the First	
- Use of drawing tools, starting engineering drawing learning students the basic principles.	
- The application of the basic principles of engineering drawing	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

A1. Know the methodology of engineering drawing.

A2. Enable the student to draw A3. Enable the student to learn and understand the basic for drawing word and numbering drawing, dimensions, sections, projections and isometric drawing

### B. Subject-specific skills

B1. Learn student how to have skill to draw word and numbering , dimensions, sections, projections and isometric drawing

## Teaching and Learning Methods

Theoretical and experimental method

### Assessment methods

- Classroom discussions and to identify the potential of the student to draw.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Projects and seminars.
- The student's performance in the class .

### C. Thinking Skills

C1. Description of projections

C2. Description of writing and numbering on sheet.

C3. Description of Isometric drawing .

### D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Employing all due respect to the course such as software, tables and diagrams to draw in engineering drawing .

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	4 hours per week	Introduction in engineering drawing , using drawing tools, drawing letters and number	Introduction and discussing drawing tools	Theoretical and experimental .	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
5-9	4 hours per week	Obtaining Projection and sections	projections	=	=
10-13	4 hours per week	Hand drawing and dimensions	Hand drawing	=	=
14-17	4 hours per week	isometric drawing	Isometric drawing	=	=
18-21	4 hours per week	Engineering drawing using Autocad , setup, repare, basic operation tools.	Auto cad	=	=
22-25	3 hours per week	Tool definition , draw modify, layers, prope rties, utilities, block	Auto cad 2010	=	=
26-30	3 hours per week	Two and three dimensional drawings.	Autocad	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Engineering drawing Abdal Rasool Al khafaf. Auto cad 2010 tutorials
Special requirements (include for example workshops, periodicals, IT software, websites)	Autocad 2010 tutorial
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting seminars. - Visits to internent sites.



13. Admissions	
Pre-requisites	Pass the secondary school. In addition, students have the capacity to communicate in English.
Minimum number of students	No identification.
Maximum number of students	No identification.

## PROGRAMME REVIEW C++ Computer Programming for 1<sup>st</sup> Year

### COURSE SPECIFICATION

This course acquaints students of 1<sup>st</sup> Year with the design, development, testing and documentation of C++ programming language. Data structure (variables, arrays, structure, and pointer), conditional and repetition statements, functions, files, graphics, math, string, dos functions, and I/O interface.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and optoelectronics Eng. Dept.
3. Course title/code	C++ Computer Programming / LOPE1107
4. Programme(s) to which it contributes	Laser and optoelectronics Eng. programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	Annual (1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year)
7. Number of hours tuition (total)	Two Hours / Week (Theory) Two Hours / Week (Practical) 2H X 30W = 60H/Year theory + 60H/Year practical
8. Date of production/revision of this specification	24/06/2017
9. Aims of the Course	
The aims which can be achieved during teaching this course program are as follows:	
-Giving knowledge about the computer hardware & software	
-Understanding of programming in C++ programming language	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### **A- Knowledge and Understanding**

- A1. Create a program using the C++ programming language
- A2. Use sequential looping, control logic and graphic in programs
- A3. Solving problems in different applications

### **B. Subject-specific skills**

- B1.Literatures
- B2. Computer Laboratory.

### **Teaching and Learning Methods**

- 1-Computer Laboratory.
- 2- Power point literatures by Data show Reviews.

### **Assessment methods**

- 1- Examinations.
- 2- Quizzes.
- 3- Home works.

### **C. Thinking Skills**

- C1. Reports.
- C2. Home works .
- C3. Research

### **Teaching and Learning Methods**

- 1- Literatures.
- 2- Applications in computer laboratory .

### **Assessment methods**

- 1-Test 1
- 2- Test 2.
- 3- Quizzes and Assignments.
- 4- Laboratory.
- 5-Final Examination

### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Apply Solution of different examples .
- D2. Training to write programs for different applications.
- D3. Training to draw football and Tanis playing ground using graphic statements.

### 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2+2	Literature and Experiments	Introduction to C++ Programming Language, Constants and Variables	Lecture & p.p Show.	Examinations ,Quizzes, and Reports.
3-4	=	=	<b>Operators</b> :Arithmetic Operators, Bitwise Operators, Input/ Output technique, Relational operators ( < ><= and >= ) , Equality operators, Conditional operator ( ? : ), Comma punctuator and operator ( , )	=	=
5-8	=	=	<b>Conditional statements:</b> The if statement (keyword), If/else if/ else statement, The switch statement, Menu.	=	=
9-12	=	=	<b>The iteration (looping) statement :</b> (if with counter)For (keyword), While (keyword), Do...while loop, Break , Continue,	=	=
13-18	=	=	<b>Data structure:</b> Math. Functions, One Dimensional Arrays, Strings, Two dimensional array, Squared array, Structures, Pointers	=	=
19-25	=	=	<b>Functions:</b> Arrays, Pointers, Structures as function parameters, Local and Global Variables, Dynamic memory allocation	=	=
26-30	=	=	<b>Text Files and Graphics,</b> Applications on Graphics, I/O Interface	=	=

### 12. Infrastructure

#### Required reading:

- CORE TEXTS
- COURSE MATERIALS
- OTHER

C++ manual, Help, and lectures prepared by the teacher.

Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

## PROGRAMME REVIEW : **Optoelectronics Eng.**

### **COURSE SPECIFICATION:** Human rights, 1<sup>st</sup> year

The course covers the concept of human rights and development, definition , classes , properties , and the most important human rights conventions and declarations and international conventions on human rights , and human rights in religions and the role of non-governmental organizations in this field and other human rights issues.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering department
3. Course title/code	Human rights /
4. Programme(s) to which it contributes	General

5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> &2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Thirty Hours 1H X 30Week =30h/year
8. Date of production/revision of this specification	4/7/2017

#### 9. Aims of the Course

The aims which can be achieved during teaching this course program are as follows:

1. Working to promote, disseminate and consolidate the culture of human rights , freedom and democracy among university students.
2. Promising d conscious generation and cultured human rights issues , freedom and democracy and believes in political pluralism and the peaceful transfer of medium- and freedom of expression and respect for and acceptance of the other opinion and respect for minority rights and peaceful coexistence in society .
3. Ability to diagnose human rights violations or restrict public freedoms or overtaking on the Constitution and the ability to propose realistic solutions to the problems of the community to achieve a peaceful coexistence in society .
4. Inform students on the experiences of past and contemporary Nations in the field of human rights , freedom and democracy of worldviews , humane and scientific , religious and objectively away from the effects of political, intellectual and religious .
5. Seeking to bring about a change in the student's behavior in line with the overall objective by directing attention to the implications of the real human rights and the dimensions of the legal and the study of international declarations and covenants , and the impact of the violations egregious to those rules , which affect the lives of people or their dignity , especially that human rights are inclusive and all human societies .

#### 10. Learning Outcomes, Teaching ,Learning and Assessment Method

##### A-Knowledge and Understanding

A 1 - to identify the concepts of human rights , freedom and democracy

A 2 - to know and understand the most important terms that relate to the subject of human rights , freedom and democracy.

A 3 - to know and understand the principles and theories on human rights , freedom and democracy.

A 4 - to know and understand the most important announcements and international charters and conventions on human rights , freedom and democracy.

A 5 - to identify the key role of human rights issues , freedom and democracy in the stability of human societies.

A 6 - to know and understand the importance of employing the concepts of human rights , freedom and democracy in public life , whether at home , school , university , work , street , factory .... etc. especially with the worldview of modern issues of human rights , freedom and democracy .

## B. Subject-specific skills

B 1 - the most important acquisition of the student terminology, principles and theories on human rights, freedom and democracy .

B-2 - the ability to debate and interpretation, analysis and comparison of the issues or the subjects on human rights, freedom and democracy, particularly in relation to the experiences of nations in this field .

B-3 Ability to summarize the issues and do rewrite the subject manner of its student .

B- 4 The ability to search and collection, arrangement and classification of information when conducting research and writing scientific reports and do activities and exercises and participation of various activities.

### Teaching and Learning Methods

Method of lecture and discussion , preparation and effective participation of tribal, stirring diverse Questions for discussion, arrangement and discuss ideas, individual and collective debates between students, cooperative learning, how to do household duties Research - Abstracts - Posters, film screenings and educational presentations.

### Assessment methods

Exam calendar, exam daily, monthly exam, attendance and active participation of students, providing research - summaries - Mural - Posters.

## C. Thinking Skills

C 1 - Critical Thinking

C 2 - problem solving, brainstorming

C 3 - Case Study

C 4 - study skills

### Teaching and Learning Methods

Way discussion, provoke questions and diverse ideas, research work and scientific reports, dialogue and debate between individual and collective student, individual and collective training to students, film screenings and educational presentations.

### Assessment methods

Exam sudden, daily and monthly examinations, oral examinations variety of questions, participate effectively in the classroom, Individual activities for students .

## D. General and Transferable Skills (other skills relevant to employability and personal development)

D 1 - the student should be able to connect and communicate written and oral communication, research and information gathering .

D 2 - the ability to throw and apply for different subjects .

D 3 - to doing the work of different reports - summaries - Posters - Mural in a particular subject .

D 4 - leadership team collectively to various activities

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1	Lecture	concept of human rights and development of historic	Recognize the concept of human rights and development of historic	Exam and participation in the subject matter
2	1	Lecture	of the right to language and terminology and definition and characteristics of human right	Knowledge and understanding of the meaning of the right to language and terminology and definition and characteristics of human rights	Exam and participation in the subject matter
3	1	Lecture	type of human rights in the community	Knowledge and understanding of the importance of each type of human rights in the community	Exam and participation in the subject matter
4	1	Lecture	human rights in religions	Identify the implications of human rights in religions	Exam and participation in the subject matter
5	1	Lecture	human rights in religions	Identify the implications of human rights in religions	Exam and participation in the subject matter
6	1	Lecture	the regional human rights mechanisms and their application	Identify the terms of the agreements in the regional human rights mechanisms and their application	Exam and participation in the subject matter
7	1	Lecture	of human rights in international law and the extent to which	Identified on the basis of human rights in international law and the extent to which	Exam and participation in the subject matter
8	1	Lecture	human rights and public rights of persona	Comparison between human rights and public rights of persona	Exam and participation in the subject matter
9	1	Lecture	the stages of the international recognition of human rights	Identify the stages of the international recognition of human rights	Exam and participation in the subject matter
10	1	Lecture	non-governmental organizations and the defense of human rights	Identification of non-governmental organizations and the defense and diagnosis of human rights violations in the world and the mechanisms of action	Exam and participation in the subject matter
11	1	Lecture	non-governmental organizations and the defense of human rights	Identification of non-governmental organizations and the defense and diagnosis of human rights violations in the world and the mechanisms of action	Exam and participation in the subject matter
12	1	Lecture	content of the most important civil rights	Knowledge and understanding of the	Exam and participation in the subject matter



				content of the most important civil rights	
13	1	Lecture	content of the most important civil rights	Knowledge and understanding of the content of the most important civil rights	Exam and participation in the subject matter
14	1	Lecture	guarantees for the exercise of the rights and public freedoms in national legislation	Knowledge of the most important guarantees for the exercise of the rights and public freedoms in national legislation	Exam and participation in the subject matter
15	1	Lecture	the rights of the social strata, especially	Knowledge of the importance of the rights of the social strata, especially	Exam and participation in the subject matter

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1	Lecture	the term public freedoms	Knowledge and understanding of the term public freedoms	Exam and participation in the subject matter
2	1	Lecture	the historical development of the rights and freedoms	Knowledge and understanding of the historical development of the rights and freedoms	Exam and participation in the subject matter
3	1	Lecture	public freedoms kinds	Know the meaning of public freedoms kinds	Exam and participation in the subject matter
4	1	Lecture	democracy	Identify the meaning of democracy	Exam and participation in the subject matter
5	1	Lecture	types of democracy	Knowledge of the most important types of democracy and the comparison between the kinds of	Exam and participation in the subject matter
6	1	Lecture	advantages and characteristics and conditions of democracy	Identify the advantages and characteristics and conditions of democracy	Exam and participation in the subject matter
7	1	Lecture	of individual freedom and liberty coercive	Know the meaning of individual freedom and liberty coercive	Exam and participation in the subject matter
8	1	Lecture	the state and the rights of sovereignty, freedom	Knowledge about the state and the rights of sovereignty, freedom	Exam and participation in the subject matter
9	1	Lecture	reconcile the sovereignty and freedom	Knowledge of how to reconcile sovereignty and freedom	Exam and participation in the subject matter
10	1	Lecture	the historical dimension of democracy	Recognize the historical dimension of democracy	Exam and participation in the subject matter

11	1	Lecture	pressure groups	Identify the influence of pressure groups in society	Exam and participation in the subject matter
12	1	Lecture	pressure groups	Identify the influence of pressure groups in society	Exam and participation in the subject matter
13	1	Lecture	components of democracy	Identify the most important components of democracy	Exam and participation in the subject matter
14	1	Lecture	components of democracy	Identify the most important components of democracy	Exam and participation in the subject matter
15	1	Lecture	the minorities and their participation in democratic governance	Know the meaning of the minorities and their participation in democratic governance	Exam and participation in the subject matter

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Lectures relating to Article school
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from last stage (year ).
Minimum number of students	No limit.
Maximum number of students	No limit.

