

Lab project I

Academic Year: (2024 / 2025)

Review date: 06-04-2024

Department assigned to the subject: Electronic Technology Department, ENG/Masters interuniversitarios

Coordinating teacher: VERGAZ BENITO, RICARDO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The ones included in M1.ADVANCED PHOTONICS ENGINEERING BASICS

OBJECTIVES

BASIC

CB7

That the students can apply their knowledge and ability to solve problems in new or unfamiliar in wider or multidisciplinary environments related to their field of study.

CB8

That the students can integrate their knowledge, as well as handle the complexity of making judgements from an incomplete or limited information, but which could include reflections about the social and ethic responsibilities that could be linked to the application of their judgements and knowledge.

CB10

That the students possess learning skills that allow them following their long-life learning in a self-conducted and self-sufficient way.

GENERAL

CG1

Ability to produce English-language documents, plans and projects in the field of Photonics Engineering

CG2

Ability to propose, design, implement and maintain a system with photonic components for a specific application

CG4

Capacity to lead and work in a team integrating multidisciplinary approaches, managing and planning their own work.

CG6

Capacity to apply the scientific method as a fundamental work tool both in the professional and the research fields, managing the sources of information.

SPECIFIC

CE1

Identify the different blocks which are present in a system where photonics plays an essential role, the specificities of its design, possible subsystems to be used, its integration and its final verification.

CE2

Handling of tools aiming to design photonic devices and systems.

CE4

Handling of measurement instruments and photonics with the support of electronics to develop different devices and systems, with application in communications, avionics, automotive, energy sector and civil infrastructures.

CE6

Capacity of designing photonic devices, passive and active, and of evaluating its performance

CE7

Capacity of analyzing and designing photonic systems for applications in communications and sensing.

CE9

Capacity of experimentally verifying in the laboratory the achievement of the required specifications in a new photonic device or system after its implementation.

DESCRIPTION OF CONTENTS: PROGRAMME

The subjects Lab Project allow the student to develop a full instrument as a laboratory project. Each project will comprise a complete system of moderate complexity covering a specific photonic application, thus, the design and development of a complete system of multidisciplinary nature, but based mainly on photonic technology, will be proposed. All the design and development steps will be covered by the students. The compulsory and elective subjects offered during the first semester will be taken into account to conform the list of projects, trying to cover several application areas related to the field of photonics engineering.

The student will participate within a team in the assigned project and must coordinate with the rest of the team members to develop it. Both the team and individual performance will be assessed.

LEARNING ACTIVITIES AND METHODOLOGY

Learning activities:

AF3 Theoretical and practical lectures

AF4 Lab sessions

AF5 Tutorial hours

AF6 Group working

AF7 Individual work of the student

Methodology

MD3

Practical cases resolution, problems, etc. set by the teacher in an individual or group way.

MD5

Documents and reports in an individual or group way.

ASSESSMENT SYSTEM

% end-of-term-examination: 20

% of continuous assessment (assignments, laboratory, practicals...): 80

As this is a practical design developed in a laboratory, grading will be based on achieving the different milestones of the project, this is considered SE2 system evaluation. There will be a final laboratory exam including the writing of a lab report and its presentation to others that will be considered SE3. A higher weight has been