# TEMPLATE FOR COURSE SPECIFICATION

## Second stage

**PROGRAMME REVIEW Laser Eng. 2<sup>nd</sup> year**

### **COURSE SPECIFICATION: Mathematics(II)**

This Course Specification provides the main features of the Theory of Mathematics for the students of 2<sup>nd</sup> year in Laser Engineering. Learning outcomes which gained by this course will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programme specification as Laser Engineering.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering Dept
3. Course title/code	Mathematics (II) / LOPE2201
4. Programme(s) to which it contributes	Laser and Optoelectronics programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Three Hours / Week 3H X30W=90H/Year
8. Date of production/revision of this specification	15/7/2017
9. Aims of the Course	
The aims which can be achieved during teaching this course program are :	
1- Giving knowledge about using the mathematical theories in their studies.	
2- Provides the mathematical methods which can be used in laser and optoelectronics theory and applications.	
3- Provide students with experiences that will assist them in solving the scientific problems.	

10. Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

- A1. Enabling student to get the knowledge and understanding of the theoretical principles of mathematics.
- A2. Proceeding the understanding to how solve the mathematical problems of the laser or optoelectronic concepts.

B. Subject-specific skills

- B1. Literatures
- B2. Tutorials
- B3. Conversation

Teaching and Learning Methods

1- Tutorials

2- Literatures.

Assessment methods

- 1- Examinations.
- 2- Quizzes.
- 3- Home works.

C. Thinking Skills

- C1. Ability of understanding mathematics concepts.
- C2. Certain discussion and conversation.
- C3. General information collection for different sources relating to the mathematical problems.

Teaching and Learning Methods

1- Literatures.

2- Tutorials.

Assessment methods

- 1- Test 1
- 2- Test 2.
- 3- Quizzes and Assignments.
- 4- Final Examination

D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Different group conversations.
- D2. New learning methods.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	3	Literature	Partial derivative of function of two or more independent variable	Lecture	Examinations, Quizzes.
2	=	=	The Chain rule - Directional derivative and Gradient vectors	=	=
3	=	=	Tangent planes and normal lines	=	=
4	=	=	Maxima; Minima; and saddle points for function with two variables	=	=
5	=	=	Vectors in the plane - Cartesian coordinate and vector in space	=	=
6	=	=	Dot product and Cross product of two vectors	=	=
7	=	=	Line and planes in space	=	=
8	=	=	Applications	=	=
9	=	=	Polar coordinates and graphing in polar coordinate	=	=
10	=	=	Arc length, Area, and surface area	=	=
11	=	=	Double Integral - Area, moment, and centers of mass	=	=
12	=	=	Double integral in polar form	=	=
13	=	=	Applications	=	=
14	=	=	Triple integral	=	=
15	=	=	Triple integral in cylindrical and spherical coordinate	=	=
16	=	=	Preview of differential equations - Separable first order equation	=	=
17	=	=	Homogeneous differential equation - Linear first order differential equation	=	=
18	=	=	Second order homogeneous linear equation	=	=
19	=	=	Second order non homogeneous linear equation	=	=
20	=	=	Infinite Series.	=	=
21	=	=	Ratio test. - Root test of the series.	=	=

22	=	=	Power series. - Taylor series and Maclaurin Series.	=	=
23	=	=	Solving differential equation by power series	=	=
24	=	=	Special Function Gama and Beta function	=	=
25	=	=	Applications	=	=
26	=	=	Fourier series.	=	=

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Literatures in mathematics for engineering students.
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from last stage.
Minimum number of students	No limit.
Maximum number of students	No limit.

## COURSE REVIEW: Laser Principles

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Eng, Dept.
3. Course title/code	Laser Principles
4. Programme(s) to which it contributes	Laser and Optoelectronics Programs
5. Modes of Attendance offered	Full Time
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters /Year
7. Number of hours tuition (total)	2hours (Theory)/Week+2 hours (Practical)/Week $2H*30Weeks=(60H+60H) / Year$
8. Date of production/revision of this specification	26 / 10 /2017
9. Aims of the Course	
	1-Demonstrating concepts and principles of the laser for students of the second Year for both of laser and optoelectronics Engineering programs
	2- Describing the physical properties of laser and specifications as well as addressing all kinds of lasers
	3- Preparing the students theoretically and practically in the field of competence of the planned public sector companies and private sector

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

- A1. Understanding the laser theory
- A2. To get knowledge about the laser generating and application.
- A3. Acquiring information about laser radiation properties.
- A4. Design different types of laser systems
- A5. Classification of Laser types and operation concepts.

### B. Subject-specific skills

- B1.
- B2.
- B3.

### Teaching and Learning Methods

### Assessment methods

### C. Thinking Skills

- C1.
- C2.
- C3.
- C4.

### Teaching and Learning Methods

### Assessment methods

### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1.
- D2.
- D3.
- D4.



## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	8 - hours per week (4 hours theoretical +4 hour practical)	- Spontaneous emission + stimulated emission + absorption + relationship Einstein + feedback	laser concepts	Motivate the student to develop his abilities in data analysis question and diagnose the problem and describe the solution	.Discussions - .Homework .Sudden exams Quarterly examinations Projects and seminars Laboratory
5-9	hours per week (2 hours theoretical +4 hour practical)	Properties of - the laser beam items + + Laser stimulation operations + feedback + examples of the types of lasers	laser system -	Motivate the student to develop his abilities in data analysis question and diagnose the problem and describe the solution	.Discussions - .Homework .Sudden exams Quarterly examinations Projects and seminars Laboratory
10-13	hours per week (2 hours theoretical +4 hour practical)	Laser modes +standing wave +longitudinal mode + transvers	Laser modes	Motivate the student to develop his abilities in data analysis question and diagnose the problem and describe the solution	.Discussions - .Homework .Sudden exams Quarterly examinations Projects and seminars Laboratory
14-17	hours per week (2 hours theoretical +4 hour practical)	Coefficient of - profit threshold + control the number of laser modes + shapes own modes of electromagnetic transverse	Patterns of - transverse	Motivate the student to develop his abilities in data analysis question and diagnose the problem and describe the solution	.Discussions - .Homework .Sudden exams Quarterly examinations Projects and seminars Laboratory
18-28	hours per week (2 hours theoretical +4	The - distribution of the electric field pattern Browser + Stability, laser	Laser stability	Motivate the student to develop his abilities in data analysis question and	.Discussions - .Homework .Sudden exams Quarterly examinations Projects and

	hour practical (	systems of its own terms + cavities		diagnose the problem and describe the solution	.seminars Laboratory

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	”Orazio svelto “principle of laser
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the - <a href="http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm">http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	Conduct experiments in laboratories  Hold seminars  Summer Training

13. Admissions	
Pre-requisites	The success of the second first and good in English language
Minimum number of students	
Maximum number of students	

**COURSE REVIEW: Electrical A.C. Circuits 2<sup>nd</sup> year**

This Course Specification provides the main features of the Theory of Fundamental of Electric A.C. circuit for the students of second year in Laser and optoelectronics Engineering. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programmed specification as electromechanical systems Engineering.

1. Teaching Institution	University of Technology
2. University Department/Centre	Optoelectronics and laser Engineering
3. Course title/code	Electrical A.C. Circuit /LOPE 2203
4. Programmers(s) to which it contributes	Bsc. Optoelectronic and Laser engineering
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Theoretical / Branch : 2hrs / w Practical / Branch : 2 hrs / w Total: 2*30=60H/Year+60h/Year
8. Date of production/revision of this specification	5/7/2017
9. Aims of the Course	
<p>The aims which can be achieved during teaching this course program are as follows:</p> <ol style="list-style-type: none"> <li>1- Illustration and discussion the fundamental of A.C. electric engineering and definition.</li> <li>2- Concentration on series, parallel, series-parallel, Resonance, Locus diagram circuits.</li> <li>3- Identify the equations voltages &amp; current for circuits above.</li> <li>4- Illustration and discussion the analysis methods of the above Circuits, delta-star, Branch, loop, nodal.</li> <li>5- Illustrations and discussion the Network theorems, super position, Thevenin's theorem, Norton theorem .maximum power transfer.</li> <li>6- discussion the fundamental of the Electric Filters.</li> <li>7- Illustration and discussion the Power in AC Electrical Circuits.</li> <li>8- Illustration and discussion the Magnetic Circuits.</li> </ol>	

## 10• Learning Outcomes, Teaching ,Learning and Assessment Method

### **A- Knowledge and Understanding**

- A1.Enabling student to get the knowledge and understanding the fundamental of A.C. circuit engineering for different circuits.
- A2. Enabling student to analysis different electrical circuits by analysis methods.
- A3. Enabling student to get the knowledge and understanding the network methods for different electrical circuits.

### **B. Subject-specific skills**

- B1.Literatures
- B2. Tutorials
- B3. Laboratory and performing some Experiments.

#### Teaching and Learning Methods

- 1-Practical experiments.
- 2- Simulation and Innovation.
- 3- Pdf literatures by Data show Reviews.

#### Assessment methods

- 1-Examinations.
- 2-Quizzes.
- 3- Home works.
- 4- Tutorials and discussions.

### **C. Thinking Skills**

- C1. Reports.
- C2. Certain Electric Engineering problem analysis.
- C3. Technical information collection for Electric Engineering problem.
- C4. Research and collection data.

#### Teaching and Learning Methods

- 1-Literatures.
- 2- Tutorials.
- 2- Experiments.

#### Assessment methods

- 1-Test 1
- 2-Test 2.
- 3-Quizzes and Assignments.
- 4- Laboratory.

## 5-Final Examination

### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Solution of different circuits of Electric Engineering systems.
- D2. Analysis of different circuits of Electric Engineering by analysis methods.
- D3. Solution of different circuits of Electric Engineering systems by network theorems.
- D4. Simulation of different system of Electric Engineering methods.
- D5. Training on some software package programs related to the program.

### 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-5	2 Theoretical + 2 Practical	Literature , Experimental,	Complex Representation of voltage and current, Complex impedance and admittance. Complex power, Series parallel Circuits, phasor diagram	Lecture & pdf Show.	Examinations ,Quizzes, and Reports.
6-18	=	=	Series resonance, Parallel resonance, Locus diagrams, Solution of AC. Circuit, maximum power transfer,	=	=
19-30	=	=	Magnetically coupled circuit, Two port Network, Electric Filter.	=	=

<b>12. Infrastructure</b>	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1-Literatures in different kinds of Electric Engineering circuits 2.Introductory circuit Analysis; by Robert L. Boylestad . 3-Basic Electrical Engineering science; by Mckenzie smith and K.T. Hosie
Special requirements (include for example workshops, periodicals, IT software, websites)	-
Community-based facilities (include for example, guest Lectures , internship , field studies)	-

<b>13. Admissions</b>	
Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

**COURSE REVIEW: Electronics(I)**

## **COURSE SPECIFICATION**

This Course Specification provides the main features of the Theory of electronics for the students of 2<sup>nd</sup> year in optoelectronics engineering. Learning outcomes which gained by this course will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the course specification as optoelectronics Engineering.

<b>1. Teaching Institution</b>	University of Technology
<b>2. University Department/Centre</b>	Laser and Optoelectronics Engineering Dept.
<b>3. Course title/code</b>	Electronics (I) / LOPE2204

<b>4. Programm(s) to which it contributes</b>	Laser & Optoelectronics Eng. Programs
<b>5. Modes of Attendance offered</b>	Full Hours
<b>6. Semester/Year</b>	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
<b>7. Number of hours tuition (total)</b>	four Hours / Week (2hours theory ,2 hours application) 4H X30W=120H/Year
<b>8. Date of production/revision of this specification</b>	5/7/2017

#### **9. Aims of the Course**

The aims which can be achieved during teaching this course are as follows:

- Introduction of advanced concepts in electronics devices and circuits for students of the Second year in both branches, such as diodes, transistors and complex circuits of specific function.
- Theoretical and experimental preparation of students to gain knowledge of electronics physics.
- Scientific applications and uses of electronic devices in current days.

#### **10• Learning Outcomes, Teaching ,Learning and Assessment Method**

##### **A- Knowledge and Understanding**

A1. Know the physics of semiconductor materials and operation, properties and applications of the diode.

A2. Enable the student to use mathematical equations of the diode and know the types of diodes with applications such as Zener diode etc.

A3. Enable the student to learn and understand the basic characteristics of Transistors and its operation and explain their structures, advantages and drawbacks.

A4. Enable the student to learn and understand the mathematical principles of using equation in order to find the value of transistor current and voltage.

A5. Diode and Transistor biasing methods and their function within circuit.

##### **B. Subject-specific skills**

Skills in electronic subject include studying and gain knowledge of semiconductor characteristics of diodes and transistors with their applications. In addition to how students can analyze the electronics circuits mathematically and schematically to find the output signal and what are the changes on it. Further to studying the h-parameters of the transistor.

#### **Teaching and Learning Methods**

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the (optical fiber communications) Laboratory experiments.

**Assessment methods**

- Classroom discussions and to identify the potential of the student to analyze problems.
- Homework
- Sudden exams.
- Quarterly examinations.
- Projects and seminars.
- The student's performance in the laboratory.
  - First semester exam (20%).
  - Second semester exam (20%).
  - Home work and quizzes (10%).
  - Final exam (50%).

**C. Thinking Skills**

- C1. Description of diode I-V characteristics.
- C2. Description of rectifier and amplifier work.
- C3. Description of diode and transistor characteristics with different biasing methods.
- C4. Understanding the Transistor operation.
- C5. Describe the applications of modern electronic circuit and its importance in engineering topics.

**D. General and Transferable Skills (other skills relevant to employability and personal development)**

- D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

**11. Course Structure**

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
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<b>1-8</b>	4 hours per week (included lab time)	Knowledge and Understanding – Specific Skills – Thinking methods	- Introduction to Semiconductors – PN junction – Diode types	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
<b>9-15</b>	4 hours per week (included lab time)	Knowledge and Understanding – Specific Skills – Thinking methods	Transistor – Transistor types – Transistor characteristic – load line – Transistor biasing	=	=
<b>16-23</b>	4 hours per week (included lab time)	Knowledge and Understanding – Specific Skills – Thinking methods	-Transistor - h-parameters – Amplifiers – Amplifier applications – FET – JFET biasing	=	=
<b>24-30</b>	4 hours per week (included lab time)	Knowledge and Understanding – Specific Skills – Thinking methods	Digital Electronics	=	=

## 12. Infrastructure

### Required reading:

- CORE TEXTS
- COURSE MATERIALS
- OTHER

- Electronic Circuits - Theraja
- Electronic Circuits - Millman

Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the <a href="http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm">http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting experiments in the laboratory.
13. Admissions	
Pre-requisites	Pass from last stage (year ).
Minimum number of students	No limit.
Maximum number of students	No limit.

## **TEMPLATE FOR COURSE SPECIFICATION**

### **HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW**

#### **COURSE SPECIFICATION**

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering College
3. Course title/code	Geometrical Optics

4. Programme(s) to which it contributes	Laser & Optoelectronics Programme
5. Modes of Attendance offered	Full Time
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters / year
7. Number of hours tuition (total)	2Hours / Week 2*30=60Hours / year
8. Date of production/revision of this specification	8/9/2017
9. Aims of the Course	
1. The student should understand the theories of light and their applications in optical instruments.	
2. This course is intended for engineers, scientists, and managers who are developing, specifying, or purchasing optical, electro-optical, and infrared systems. An introduction to geometrical optics for first semester and physical optic for second semester.	
3. Identification of aberration occurring in optical systems.	
4. Understanding the mechanism of interferometry instruments by students.	

10. Learning Outcomes, Teaching ,Learning and Assessment Method
B- Knowledge and Understanding
A1. Reflection and Refraction equations of mirror and lens.
A2. Matrix methods in paraxial optics.
A3. Aberration.
A4. Superposition of waves.
A5. Interference.
B. Subject-specific skills
B1. The student has to recognize nature of theories of light.
B2. To be able to interpret reflection of spherical waves on different surfaces.
B3. To recognize operation of different kinds of lenses and their application
Teaching and Learning Methods
1. Lectures
2. Practical
3. Simulation programs and problem solving
Assessment methods

1. Student understand to the lectures evaluation semester activities including classroom interaction and Quizzes.
2. Practical skills by practical evaluation
3. The ability of student to acquire evaluation oral exam
4. Student achievement evaluation final exam

#### C. Thinking Skills

To be able to interpret reflection of light at plane surfaces from both points of view of corpuscular and wave theories.

#### Teaching and Learning Methods

##### 1. Lectures

#### D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. The student has to recognize nature of theories of light.

D2. To be able to interpret reflection of spherical waves on different surfaces.

D3. To recognize operation of different kinds of lenses and their application

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	5		<b>Wave Optics:</b> Wave nature of light <b>Geometrical Optics:</b> Basics of light and light propagation	Lectures, tutorials and practical	Examination, Reports, Quiz
3-4	5		<b>WO:</b> Wave nature of light <b>GPO:</b> Refraction at plane Surfaces, lens, mirrors and Prism	Lectures, tutorials and practical	Examination, Reports, Quiz
5-7	5		<b>WO:</b> Superposition of waves <b>GPO:</b> lens, mirrors and Prism Refraction at Spherical Surfaces	Lectures, tutorials and practical	Examination, Reports, Quiz
8-10	5		<b>WO:</b> Interference <b>GPO:</b> Refraction at Spherical Surfaces	Lectures, tutorials and practical	Examination, Reports, Quiz
11-13	5		<b>WO:</b> Interference <b>GPO:</b> Thin Lenses	Lectures, tutorials and practical	Examination, Reports, Quiz
14-16	5		Aberration	Lectures, tutorials and practical	Examination, Reports, Quiz
17-20	5		Superposition of waves.	Lectures, tutorials and practical	Examination, Reports, Quiz
21-24	5		Interference.	Lectures, tutorials and practical	Examination, Reports, Quiz
25-28	5		Interferometry instrument	Lectures, tutorials and practical	Examination, Reports, Quiz
29-30	5		Geometrical Practices	Lectures, tutorials and practical	Examination, Reports, Quiz

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Introduction to Optics, <i>Frank L. Pedrotti, and Leno S. Pedrotti, 2<sup>nd</sup> Ed., ISBN(0-13-501545-6)</i>
Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	
Minimum number of students	
Maximum number of students	

## COURSE REVIEW: Visual Basic Programming

### **COURSE SPECIFICATION**

This course acquaints students of 2<sup>nd</sup> Year with the design, development, testing and documentation of Visual BASIC programs. Visual BASIC's object oriented event driven (OOED) interface is used to program sequential, conditional, and repetition structures. Multiple objects and control arrays are used to gather input. Sequential data files are created and accessed in Visual BASIC programs.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering Dept.
3. Course title/code	Visual Basic Programming /LOPE2206
4. Programme(s) to which it contributes	General
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semesters / Year
7. Number of hours tuition (total)	1 Hour / Week (Theory) 2 Hours / Week (Practical) 1H X30W=30H/Year(Theory) +60H (practical)
8. Date of production/revision of this specification	6/7/2017
9. Aims of the Course	
The aims which can be achieved during teaching this course program are as follows:	
<ul style="list-style-type: none"> <li>1- Giving knowledge about the computer hardware &amp; software</li> <li>2- Understanding of programming in Visual Basic</li> </ul>	

10. Learning Outcomes, Teaching ,Learning and Assessment Method
<p>A- Knowledge and Understanding</p> <ul style="list-style-type: none"> <li>A1. Create a program using the VB development environment</li> <li>A2. Use sequential looping &amp; control logic in programs</li> <li>A3. Solving problems in different applications</li> </ul>
<p>B. Subject-specific skills</p> <ul style="list-style-type: none"> <li>B1. Literatures</li> <li>B2. Tutorials</li> <li>B3. Computer Laboratory.</li> </ul>
Teaching and Learning Methods
<ul style="list-style-type: none"> <li>1-Computer Laboratory.</li> <li>2- Power point literatures by Data show Reviews.</li> </ul>
Assessment methods

- 1- Examinations.
- 2- Quizzes.
- 3- Home works.

- C. Thinking Skills
  - C1. Reports.
  - C2. Home works .
  - C3. Research

#### Teaching and Learning Methods

- 1- Literatures.
- 2- Applications in computer laboratory .

#### Assessment methods

- 1-Test 1
  - 2- Test 2.
- 3- Quizzes and Assignments.
- 4- Laboratory.
- 1- Final Examination

- D. General and Transferable Skills (other skills relevant to employability and personal development)
  - D1. Solution of different examples .
  - D2. Training to write flow charts for different applications.
  - D3. Training to build a projects in real world for examples supermarket .
  - D4.



11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching	Assessment
12. Infrastructure					
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER			- Computer Science, Dr. Balagurusamy E, 2005 -Visual Basic 6 , Made Easy, D.Liew Voon Kiong, 2006 -Visual Basic , Dr. Abdul Mutalib, 2004		
9-12	=	=	<b>Components:</b> Menu Bar, Tool Bar, Project Explorer Window, Form Layout Window, properties Window, Toolbox	=	=
13-18	15	=	<b>Working with Forms: Properties, Events, Methods Working with Basic Controls:</b> Label, Command Button, Text Box, Option Button, Frame, Check Box, List Box, Combo Box, Image, Scroll, Picture, Timer, Drive List Box, Dir List Box, File List Box and Shape Controls.	=	=
19-25	18	=	<b>Basic Programming Fundamentals:</b> Variables, Data types, Constant, Conversion Function. Scope of Variable: Public, Private Static. Operators: Logical, Arithmetic, Concatenation, Comparison. Decision Structure: If.. Then, If..Then..Else, Select Case.. End Case. Loop Structure: Do..While, For.. Next,	=	=
26-30	12	=	<b>One &amp; Two Dimensional Array</b>	=	=

13. Admissions	
Pre-requisites	Pass from last stage (first year).
Minimum number of students	No limit.
Maximum number of students	No limit.

Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: **Electromagnetic Fields for second year**

#### COURSE SPECIFICATION

This Course Specification provides the main features of the Electromagnetic Fields for the students of 2<sup>nd</sup> year. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programme specification as Laser & Optoelectronics Engineering.

1. Teaching Institution	<b>University of Technology</b>
2. University Department/Centre	<b>Laser &amp; optoelectronics Engineering Dept.</b>
3. Course title/code	<b>Electromagnetic fields / LOPE 2207</b>
4. Programme(s) to which it contributes	<b>Laser &amp; Optoelectronics Engineering Programs</b>
5. Modes of Attendance offered	<b>Actual classroom learning- interactive Full Hours</b>
6. Semester/Year	<b>1<sup>st</sup> &amp; 2<sup>nd</sup> Semester / 2017</b>
7. Number of hours tuition (total)	<b>2 Hours / Week Total =60H</b>

8. Date of production/revision of this specification	8/05/2017
9. Aims of the Course	
The overall goals of the course are to develop student proficiency in:	
1. Gaining factual knowledge (terminology, classifications, and methods) in the area of Electromagnetic fields	
2. Learning fundamental principles, generalization or theories concerning the basic area of Electromagnetic fields.	
3. Learning to apply a background in physics and math and to improve engineering problem solving.	
4. Developing skill in communicating engineering solutions both orally and in writing	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methode

- A1. Enabling student to get the knowledge and understanding of the theoretical principles of Electromagnetic Fields.
- A2. Understanding of Ideological philosophy of Electromagnetic Fields and their applications.
- A3. Understanding the knowledge of Electromagnetic Fields for different methods of solution in their applications.
- A4. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory and application of Electromagnetic Fields

- B1. An ability to analyze the Electromagnetic Fields problems.
- B2. An ability to identify, formulates, and solves Electromagnetic Fields problems.
- B3. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

### Teaching and Learning Methods

- Include theoretical lectures and the Practical experiments.
- The implementation of reports by student and monitoring by supervisors

### Assessment methods

- General or Central Examinations in scientific Dept.
- Quizzes.
- Home works.
- Tutorials and discussions

### C. Thinking Skills

- C1. Reports.
- C2. Problem analysis depending on theoretical in formations.
- C3. Decisions making for solve problems.
- C4. Working together as groups.

### Teaching and Learning Methods

- Literatures.
- Using the blackboard as basic way for learning.
- Using AI Data- Show for presentation of material.

### Assessment methods

- First semester exam (15%).
- Second semester exam (15%).
- Home work and quizzes (10%).
- Final exam (60%).

## D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. The ability to throw and apply for different subjects .
- D 3 - To doing the work of different reports - summaries
- D2. Examinations.

## 11. Course Structure

Week	Hou rs	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
Week 1	2	Literature and Experimental	Vector notation Vector algebra Coordinate system	Lecture	Examinations ,Quizzes, and Reports Training.
Week 2	2	=	Differential value Vector field	=	=
Week 3	2	=	Transformation coulombs law	=	=
Week 4	2	=	Electric field Distributions	=	=
Week 5	2	=	Standard charge configuration	=	=
Week 6	2	=	Net charge in a region Electric flux	=	=
Week 7	2	=	Flux density gausss law	=	=
Week 8	2	=	Relation between flux and density electric flux	=	=
Week 9	2	=	divergence	=	=
Week 10	2	=	Divergence in Cartesian Coordinates	=	=
Week 11	2	=	Divergence of D	=	=
Week 12	2	=	The del operator	=	=
Week 13	2	=	The del operator	=	=
Week 14	2	=	The divergence theory	=	=
Week 15	2	=	The divergence theory	=	=
Week 16	2	=	Work done in moving point charge	=	=
Week 17	2	=	Electric potential	=	=
Week 18	2	=	Potential of a charge Distribution Gradient	=	=
Week19	2	=	Relationship between E and V	=	=
Week 20	2	=	Charge in motion Convection current density	=	=
Week 21	2	=	Conductivity Current I, resistance	=	=
Week 22	2	=	Polarization of p and relation permittivity	=	=
Week 23	2	=	Fixed-voltage D and E	=	=
Week 24	2	=	Boundary conductivity	=	=
Week 25	2	=	Conductor , dielectrics, Capacitance	=	=
Week 26	2	=	Poissons" equation and Laplace	=	=

Week 27	2	=	The steady magnetic field	=	=
Week28	2	=	The steady magnetic field	=	=
Week 29	2	=	Magnetic Forces, Material and Inductance	=	=
Week 30	2	=	Magnetic Forces, Material and Inductance	=	=

## 12. Infrastructure

Required reading: <ul style="list-style-type: none"> <li>· CORE TEXTS</li> <li>· COURSE MATERIALS</li> <li>· OTHER</li> </ul>	1- Electromagnetic Fields /Sixth Edition by William Hayt. 2-Elements of electromagnetic by SADIKU
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet Web sites
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from past year
Minimum number of students	No limits
Maximum number of students	No limits

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: MEASUREMENTS AND EQUIPMENTS

#### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Laser and Optoelectronics Engineering
2. University Department/Centre	Laser & Optoelectronics Engineering / University of Technology
3. Course title/code	Measurements LOPE2208
4. Programme(s) to which it contributes	General
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week (Theory) 2H X30W=60H/Year
8. Date of production/revision of this specification	24/6/2017
9. Aims of the Course	
- See reference systems that describe units of measurement.	
- Knowledge of various types of electrical units.	
- Know the different types of errors in the measurement process.	
- Make statistical analysis of the errors in the measurement process.	
- Knowledge of the elements of electronic measuring devices.	
- How to choose and care using measuring devices.	

- See reference systems that describe units of measurement.
- Knowledge of various types of electrical units.

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methode

### A- Knowledge and Understanding

- A1. Knowledge of the installation and operation of D'Arsonval measurable with moving coil.
- A2. Enable the student to the optimal use of mathematical equations to design a device to measure a moving coil and how to use it for measuring electrical quantities (voltage - current - resistance).
- A3. Enable the student to know the basic principles of bridges used in DC circuits in addition to the bridges used in AC circuits and their applications in measurement and control.
- A4. Enable the student to know and understand the basic principles of the work of electronic measuring devices.

### B. Subject-specific skills

- B1. Use mathematical equations to work statistical analysis of the mistakes that you get during the measurement.
- B2. Use mathematical equations to make the conceptual design of the devices to measure voltage and current.

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach the best solution through textbooks and lectures, in addition to the practical experiences laboratory.

### Assessment methods

- Classroom discussions and to identify the potential of the student to analyze issues.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Performance in the laboratory.

### C. Thinking Skills

- C1. Describe the elements of different measurement devices.
- C2. Description and study of the factors causing the occurrence of errors during the measurement process.
- C3. Description and study the types of bridges and its applications in DC and AC circuits.



## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	2Hrs/week	litruters	<ol style="list-style-type: none"> <li>1. Introduction.</li> <li>2. Classification of Measuring Instruments.</li> <li>3. Essential Requirements of an Instrument.</li> <li>4. Deflecting System.</li> <li>5. Controlling System.</li> <li>6. Damping System.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tutorials</li> <li>2. Power point literatures by Data show Reviews.</li> </ol>	<ul style="list-style-type: none"> <li>- Classroom discussions to identify the potential of the student to analyze issues.</li> <li>- Homework.</li> <li>- Sudden exams.</li> <li>- Quarterly examinations.</li> <li>- Performance in the laboratory.</li> </ul>
5-8	2Hrs/week	=	<ol style="list-style-type: none"> <li>1. Permanent Magnet Moving Coil Instruments (PMMC).</li> <li>2. Moving Iron Instruments.</li> </ol>	=	=
9-12	2Hrs/week	=	<ol style="list-style-type: none"> <li>1. Basic D.C. Ammeter.</li> <li>2. Multirange Ammeter.</li> <li>3. The Ayrton Shunt or Universal Shunt.</li> <li>4. Requirements of a Shunt.</li> <li>5. Basic D.C. Voltmeter.</li> </ol>	=	=
17-21	2Hrs/week	=	<ol style="list-style-type: none"> <li>1. Introduction to Resistance Measurements.</li> <li>2. Classification of Resistances.</li> <li>3. Voltmeter-Ammeter Method.</li> <li>4. Ohmmeter Method.</li> <li>5. Wheatstone Bridge Method.</li> <li>6. Sensitivity of Wheatstone Bridge.</li> </ol>	=	=
22-25	2Hrs/week	=	<ol style="list-style-type: none"> <li>1. Introduction to A.C. Bridge.</li> <li>2. Types of Bridges.</li> <li>3. A.C. Bridges.</li> <li>4. Maxwell's Bridge.</li> </ol>	=	=
26-30	2Hrs/week	=	<ol style="list-style-type: none"> <li>1. Hay's Bridge.</li> <li>2. Wien's Bridge.</li> <li>3. Heaviside Mutual Inductance Bridge.</li> <li>4. Measurement of Power.</li> </ol>	=	=

## 12. Infrastructure

### Required reading:

- CORE TEXTS
- COURSE MATERIALS
- OTHER

Uday A. Bakshi. "Electrical Measurements", first edition 2008.

Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from first year
Minimum number of students	No limit.
Maximum number of students	No limit.

### **COURSE SPECIFICATION:** Freedom and Democracy 2<sup>nd</sup> year

The course covers the concept of human rights and development, definition , classes , properties , and the most important human rights conventions and declarations and international conventions on human rights , and human rights in religions and the role of non-governmental organizations in this field and other human rights issues.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering department
3. Course title/code	Freedom and Democracy / LOPE2109
4. Programme(s) to which it contributes	General
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> &2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Thirty Hours 1H X 30Week =30h/year

8. Date of production/revision of this specification

4/7/2017

## 9. Aims of the Course

The aims which can be achieved during teaching this course program are as follows:

1. Working to promote, disseminate and consolidate the culture of human rights , freedom and democracy among university students.
2. Promising d conscious generation and cultured human rights issues , freedom and democracy and believes in political pluralism and the peaceful transfer of medium- and freedom of expression and respect for and acceptance of the other opinion and respect for minority rights and peaceful coexistence in society .
3. Ability to diagnose human rights violations or restrict public freedoms or overtaking on the Constitution and the ability to propose realistic solutions to the problems of the community to achieve a peaceful coexistence in society .
4. Inform students on the experiences of past and contemporary Nations in the field of human rights , freedom and democracy of worldviews , humane and scientific , religious and objectively away from the effects of political, intellectual and religious .
5. Seeking to bring about a change in the student's behavior in line with the overall objective by directing attention to the implications of the real human rights and the dimensions of the legal and the study of international declarations and covenants , and the impact of the violations egregious to those rules , which affect the lives of people or their dignity , especially that human rights are inclusive and all human societies .

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### A. Knowledge and Understanding

A 1 - to identify the concepts of human rights , freedom and democracy

A 2 - to know and understand the most important terms that relate to the subject of human rights , freedom and democracy.

A 3 - to know and understand the principles and theories on human rights , freedom and democracy.

A 4 - to know and understand the most important announcements and international charters and conventions on human rights , freedom and democracy.

A 5 - to identify the key role of human rights issues , freedom and democracy in the stability of human societies.

A 6 - to know and understand the importance of employing the concepts of human rights , freedom and democracy in public life , whether at home , school , university , work , street , factory .... etc. especially with the worldview of modern issues of human rights , freedom and democracy .

### B. Subject-specific skills

B 1 - the most important acquisition of the student terminology, principles and theories on human rights, freedom and democracy .

B-2 - the ability to debate and interpretation, analysis and comparison of the issues or the subjects on human rights, freedom and democracy, particularly in relation to the experiences

of nations in this field .

B-3 Ability to summarize the issues and do rewrite the subject matter of its student .

B- 4 The ability to search and collection, arrangement and classification of information when conducting research and writing scientific reports and do activities and exercises and participation of various activities.

### Teaching and Learning Methods

Method of lecture and discussion , preparation and effective participation of tribal, stirring diverse Questions for discussion, arrangement and discuss ideas, individual and collective debates between students, cooperative learning, how to do household duties Research - Abstracts - Posters, film screenings and educational presentations.

### Assessment methods

Exam calendar, exam daily, monthly exam, attendance and active participation of students, providing research - summaries - Mural - Posters.

### C. Thinking Skills

C 1 - Critical Thinking

C 2 - problem solving, brainstorming

C 3 - Case Study

C 4 - study skills

### Teaching and Learning Methods

Way discussion, provoke questions and diverse ideas, research work and scientific reports, dialogue and debate between individual and collective student, individual and collective training to students, film screenings and educational presentations.

### Assessment methods

Exam sudden, daily and monthly examinations, oral examinations variety of questions, participate effectively in the classroom, Individual activities for students .

### D. General and Transferable Skills (other skills relevant to employability and personal development)

D 1 - the student should be able to connect and communicate written and oral communication, research and information gathering .

D 2 - the ability to throw and apply for different subjects .

D 3 - to doing the work of different reports - summaries - Posters - Mural in a particular subject .

D 4 - leadership team collectively to various activities

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1	Lecture	concept of human rights and development of historic	Recognize the concept of human rights and development of historic	Exam and participation in the subject matter
2	1	Lecture	of the right to language and terminology and definition and characteristics of human right	Knowledge and understanding of the meaning of the right to language and terminology and definition and characteristics of human rights	Exam and participation in the subject matter
3	1	Lecture	type of human rights in the community	Knowledge and understanding of the importance of each type of human rights in the community	Exam and participation in the subject matter
4	1	Lecture	human rights in religions	Identify the implications of human rights in religions	Exam and participation in the subject matter
5	1	Lecture	human rights in religions	Identify the implications of human rights in religions	Exam and participation in the subject matter
6	1	Lecture	the regional human rights mechanisms and their application	Identify the terms of the agreements in the regional human rights mechanisms and their application	Exam and participation in the subject matter
7	1	Lecture	of human rights in international law and the extent to which	Identified on the basis of human rights in international law and the extent to which	Exam and participation in the subject matter
8	1	Lecture	human rights and public rights of persona	Comparison between human rights and public rights of persona	Exam and participation in the subject matter
9	1	Lecture	the stages of the international recognition of human rights	Identify the stages of the international recognition of human rights	Exam and participation in the subject matter
10	1	Lecture	non-governmental organizations and the defense of human rights	Identification of non-governmental organizations and the defense and diagnosis of human rights violations in the world and the mechanisms of action	Exam and participation in the subject matter
11	1	Lecture	non-governmental organizations and the defense of human rights	Identification of non-governmental organizations and the defense and diagnosis of human rights violations in the world and the mechanisms of action	Exam and participation in the subject matter
12	1	Lecture	content of the most important civil rights	Knowledge and understanding of the	Exam and participation in the subject matter

				content of the most important civil rights	
13	1	Lecture	content of the most important civil rights	Knowledge and understanding of the content of the most important civil rights	Exam and participation in the subject matter
14	1	Lecture	guarantees for the exercise of the rights and public freedoms in national legislation	Knowledge of the most important guarantees for the exercise of the rights and public freedoms in national legislation	Exam and participation in the subject matter
15	1	Lecture	the rights of the social strata, especially	Knowledge of the importance of the rights of the social strata, especially	Exam and participation in the subject matter

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1	Lecture	the term public freedoms	Knowledge and understanding of the term public freedoms	Exam and participation in the subject matter
2	1	Lecture	the historical development of the rights and freedoms	Knowledge and understanding of the historical development of the rights and freedoms	Exam and participation in the subject matter
3	1	Lecture	public freedoms kinds	Know the meaning of public freedoms kinds	Exam and participation in the subject matter
4	1	Lecture	democracy	Identify the meaning of democracy	Exam and participation in the subject matter
5	1	Lecture	types of democracy	Knowledge of the most important types of democracy and the comparison between the kinds of	Exam and participation in the subject matter
6	1	Lecture	advantages and characteristics and conditions of democracy	Identify the advantages and characteristics and conditions of democracy	Exam and participation in the subject matter
7	1	Lecture	of individual freedom and liberty coercive	Know the meaning of individual freedom and liberty coercive	Exam and participation in the subject matter
8	1	Lecture	the state and the rights of sovereignty, freedom	Knowledge about the state and the rights of sovereignty, freedom	Exam and participation in the subject matter
9	1	Lecture	reconcile the sovereignty and freedom	Knowledge of how to reconcile sovereignty and freedom	Exam and participation in the subject matter
10	1	Lecture	the historical dimension of democracy	Recognize the historical dimension of democracy	Exam and participation in the subject matter

11	1	Lecture	pressure groups	Identify the influence of pressure groups in society	Exam and participation in the subject matter
12	1	Lecture	pressure groups	Identify the influence of pressure groups in society	Exam and participation in the subject matter
13	1	Lecture	components of democracy	Identify the most important components of democracy	Exam and participation in the subject matter
14	1	Lecture	components of democracy	Identify the most important components of democracy	Exam and participation in the subject matter
15	1	Lecture	the minorities and their participation in democratic governance	Know the meaning of the minorities and their participation in democratic governance	Exam and participation in the subject matter

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Lectures relating to Article school
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from last stage (year ).
Minimum number of students	No limit.
Maximum number of students	No limit.

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering Dept.
3. Course title/code	Engineering Analysis /LOPE3201
4. Programme(s) to which it contributes	Laser & Optoelectronics Programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week 2H X30W=60H/Year
8. Date of production/revision of this specification	15/7/2017
9. Aims of the Course	
The aims which can be achieved during teaching this course program are :	
1- Giving knowledge about using the advance mathematical theories in their studies.	
2- Provides the advanced mathematical methods which can be used in laser and optoelectronics theory and applications.	
3- Provide students with experiences that will assist them in solving the scientific problems.	



10. Learning Outcomes, Teaching ,Learning and Assessment Methode

A- Knowledge and Understanding

A1. Enabling student to get the knowledge and understanding of the theoretical principles of mathematics.

A2. Proceeding the understanding to how solve the mathematical problems of the laser or optoelectronic concepts.

B. Subject-specific skills

B1.Literatures

B2. Tutorials

B3. Conversation

Teaching and Learning Methods

1- Tutorials

2- Literatures.

Assessment methods

1- Examinations.

2- Quizzes.

3- Home works.

C. Thinking Skills

C1. Ability of understanding mathematics concepts.

C2. Certain discussion and conversation.

C3. General information collection for different sources relating to the mathematical problems.

Teaching and Learning Methods

1- Literatures.

2- Tutorials.

Assessment methods

1- Test 1

2- Test 2.

3- Quizzes and Assignments.

4- Final Examination

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Different group conversations.

D2. New learning methods.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Literature	Fourier Analysis Fourier Series	Lecture	Examinations, Quizzes.
2	=	=	Fourier Analysis Odd and Even Functions	=	=
3	=	=	Fourier Analysis Half-Wave Fourier series.	=	=
4	=	=	Fourier Analysis Frequency spectra Transformations.	=	=
5	=	=	Applications	=	=
6	=	=	Laplace Transformation Partial Fractions	=	=
7	=	=	Laplace Transformation Transformations	=	=
8	=	=	Laplace Transformation Solving Differential Equations	=	=
9	=	=	Laplace Transformation Solving Differential Equations	=	=
10	=	=	Applications	=	=
11	=	=	Complex Variables Complex Numbers	=	=
12	=	=	Complex Variables Cauchy-Remann Equations	=	=
13	=	=	Complex Variables Complex Functions	=	=
14	=	=	Complex Variables Integrations	=	=
15	=	=	Applications	=	=
16	=	=	Power series Divergence and Convergence	=	=
17	=	=	Power Series Solving Differential Equations	=	=
18	=	=	Power Series Solving Differential Equations.	=	=
19	=	=	Power series Basic Functions.	=	=
20	=	=	Power Series Legendr'e Polynomials	=	=
21	=	=	Power Series Bessel's Function.	=	=
22	=	=	Applications	=	=
23	=	=	Matrix Theory Basic Properties.	=	=

24	=	=	Matrix Theory Matrix Inverse.	=	=
25	=	=	Matrix Theory Solving Linear Equations.	=	=
26	=	=	Matrix Theory Solving Linear Equations.	=	=
27	=	=	Matrix Theory Eigen Values And Vectors.	=	=
28	=	=	Applications.	=	=
29	=	=	Numerical Analysis The Roots of Equation.	=	=
30	=	=	Numerical Analysis Integration	=	=

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Literatures in geometrical analysis for engineering.
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from last stage.
Minimum number of students	No limit.
Maximum number of students	No limit.

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Eng. Dept.
3. Course title/code	Communications & Wave Propagation
4. Programme(s) to which it contributes	Laser & Optoelectronics Programs
5. Modes of Attendance offered	Full-Time Attendance
6. Semester/Year	2017-2015
7. Number of hours tuition (total)	4 hours – 2 per each branch
8. Date of production/revision of this specification	20-10-2017
9. Aims of the Course	
	To provide an introduction to, and understanding of, the fundamental principles of communication systems and radio wave propagation; to provide the theoretical analysis and analytical techniques to be used in future advanced modules.

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### B- Knowledge and Understanding

- A1. Enable students to be familiar with different types of signals and systems.
- A2. To make students more understandable with the concepts of Linear Modulation techniques.
- A3. Enable the students to be familiar with the mathematical representation for each modulation type and systems response in both Time and Frequency Domain by using Fourier analysis.
- A4. Sampling, Quantization and digital transmission of analog signals; for instance Pulse Code Modulation.
- A5. Studying, analyzing and understanding the term of noise in engineering sight of view and how does it affect the overall performance of the system.
- A6. Maxwell's equations and different radio wave propagation.

### B. Subject-specific skills

- B1. The benefit behind the modulation process and how to transform time-domain function to frequency domain using Fourier analysis.
- B2. Understanding the frequency translation and modulation theorem, in addition to Hilbert transfer function of some filter types.
- B3. How to calculate the overall system performance by the mean of SNR and Noise Figure.

### Teaching and Learning Methods

- 1- Weekly lectures, lecture notes and text book all as references.
- 2- Power point presentations and monthly tutorials.
- 3- Simulink modules and simulation codes by using MATLAB.

### Assessment methods

- 1- Direct and indirect question through lecture time.
- 2- Sudden Exams (Quiz).
- 3- Mid-year, second semester and final exam.

### C. Thinking Skills

- C1. How to use Fourier analysis properties to think about how time and frequency shifting are valuable in modulation process.
- C2. Student's ability to re-derive the noisy received waveform and process it using either low pass or band pass filters.
- C3. The importance of convolution and correlation theorem in signal-systems interaction.
- C4. Looking to electromagnetic waves from the side of differential equation.

### Teaching and Learning Methods

- 1- Weekly lectures, lecture notes
- 2- MatLab simulation tutorials and Solving questions.
- 3- Topics to be looked, analyzed and researched by students

### Assessment methods

- 1- Evaluating marks depending on in-lecture student performance and their response to different types of given assignments.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Searching on International Network (Internet).

D2. Other resources could also be valuable; such as papers and other text books.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1 <sup>st</sup>	2	Knowledge and Understanding	Introduction to Communication Systems	Weekly lectures, lecture notes and text book all as references	Mid-year, second semester and final exam
2 <sup>nd</sup> -3 <sup>rd</sup>	2	Knowledge and Understanding	Signals and Systems	Weekly lectures, lecture notes and text book all as references	Mid-year, second semester and final exam
4 <sup>th</sup> – 15 <sup>th</sup>	22	Knowledge, Understanding and Thinking	Continuous Wave Modulation, Digital Transmission of Analog signals and Digital Modulation	Weekly lectures, lecture notes, Power point presentations, monthly tutorials and Matlab	Mid-year, second semester and final exam, Sudden Exams, in-Lecture Questions
15 <sup>th</sup> – 27 <sup>th</sup>	24	Understanding and Thinking	Maxwell's Equations and Radio Wave Propagation	Weekly lectures, lecture notes	Mid-year, second semester and final exam, Sudden Exams, in-Lecture Questions
27 <sup>th</sup> – 30 <sup>th</sup>	6	Understanding and Thinking <sup>2</sup>	Transmission Lines and Waveguides	Weekly lectures, lecture notes	Mid-year, second semester and final exam, Sudden Exams, in-Lecture Questions

## 12. Infrastructure

Required reading:

- CORE TEXTS
- COURSE MATERIALS
- OTHER

- 1- Communication Systems, Simon Haykin, 4th Edition.
- 2- Lecture Notes or any others.

Special requirements (include for example workshops, periodicals, IT software, websites)	<ul style="list-style-type: none"> <li>1- Passing from 2<sup>nd</sup> year.</li> <li>2- Very good understanding of different mathematical subjects.</li> </ul>
Community-based facilities (include for example, guest Lectures , internship , field studies)	None

13. Admissions	
Pre-requisites	Passing from 2 <sup>nd</sup> year
Minimum number of students	15
Maximum number of students	35

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser & optoelectronics Engineering Department
3. Course title/code	Computer applications
4. Programme(s) to which it contributes	Laser and Optoelectronics Engineering Programme
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Theoretical : 1hrs/w Practical : 2 hr/w 3H X30W=90H/Year
8. Date of production/revision of this specification	15 / 9 / 2017
9. Aims of the Course	The aims which can be achieved during teaching this course program are as follows: 1-Illustration and discussion the fundamental of MATLAB. 2- programming & drawing mathematical equations. 3- programming conditional statements. 4-programming loops. 5-Fourier and Laplace transformation.



## 6-modelling using a simulink.

### 10. Learning Outcomes, Teaching ,Learning and Assessment Method

#### A- Knowledge and Understanding

- A1.Enabling student to get the knowledge and understanding the fundamental of MATLAB programming for different equation.
- A2. Enabling student to draw different equation by matlab programming.
- A3. Enabling student to get the knowledge and understanding the Simulink blockes.

#### B. Subject-specific skills

- B1. Literatures
- B2. Tutorials
- B3. Laboratory and performing some programmes

#### **Teaching and Learning Methods**

- 1-Practical experiments.
- 2- Simulation and Innovation.
- 3- pdf literatures by Data show Reviews.

#### **Assessment methods**

- 1-Examinations.
- 2-Quizzes.
- 3- Home works.
- 4- Tutorials and discussions.

#### C. Thinking Skills

- C1. Reports.
- C2. Certain MATLAB problem analysis.
- C3. information collection for MATLAB functions.
- C4. Research and collection data.

#### **Teaching and Learning Methods**

- 1. Lectures.
- 2- Tutorials.
- 3. Experiments.

#### Assessment methods

- 1-Test 1
- 2-Test 2.
- 3-Quizzes and Assignments.
- 4- Laboratory.
- 5-Final Examination

#### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D1. Solution of different MATLAB programs.
- D2.Analysis of programming & drawing mathematical equations

D3. fourier and laplace transformation..  
 D4. Simulation modelling a simulink .

### 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	1+2	Practice	MATLAB Desk top	Lecture & Practice	Examinations and practice
2	=	=	MATLAB functions	=	=
3-5	=	=	Plotting	=	=
6-8	=	=	3D-plotting	=	=
8-11	=	=	Plotting multiple graphs	=	=
12-15	=	=	Conditional statement	=	=
16-18	=	=	loops	=	=
17-20	=	=	Integration & differentiations	=	=
21-23	=	=	Fourier & Laplace transformation	=	=
24-28	=	=	simulink	=	=
29-30	=	=	exam	=	=

### 12. Infrastructure

Required reading:  
 · CORE TEXTS  
 · COURSE MATERIALS  
 · OTHER

### 13. Admissions

Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

## FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering Dept./ Optoelectronic Engineering
3. Course title/code	Quantum Mechanics LE3304
4. Programme(s) to which it contributes	Laser Engineering
5. Modes of Attendance offered	2 Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week 2H X 30W = 60H/Year
8. Date of production/revision of this specification	15/7/2017
9. Aims of the Course	
1. The course provides an introduction to quantum methods including solving Schrodinger equation for many cases.	
2. The course also attempts to describe the behavior of matter and energy at the sub atomic scale.	
3. Giving an idea to compare between classical mechanics and quantum one.	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### A. Knowledge and Understanding

A1. Enabling students to get the knowledge and understanding of the theoretical principles of quantum mechanics.

A2. Quantum mechanics has explained the structure of the atom and the structure of the nucleus.

A3. Describe that among the most important things which quantum mechanics can describe while classical physics cannot are (Discreteness of energy, The wave-particle duality of light and matter, Quantum tunneling, The Heisenberg uncertainty principle, Spin of a particle)

A4. Explain the photoelectric , Compton scattering and black body radiation

A5. Explain how to solve Schrödinger equation for many cases.

### B. Subject-specific skills

B1.Literatures

B2. Tutorials

B3. Conversation

### Teaching and Learning Methods

2- Tutorials

2- Literatures.

3- Computer simulation.

### Assessment methods

4- Examinations.

5- Quizzes.

6- Home works.

### C. Thinking Skills

C1. Ability of understanding quantum concepts.

C2. Certain discussion and conversation.

C3. General information collection for different sources relating to the quantum mechanics.

### Teaching and Learning Methods

2- Literatures.

2- Tutorials.

### Assessment methods

### D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Different group conversations.

D2. New learning methods.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1	2	Literature	Photons, The photoelectric effect Compton Scattering	Lecture	Examinations, Quizzes.
2	=	=	Energy quantization in atoms, The De Broglie hypothesis	=	=
3	=	=	Electron interference and diffraction.	=	=
4	=	=	State functions, Operators	=	=
5	=	=	Commutation relations, Uncertainty principle	=	=
6	=	=	Eigen values and Eigen function	=	=
7	=	=	Applications	=	=
8	=	=	Schrodinger equation for free particles	=	=
9	=	=	Schrodinger equation for a particle in a field	=	=
10	=	=	Particle in one dimension box	=	=
11	=	=	Applications	=	=
12	=	=	Particle in infinite well	=	=
13	=	=	Particle in finite well	=	=
14	=	=	Tunneling effect	=	=
15	=	=	Applications	=	=
16	=	=	The harmonic Oscillator	=	=
17	=	=	Heisenberg's equation of motion	=	=
18	=	=	The harmonic oscillator based on Heisenberg's formalism.	=	=
19	=	=	Applications	=	=
20	=	=	Quantization of free electromagnetic wave	=	=
21	=	=	Black body radiation	=	=
22	=	=	Quantum theory of coherent optical states	=	=
23	=	=	Applications	=	=
24	=	=	The Hamiltonian of the hydrogen atom	=	=
25	=	=	Angular momentum of the hydrogen atom	=	=
26	=	=	Structure of the hydrogen atom	=	=
27	=	=	Applications	=	=
28	=	=	Electron spin	=	=
29	=	=	Energy states of the hydrogen atom	=	=
30	=	=	Applications	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Literatures in Quantum Mechanics.
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from last stage.
Minimum number of students	No limit.
Maximum number of students	No limit.

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of technology
2. University Department/Centre	Laser & optoelectronics engineering department
3. Course title/code	Semiconductor Devices/LE3206
4. Programme(s) to which it contributes	Laser & optoelectronics programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week 2H X30W=60H/Year
8. Date of production/revision of this specification	
9. Aims of the Course	
1. Prepare engineers with high efficiency specialists in the field of Laser Engineering and able to develop their skills in the fields of engineering knowledge and well versed in the field of use of different applications specialized in the design and use of services related to jurisdiction	
2. Engineers create a joint organized labor, and enhance communication with institutions and universities scientific and engineering in the responsibility of local and international professional and ethical	

3. The development of the spirit of leadership among students and prepare them for their roles after graduation

4. Supplement the state institutions and private technology specialists, experts, consultants, scientists, and support scientific research centers and engineering projects distinguished scientific cadres

5. Work on developing and improving the efficiency of scientific and administrative faculty members and enable them to use the latest scientific methods, as well as the optimal use of the possibilities of section to keep up with scientific developments and qualitative cooperation with international universities and guidance to serve the community and state institutions

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### A. Knowledge and Understanding

A1.The ability to apply knowledge in the fields of mathematics, science, engineering specialized in engineering applications of laser

A2.Collection of science in various disciplines necessary for Laser Engineering

A3Prepare students for continued learning and self-collection techniques and new skills in the field of engineering.

A4.Building skills by following the correct procedures

### B. Subject-specific skills

B1.Literatures

B2. Tutorials

### Teaching and Learning Methods

#### Assessment methods

1- Examinations.

2- Quizzes.

3- Home works.

4- Final Examination

### Teaching and Learning Methods

1- Literatures.

2- Tutorials.

#### Assessment methods



**D. General and Transferable Skills (other skills relevant to employability and personal development)**

D1. Ability to work with others within the discipline of work per team, teamwork.

D2. Full realization of the moral and practical responsibility for the work that will exercise the student after graduation, the ethics of the profession

D3. The ability to display and discuss ideas and defend them verbally and in writing and electronically

D4. The ability to understanding and understanding of the English language and the technical level within the area of jurisdiction

**11. Course Structure**

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	2	Literature	Energy bands in typical semiconductor	Lecture & p.p Show.	Examinations ,Quizzes,.
3-7	=	=	Band structure of semiconductor	=	=
8-12	=	=	Elementary transport in semiconductors	=	=
13-20	=	=	Contact phenomena	=	=
21-24	=	=	Semiconductor diode	=	=
25-27	=	=	Zener diode	=	=
28-30	=	=	Transistor	=	=

**12. Infrastructure**

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites
Community-based facilities (include for example, guest Lectures , internship , field studies)	

**13. Admissions**

Pre-requisites	Pass from last stage (secondary school).
Minimum number of students	No limit.
Maximum number of students	No limit.

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

#### COURSES SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification..

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics engineering dep.
3. Course Title	Gas Discharge
4. Programme(s) to which it contribute	Laser and optoelectronics engineering Programs
5. Modes of Attendance offered	Full time
6. Semester/ Year	First semester/Year
7. Number of Hours tuition(total)	2/ week( theory) 2H*15w= 30H/semester
8. Date of production/revision of this specification	16-6-2017
<b>9. Aims of the Course</b>	
1-Define the advance phenomena in Electric Discharge for three stage from department laser branch represent the laser engineering like fundamental processes ,collision types, mobility and diffusion process, these parameters effected for the efficiency part.	
2- Explain the D.C ,Arc glow and A.C discharge.	
3-prepare the student theoretically and exterminatory in the special fields in all private and former.	
4-applied the fundamental principle of breakdown and the self –sustaining discharge	
5-Define the Electrode Effect.	

## 10. Learning Outcomes, Teaching, Learning and Assessment Methods

### A. Knowledge and Understanding

A1.knowledge the Fundamental processes like the kinetic theory of sample gas and the atomic,molecular structure.

A2.Helps the student for using the mathematical equations to calculate cross section of a gas partical.

A3.Help the students to understand how the absorption and emission of radaition.

A4.Help the student to knowledge and understand the fundamental principle of Mobillity , diffusion types and the electrode types effects.

A5.Help the student to knowledge and understanding the theoretical principle for the breakdown like townsend discharge.

A6. Help the student to knowledge and understands the self-sustaining discharge like the D,C low pressure glow high pressure glow, Arc glow and A.C discharge

### B. Subject-specific skills

B1.Find the answers of mean free path of electron and particles,mean kinetic energy problems

B2.Callulate the thermonic emission current, saturation current density and the threshold frequency .

B3.Explain the phenomena of Townsend discharge,Diffusoin process and Einstein with mathematical equation.

B4.Using the mathematical equation to explain the principle of ambipolar difusion in gas discharge.

### Assessment methods(References)

1-classroom discussions and to identify the potential of the student to analyze problems.

2- Homework.

3- sudden examination.

4- Quarterly examination.

5- Projects and seminars.

6-Introduction to Gas Dicharges by A.M.Howastson

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	2 hour (weekly) 2 hours theoretical	Define the advance phenomena in Electric Discharge knowledge .the Fundamental processes like the kinetic theory of sample gas and the atomic,molecular structure.	Basic parameters of electric Discharge	Motivate students to develop its capabilities in data analysis.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars.
4-7	2 hour (weekly) 2 hours theoretical	knowledge and understand the fundamental principle of collision type and the absorption ,emission of radiation and the Mobillity , diffusion types and the Electrode types effects.	The Mobillity Electrode types and	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. .
8-11	2 hour (weekly) 2 hours theoretical	knowledge and explain the theoretical principle for the breakdown like Townsend discharge. and the self-sustaining discharge	the breakdown	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars.
12-15	2 hour (weekly) 2 hours theoretical	Calcullate the thermonic emission current, saturation current density and the threshold frequency Explain the phenomena of Diffusoin process and Einstein with mathematical equation to explain the principle of ambipolar difusion in gas discharge.	Diffusoin process	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. .

PROGRAMME REVIEW    Theory of Control for 3<sup>rd</sup> year **of laser Eng.**

## COURSE SPECIFICATION

This Course Specification provides the main features of the Theory of control for the students of 3<sup>rd</sup> year in laser Engineering. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the program specification as laser Engineering.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics Engineering Dept.
3. Course title/code	Control Eng./LE3307
4. Program (s) to which it contributes	Laser Engineering Program.
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week
8. Date of production/revision of this specification	6/7/2017
9. Aims of the Course	
The aims which can be achieved during teaching this course are as follows:	
1- Illustration and discussion the Main Theoretical Principles of control systems	
2- Understanding of using different control systems.	
3- Giving Knowledge about the Systems, Instruments, and Apparatus used in different types of control systems.	

## 10. Learning Outcomes, Teaching ,Learning and Assessment Method

### **A-Knowledge and Understanding**

A1-Enabling student to get the knowledge and understanding of the theoretical principles of control for different engineering systems.

A2-Preceding the understanding the Ideological philosophy of open loop and closed loop systems and their applications.

A3-Proceeding knowledge and understanding of the applications, and using Matlab.

### **B. Subject-specific skills**

B1--Literatures

B2-Tutorials

### **Teaching and Learning Methods**

-lectures

-Solving Problems

-Homeworks

### **Assessment methods**

-Examinations

-Quizzes

-Home works

-Tutorials and discussions

### **C. Thinking Skills**

C1-Reports

C2.Technical information collection for system performance.

C3.Research and collection data

### **Teaching and Learning Methods**

-Literatures

-Tutorials

### **Assessment methods**

-Test 1

-Test 2

-Quizzes and Assignments

-Final Examination

### **D. General and Transferable Skills (other skills relevant to employability and personal development)**

D1.Solution of different control systems.

D2.Simulation of different control systems.

D3.Training on some software package programs related to the program (Matlab).

## 11. Course Structure

<i>Week</i>	<i>Hours</i>	<i>ILOs</i>	<i>Unit/Module or Topic Title</i>	<i>Teaching Method</i>	<i>Assessment Method</i>
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1-2	4	<i>Theoretical I</i>	<i>Introduction</i>	<i>Lectures</i>	<i>Examinations, Quizzes, and Reports.</i>
3-4	=	=	<i>Mathematical Background</i>	=	=
5-6	=	=	<i>Block Diagram</i>	=	=
7-8	=	=	<i>Reduction Rules</i>	=	=
9-10	=	=	<i>Transfer Function of Physical Systems</i>	=	=
11-12	=	=	<i>Root Locus Techniques and Routh Criteria</i>	=	=
13-14	=	=	<i>Time Domain Analysis</i>	=	=
15	=	=	<i>Nyquist Plot</i>	=	=

## 12. Infrastructure

Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	Literatures in different kinds of: Automatic Control systems
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet websites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

## 13. Admissions

Pre-requisites	Pass from last stage (year).
Minimum number of students	No limit.
Maximum number of students	No limit.

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser & Optoelectronics Engineering Dept.
3. Course title/code	Spectroscopy / LE
4. Programme(s) to which it contributes	Laser Engineering program
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester
7. Number of hours tuition (total)	Two Hours Weekly x 30W=60H/Year
8. Date of production/revision of this specification	July 12/2017
<b>9. Aims of the Course</b>	
<ul style="list-style-type: none"><li>- Give an introduction to spectroscopy</li><li>- Explain some spectroscopic systems and devices</li><li>- Explain types of spectra</li><li>- Define some spectroscopic parameters</li><li>- Discuss interaction between light and matter</li></ul>	



- Differences between line and continuous spectra
- How to calculate energy values.
- Explain theoretical basics of evaluation of energy levels.
- Discuss different models to evaluate energy level values.
- Explain differences between classical and quantum models.
- Explain molecular aspects for spectroscopy.
- Discuss the diatomic molecular approximations.
- Explain different types of electronic, vibrational and rotational energy level calculations.
- Explain types of dispersion devices like prism, diffraction grating and interferometers.

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods.

### A- Knowledge and understanding

- A1. Knowledge of types of spectroscopic devices
- A2. Enable the student to know the types of spectroscopic processes like absorption and emission
- A3. Enable the student to understand how to calculate the energy level values.
- A4. Enable the student to know how to change energy values with various systems.
- A5. Knowledge of differences between classical and quantum mechanical treatments of energy values.
- A6. Enable the student to know the differences between atomic and molecular systems.
- A7. Enable the student to know some spectroscopic resolving devices and how to deal with them.

### B. Subject-specific skills

- B1. Use different equations to convert energy values.
- B2. Use quantum mechanics to deal with energy level values.
- B3. Use different approximation methods to deal with molecular electronic, vibrational and rotational energy values

### **Teaching and Learning Methods**

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbook and lectures.

### **Assessment methods**

- Classroom discussions and to identify the potential of the student to analyze issues.
- Homework.

- Quizzes.
- Monthly examinations.

### C. Thinking Skills

- C1. Describe the methods to join spectroscopic aspects and laser generation.
- C2. Description of the spectroscopic complete system.
- C3. Describe the molecular system as a group of atomic bonding.
- C4. Description of the resolving power of the dispersion systems

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-3	2 hrs /week	Introduction to spectroscopy, line spectra , emission and absorption	Classical spectroscopy	Motivate students to develop their capabilities in the analysis of questions, diagnose the problem and describe the solution.	Discussions. Homework. Quizzes Monthly examinations. Projects and seminars.
4-6	=	Energy levels, line and continuous spectra, atomic spectra,	Atomic spectra	=	=
7-9	=	Structure of matter, Bohr model, Hydrogen atom energy levels, application to other atoms, Q.M treatment	Bohr Model, and Quantum mechanics principles	=	=
10-13	=	Wave function and Schrodinger equation, Exclusion principle and periodic table, electronic structure, quantum numbers	Quantum mechanical treatment and quantum numbers	=	=
14-17	=	Central field model, electrostatic interaction, magnetic interaction, Zeeman effect and stark effect	Central field model and atom-electromagnetic interactions	=	=

18-21	=	Principles of molecular spectroscopy, interatomic potential, Born – Oppenheimer approximation, electronic energy of diatomic molecule	Molecular spectroscopy	=	=
22-25	=	Vibrational energy of a diatomic molecule, Rotational energy of diatomic molecule	Vibrational and Rotational energy	=	=
26-27	=	Ful morse potential, Corrections to simple rigid rotor	Continue to rotational spectra	=	=
27-30	=	Spectroscopic devices and interferometers, dispersion, resolving power, units of resolving power	Spectroscopic devices	=	=

12. Infrastructure	
Required reading: <ul style="list-style-type: none"> <li>· CORE TEXTS</li> <li>· COURSE MATERIALS</li> <li>· OTHER</li> </ul>	Spectrophysics , By: Anne Thorne Molecular spectroscopy, By: Banwell
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the departmental web site: <a href="http://www.uotechnology.edu.iq/dep_laser_and_optoelectronics/index.htm">http://www.uotechnology.edu.iq/dep_laser_and_optoelectronics/index.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	Conducting seminars.

13. Admissions	
Pre-requisites	Passing second year laser engineering
Minimum number of students	Not specified
Max. number of students	Not specified

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Dep. of laser and optoelectronic Eng.
3. Course title/code	laser physics
4. Programme(s) to which it contributes	B.Sc., In laser Eng.
5. Modes of Attendance offered	Full Time
6. Semester/Year	third year
7. Number of hours tuition (total)	2
8. Date of production/revision of this specification	16-6-2017
9. Aims of the Course	
Definition of the concepts of laser physics for students of different third stage of Laser Engineering Branch and the theoretical basis for the work of lasers	

- Prepare students both theoretical and practical work in the field of competence of the planned public and private sector companies
- Consolidation of the basic principles of laser physics studied by the student in the second year

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

- A 1 - to identify the concepts of gain profile made in the laser device and the basic conditions
- A 2 - to enable students to use mathematical equations to find various parameters of laser physics
- A 3 - to enable the student to understand the guideline principles theory and practical applications

### B. Subject-specific skills

- B1 - to explain physics concepts for gain and amplification in different lasers
- B 2 - to explain concepts of generation short pulses of laser devices
- 3 - use mathematical equations to calculate different physical parameters of laser systems

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge and the order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the theory of laser physics

### Assessment methods

- Classroom discussions and to identify the potential of the student to analyze problems.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Projects and seminars.
- The student's performance in the laboratory.

### C. Thinking Skills

- C 1 - Description of the origin of the physical processes in laser systems
- C 2 - describe the process of investing in the installation of these operations different lasers
- C 3 - Description and principles of operation of the pulsed laser systems

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	2 hours per week	Know the gain line shape and its causes and find out broadening taking place and its causes	Gain line shape and broadening processes	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
5-8	2 hours per week	Knowing calculate the profit and amplification in the center of the laser	Gain calculations with and without laser	=	=
9-10	2 hours per week	Recognize the effect of the cross-section of the emission of the catalyst on the ability of the laser	Stimulated emission cross-section and laser intensity	=	=
11-12	2 hours per week	Description working principle of lasers and their work, installation and wavelengths	Special distribution of the emitted beam	=	=
13-15	2 hours per week	Account breakthrough laser beam focus	Laser beam divergence	=	=
16-21	2 hours per week	Use mathematical equations to calculate the properties and methods of pulsed radiation generated	Short pulses generation techniques	=	=
22-30	2 hours per week	Knowing when a laser beam spread in space and control characteristics	Propagation of Gaussian beam and controlling beam characteristics	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	J.wilson and J.F.B.hawkes, lasers principle and applications. Mark csele ,fundamental of light sources and lasers
Special requirements (include for example workshops, periodicals, IT software, websites)	<a href="http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm">http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting seminars. - Visits to work sites.

13. Admissions	
Pre-requisites	Pass the 2 <sup>nd</sup> year exam. In addition, students have the capacity to communicate in English to read and write
Minimum number of students	No identification.
Maximum number of students	No identification.



# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Dep. of Laser and Optoelectronics Eng.
3. Course title/code	Optical Communications / LOPE 4201
4. Programme(s) to which it contributes	Laser and Optoelectronics programs
5. Modes of Attendance offered	Full Time
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters/ year
7. Number of hours tuition (total)	4 hours/week – included practical hours 2*30=60hours/year (theoretical) 2*30=60hours/year (practical)
8. Date of production/revision of this specification	19/05/2017
9. Aims of the Course	
	<ul style="list-style-type: none"><li>- Introduction of advanced concepts in optical communications for students of the Fourth year in both branches, like theory of light propagation within optical waveguide, optical fiber types and etc.</li><li>- Theoretical and experimental preparation of students to work in the field of optical fiber communications.</li><li>- Applying physical fundamentals of light wave propagation inside optical guide.</li></ul>

- Definition of the theory of operation of optoelectronics devices and their applications in engineering problems.

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

- A1. Know the classification of different types of optical fibers e.g. MMF and SMF, and applications.
- A2. Enable the student to use mathematical equations for the light motion inside the physical media and describe the appropriate boundary conditions to find solutions to physical phenomena whose are playing a drawback point for fibers.
- A3. Enable the student to learn and understand the basic characteristics of light sources and detectors and explain their structures, advantages and drawbacks.
- A4. Enable the student to learn and understand the theoretical principles of signal distortion.
- A5. Enable the student to learn and understand the practical applications of currently used in communication industries and how to build a proper system with good quality of operation.

### B. Subject-specific skills

- B1. Find solutions to the problems of signal attenuation, signal dispersion in the optical fiber.
- B2. Calculation of power loss as light travels along distances.
- B3. Explain the concept of light modulation and the effect of low power received by optical detector on the overall system performance.
- B4. Selection and use of mathematical function to calculate the signal to noise ratio at receiver.

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to

reach a solution. Through textbooks and lectures, in addition to the (optical fiber communications) Laboratory experiments.

### Assessment methods

- Classroom discussions and to identify the potential of the student to analyze problems.
- Homework.
- Sudden exams.
- Quarterly examinations.

- Projects and seminars.
- The student's performance in the laboratory.

### C. Thinking Skills

C1. Description of optical fiber fabrication.

C2. Description of types and origins optical light sources.

C3. Description of intersymbol interference and Bit Error Rate.

C4. Understanding the theory of optical detectors operation.

C5. Describe the importance of optical loss that come from fiber cable mismatching.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	8 hours per week (included lab time)	Knowledge and Understanding	Optical Fiber: Construction and light wave propagation.	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
5-9	8 hours per week (included lab time)	Knowledge and Understanding	Signal attenuation in optical fiber	=	=
10 - 13	8 hours per week (included lab time)	Knowledge and Understanding, subject specific skills	Optical Sources	=	=
14-17	8 hours per week (included lab time)	Knowledge and Understanding, subject specific skills	Power launching and coupling	=	=
18-21	8 hours per week (included lab time)	Knowledge and Understanding, subject specific skills	Optical Detectors	=	=
22-25	8 hours per week (included lab time)	Knowledge and Understanding, subject specific skills	Optical receivers	=	=

	lab time)				
26-30	8 hours per week (included lab time)	Knowledge and Understanding, subject specific skills	Link Budget Analysis	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	- Gred Kesier, <i>Optical Fiber Communications</i> , 3ed Edition. McGraw-Hill, 2012.
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the <a href="http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm">http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting experiments in the laboratory. - Conducting seminars. - Visits to work sites.

13. Admissions	
Pre-requisites	Pass the 3d year exam. In addition, students have the capacity to communicate in English to read and write
Minimum number of students	No identification.
Maximum number of students	No identification.

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Dep. of Laser and Optoelectronics Eng.
3. Course title/code	Microprocessor \ LOPE 4202
4. Programme(s) to which it contributes	B.Sc., In Laser and Optoelectronics
5. Modes of Attendance offered	Full Time
6. Semester/Year	Fourth year
7. Number of hours tuition (total)	8 hours – included practical hours
8. Date of production/revision of this specification	19/05/2017
9. Aims of the Course	
	- Introduction of advanced concepts in microprocessor for students of the Fourth year in both branches.
	- Definition of the theory of operation of microprocessor and their applications in engineering field.

## 10· Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

- A1. Know the classification of numbers used in digital electronics and logical operations.
- A2. Enable the student to understand digital logic and logic gates fundamentals and how to build logical circuits for different use and applications e.g adder and subtractor.
- A3. Enable the student to learn and understand the 8085 microprocessor operation and its components, and the function of each one.
- A4. Enable the student to learn and understand the microprocessor programing language (assembly language of 8085).
- A5. Enable the student to learn and understand the practical applications of microprocessor.

### B. Subject-specific skills

- B1. Build of multi stage complex logical circuit to perform different applications.
- B2. To make a student familiar with how to simplify complex logical equations using different methods such as Karnouph Map.
- B3. Explain the concept of how microprocessor communicate with input and output devices and other peripherals.

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the (Microprocessor) Laboratory experiments.

### Assessment methods

- Classroom discussions and to identify the potential of the student to analyze problems.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Projects and seminars.
- The student's performance in the laboratory.

### C. Thinking Skills

- C1. Writing programs using 8085 Assembly Language.
- C2. How to convert between different numerical methods.
- C3. Data Analysis using Karnouh map and other methods of simplifications.
- C4. Understanding the function of Microprocessor data and address buses.

D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Numerical Systems.	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
3-4	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Logic Algebra and Logic Gates.	=	=
5 - 8	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Logic Simplification methods and Logic Gates.	=	=
9-10	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Adder, Subtractor, Comparator, Decoder and Encoder	=	=
11-15	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Flip-Flops, Counter, ADC and DAC	=	=
16-30	8 hours per week (included lab time)	Knowledge and Understanding, Specific Skills and Thinking Skills	Microprocessor 8085	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	-Morris M. Mano, Digital Design, 3ed Edition, Prentice Hall. -Thomas L. Floyd, Digital Fundamentals, 9 <sup>th</sup> Edition, Prentice Hall. -R. Gaonkar, Microprocessor Architecture, Programming and Applications with 8085.
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the <a href="http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm">http://www.uotechnology.edu.iq/dep-laserandoptoelec-eng/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting experiments in the laboratory.

13. Admissions	
Pre-requisites	Pass the 3d year exam. In addition, students have the capacity to communicate in English to read and write
Minimum number of students	No identification.
Maximum number of students	No identification.



# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Dep. of laser and optoelectronic Eng.
3. Course title/code	Laser systems
4. Programme(s) to which it contributes	B.Sc., In laser Eng.
5. Modes of Attendance offered	Full Time
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> semesters / year
7. Number of hours tuition (total)	4
8. Date of production/revision of this specification	16-6-2017
9. Aims of the Course	
	<ul style="list-style-type: none"><li>- Definition of the concepts of engineering systems for different laser Students Stage IV Laser Engineering Branch and the foundations of the work of various lasers and gas lasers and solid state</li><li>- Prepare students both theoretical and practical work in the field of competence of the planned public sector companies and private</li><li>- - The application of the basic principles of laser physics and semiconductor lasers in the work of various installed</li></ul>

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methods

### A- Knowledge and Understanding

- A 1 - Know the classification of laser systems and different types and their use

A 2 - to enable students to use mathematical equations to find the parameters for the different laser systems.

A3 - to enable the student to understand and knowledge the guideline principles theory and practical applications

### B. Subject-specific skills

B1 - explain the concept of the transfer laser different according to the different circles of effective.

B2 - to find solutions to issues related to the various engineering lasers

B3 - use mathematical equations to calculate the capacity of the pumping action required for different laser devices, as well as the expense of emerging capabilities

B4 - devise appropriate technologies to work lasers at wavelengths of certain

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge and the order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach a solution. Through textbooks and lectures, in addition to the theory, the practical experiences of laboratory laser systems

### Assessment methods

- Classroom discussions and to identify the potential of the student to analyze problems.

- Homework.

- Sudden exams.

- Quarterly examinations.

- Projects and seminars.

- The student's performance in the laboratory.

### D. General and Transferable Skills (other skills relevant to employability and personal development)

D1. Employing all due respect to the course such as software, tables and diagrams to solve engineering problems.

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-2	4 hours per week	Know the classification of the energy levels of different laser media and pumping sources and various parameters of lasers and methods of classification	Operation of practical lasers	Motivate students to develop its capabilities in the analysis of data question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
6-10	4 hours per week	Learn how to design and characteristics of gas lasers	Gas laser	=	=
11	4 hours per week	Describes the working principle and operation of lasers	Atomic, ionic and molecular gas laser	=	=
12-16	4 hours per week	Description working principle of lasers and their work, installation and wavelengths	Liquid dye lasers	=	=
17-21	4 hours per week	Description working principle of lasers and their work, installation and wavelengths and display equations needed to solve problems	Solid state laser	=	=
22-25	4 hours per week	Description working principle of lasers and their work, installation and wavelengths and the effect of temperature and methods of installation	Semiconductor laser	=	=
26-30	4 hours per week	Description working principle of lasers and their work, installation and wavelengths and described the specificity of each device	Special laser	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	J.wilson and J.F.B.hawkes, lasers principle and applications. Rami Arieli, laser adventure
Special requirements (include for example workshops, periodicals, IT software, websites)	<a href="http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm">http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm</a>
Community-based facilities (include for example, guest Lectures , internship , field studies)	- Conducting experiments in the laboratory. - Conducting seminars. - Visits to work sites.

13. Admissions	
Pre-requisites	Pass the 3 <sup>rd</sup> year exam. In addition, students have the capacity to communicate in English to read and write
Minimum number of students	No identification.
Maximum number of students	No identification.

PROGRAMME REVIEW "OPTOELECTRONICS & DETECTORS" for 4<sup>th</sup> year

This Course Specification provides the main features of the Theory of optoelectronics for the students of 4th year in Laser Engineering. Learning outcomes which gained by this program will help a typical student to achieve and demonstrate the learning opportunities that are provided during the course study and to comply with the programmer specification as laser systems Engineering.

1. Teaching Institution	University of Technology
2. University Department/Centre	laser and Optoelectronics Engineering
3. Course title/code	Optoelectronics & Detectors / LE 4305
4. Programmers(s) to which it contributes	Laser and optoelectronics engineering programs
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / 4 <sup>th</sup> Year
7. Number of hours tuition (total)	Theoretical : 2hrs/w 2H X30W=60H/Year
8. Date of production/revision of this specification	19/5/2017
9. Aims of the Course	

## 10• Learning Outcomes, Teaching ,Learning and Assessment Method

### A- Knowledge and Understanding

- A1.Enabling student to get the knowledge and understanding the fundamental of optoelectronic engineering for different circuits.
- A2. Enabling student to analysis different optoelectronic circuits by analysis methods.
- A3. Enabling student to get the knowledge and understanding the network methods for different Detectors.

### B. Subject-specific skills

- B 1 - mathematical analysis of the phenomenon of the optical polarization of various types and derive the equations.
- B 2 - A study of some effects such as the effects of Keer and Faraday physically and mathematically.
- B3.Analysis of the Detectors mathematically, study the non liner material .

### Teaching and Learning Methods

- 1-Practical experiments.
- 2- Simulation and Innovation.
- 3- pdf literatures by Data show Reviews.

### Assessment methods

- 1-Examinations.
- 2-Quizzes.
- 3- Home works.
- 4- Tutorials and discussions.

### C. Thinking Skills

- C 1 - What is the description polarization of light.
- C 2 - the mathematical description of the pockets cell, keer effect and acoustic optic effect.
- C 3 - Description the non liner material phenomena.
- C 4 - to understand the theory of faraday effect , optical scanner and harmonic generation .
- C 5 - Description the theory of Detectors .

### Teaching and Learning Methods

- 1-Literatures.
- 2- Tutorials.
- 1- Experiments.

### D. General and Transferable Skills (other skills relevant to employability and personal development)

- D 1 - employing all due respect to the themes of the software and tables and diagrams to solve engineering problems

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-5	2H/W	Lecture	Polarization , muls law,Birefringence, and Retardation , Electro-Optic effect , Pockls Cell, Optical Activity , Kerr Modulation , Optical frequency Kerr effect .	Lecture & pdf Show.	Examinations ,Quizzes, and Reports.
6-10	=	=	Scanning and Switching , Magneto-Optic Device and Faraday Effect, Acousto-Optic Effect,	=	=
11-14	=	=	Non Linear Optics	=	=
15-18	=	=	Thermoelectric & bolometer detectors	=	=
19-22	=	=	Pneumatic & pyroelectric detectors	=	=
23-26	=	=	Vacuum & photomultiplier detectors	=	=
27-30	=	=	Photo-emissive & photoconductive detectors		

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	John Wilson, John Hawkes, “Optoelectronics, An Introduction”, 3ed Edition, Prentice Hall, 1998.
Special requirements (include for example workshops, periodicals, IT software, websites)	Lectures are available on the site <a href="http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm">http://uotechnology.edu.iq/dep-laserandoptoelec-eng/branch/branch2.htm</a>

Community-based facilities (include for example, guest Lectures , internship , field studies)	<ul style="list-style-type: none"> <li>- Conduct the experiments in the laboratory</li> <li>- The work by seminars</li> <li>- Summer training</li> </ul>
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13. Admissions	
Pre-requisites	<ul style="list-style-type: none"> <li>-Pass from last stage (secondary school).</li> <li>- The possibility of communication in English</li> </ul>
Minimum number of students	No limit.
Maximum number of students	No limit.

## TEMPLATE FOR COURSE SPECIFICATION

### HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

### COURS SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification..

1. Teaching Institution	University of Technology
2. University Department/Centre	Laser and Optoelectronics engineering dep.
3. Course title / Code	Laser applications / LE4306
4. Programme(s) to which it contribute	Laser & optoelectronics engineering programs
5. Modes of Attendance offered	Full time



6. Semester / year	1 <sup>st</sup> and 2 <sup>nd</sup> semesters / year
7. Number of hours tuition(total)	Four hour-two hour theoretical and two hour experimental/year
8. Date of production/revision of this specification	16-6-2017
<b>9. Aims of the Course</b>	
1-Define the advance phenomena in laser applications for fourth stage from department branch represent the laser engineering like medical ,military and industrial application and these parameters effected for the efficiency part.	
2-using the laser technical in scientific, medical and industrial application and environmental application.	
3-prepare the student theoretically and exterminatory in the special fields in all private and former.	
4-applied the fundamental principle of light rays propagation include the laser inside virtual media and human tissue.	
5-Define for the new technical using the laser in all applications.	

<b>10. Learning Outcomes, Teaching, Learning and Assessment Methods</b>
<b>A. Knowledge and Understanding</b>
<p>A1.knowledge the classified of scientific laser application and types.</p> <p>A2.helps the student for using the mathematical equations to calculate the laser and light propagation inside the virtual media and human tissue with optimal conditions from laser energy ,mode type and spot size</p> <p>A3.help the students to understand how the experimental and scientific equipment work which use the laser and light in operational like laser printer ,distance measure device and depth of sea.</p> <p>A4.help the student to understand the theoretical principle for the interaction between light and laser with material and how classified depend on the photon energy ,exposure time and reaction type.</p>
<b>B. Subject-specific skills</b>
<p>B1.find the answers of decay lights energy problems and phenomena of absorption, scattering and reflective of light beam through the virtual media and human tissue</p> <p>B2.calculatte the wavelength and focal length of mirror that used to focus the light beam inside the optimum media to treatment .</p> <p>B3.explain the phenomena of material and laser parameters and how to effect on type of diagnostic or treatment include the ablation or damage of cell.</p>

B4.using the mathematical equation to calculate the photonics energy wavelength and spot size for every applications depend on the media type foe human tissue or metals through focus of beam size.

### **Assessment methods & (References)**

Assessment methods –

1-classroom discussions and to identify the potential of the student to analyze problems.

2- Homework.

3- sudden examination.

4- Quarterly examination.

5- Projects and seminars

[1] James T. Luxon, David E. Parker, “Industrial Lasers and their Applications”, Second Edition, Prentice-Hall, Inc., 1992.

[2] Raymond A. Serway, John W. Jewett, “Physics for Scientists and Engineers”, Thomson Learning Academic Resource Center, 2004.

[3] J. Wilson "Lasers Principles & Applications" Prentice Hall International (UK) Ltd., 1987.

[4] J. Wilson " Optoelectronics an Introduction" Prentice Hall International Inc., 1983.

[5] John C. Ion, “Laser Processing of Engineering Materials”, Elsevier Butterworth-Heinemann-2003

### **C. Thinking Skills**

C1.Explain the process of preparing the elements to construct a focusing system and determine the optimum spot size

C2.Explainthe types and modes of light sources and laser with optical properties suitable of application.

C3.Explain the absorption ,scattering and interference of laser rays inside media and human tissue for every application like industrial, medical and military.

C4. Understand the interaction of light and laser interaction theory.

D. General and Transferable Skills (other skills relevant to employability and personal development)

## 11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	4 hour (weekly) 2 hours theoretical + 2 hours experimental	Knowledge of the basic parameters of materials, lasers and classified by the applications of industrial, medical and military	Basic parameters of materials and laser	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
5-9	4 hour (weekly) 2 hours theoretical + 2 hours experimental	The mechanism of action and scientific laboratory devices that use laser technology and light in their work, including the laser printer and measuring devices courses and deep sea.	The mechanism of action of light and lasers in scientific instruments	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
10-13	4 hour (weekly) 2 hours theoretical + 2 hours experimental	The theory of the interaction of light and matter calculate the photon energy and exposure time and optical properties	Light and matter	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
14-17	4 hour (weekly) 2 hours theoretical + 2 hours experimental	Explain the principle of the use of lasers in industrial application and includes (cutting, welding and punching) the pros and disadvantages and math to calculate the power required and the spot size	Laser cutting and welding and perforating	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
18-21	4 hour (weekly) 2 hours theoretical + 2 hours experimental	Enable students to learn and understand the basic characteristics of the use of laser application in	Laser and human tissue	Motivate students to develop its capabilities in data analysis question and diagnose the problem and	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and

		medical and especially the interaction of laser light with human tissue		describe the solution.	seminars. Laboratories.
22-25	4 hour (weekly) 2 hours theoretical + 2 hours experimental	Laser as a technique in the diagnosis and treatment of diseases of the eye and visual teeth and skin diseases.	Laser and the human eye and teeth and skin diseases	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.
26-30	4 hour (weekly) 2 hours theoretical + 2 hours experimental	Explain how to use laser technology to find and determine distances in military applications and destroyed remotely using satellites	Laser and military uses	Motivate students to develop its capabilities in data analysis question and diagnose the problem and describe the solution.	Discussions. Homework. Sudden exams. Quarterly examinations. Projects and seminars. Laboratories.

# TEMPLATE FOR COURSE SPECIFICATION

## HIGHER EDUCATION PERFORMANCE REVIEW: LASER DESIGN

### COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	Laser and Optoelectronics Engineering
2. University Department/Centre	Laser Engineering / University of Technology
3. Course title/code	Laser Design / LE4307
4. Programme(s) to which it contributes	Laser Engineering Program
5. Modes of Attendance offered	Complete Hours
6. Semester/Year	1 <sup>st</sup> & 2 <sup>nd</sup> Semester / Year
7. Number of hours tuition (total)	Two Hours / Week (Theory) 2H X30W=60H/Year
8. Date of production/revision of this specification	24/6/2017
9. Aims of the Course	
- Introduction of advanced concepts in engineering design of different laser systems for students in the fourth phase of Laser Engineering Branch, like theory of light transmission , effective types of laser optical resonator and the factors that negatively affect the efficiency beyond the ability of different laser systems.	
- Prepare students both theoretical and practical work in the field of competence of the companies to be in public and private sector	

- Definition of thermal impacts, associated with the pumping process and its effects on the efficiency of the laser output.

## 10. Learning Outcomes, Teaching ,Learning and Assessment Methode

### A- Knowledge and Understanding

- A1. Know the classification of the different sources and types of pumping (electrical discharge - optical pumping) and optimal use of each source.
- A2. Enable the student to the optimal use of the mathematical equations for the movement of light inside the laser medium and describe the effective boundary conditions appropriate to find solutions to the physical phenomena that are emerging to reduce the ability of different laser systems.
- A3. Enable the student to know and understand the basic characteristics of the different sources of optical pumping (laser semiconductor - Flash lamps) and explain the installation and their uses and the benefits and disadvantages of each source.
- A4. Enable the student to know and understand the basic principles of building systems of the level of good work.

### B. Subject-specific skills

- B1. The use of mathematical formulas to calculate the formation of pulse forming network and the ability to work flash lamps.
- B2. Calculate the value of the loss resulting from the transfer pack light inside the laser medium.
- B3. The use of mathematical formulas to calculate the distributions of temperature and stress generated inside solid state laser rods.

### Teaching and Learning Methods

The development of the student's ability to apply the knowledge in order to be able to correct analysis of the question and thus put the appropriate assumptions and interpretation to reach the best solution through textbooks and lectures, in addition to the practical experiences in laser systems laboratory.

### Assessment methods

- Classroom discussions to identify the potential of the student to analyze issues.
- Homework.
- Sudden exams.
- Quarterly examinations.
- Performance in the laboratory.

### C. Thinking Skills

- C1. Description pumping operations to various laser media.
- C2. Description and study the types of sources of optical and electrical pumping.
- C3. Description and study the types of optical resonator.

11. Course Structure					
Week	Hours	ILOs	Unit/Module or Topic Title	Teaching Method	Assessment Method
1-4	2Hrs/week	Literature	Design Consideration and Scaling Laws for Gas Lasers.	1.Tutorials 2. Power point literatures by Data show Reviews.	- Classroom discussions to identify the potential of the student to analyze issues. - Homework. - Sudden exams. - Quarterly examinations. - Performance in the laboratory.
5-8	2Hrs/week	=	Optical Pump Systems.	=	=
9-12	2Hrs/week	=	Optical Pump Systems.	=	=
17-21	2Hrs/week	=	Optical Resonator	=	=
22-25	2Hrs/week	=	Thermo-Optic Effects	=	=
26-30	2Hrs/week	=	Pump Radiation Transfer Methods	=	=

12. Infrastructure	
Required reading: · CORE TEXTS · COURSE MATERIALS · OTHER	1.Principles of Lasers (O.Svelto) 2.Solid-State Laser Engineering (W.Koechner)
Special requirements (include for example workshops, periodicals, IT software, websites)	Internet web sites.
Community-based facilities (include for example, guest Lectures , internship , field studies)	N/A

13. Admissions	
Pre-requisites	Pass from third year
Minimum number of students	No limit.
Maximum number of students	No limit.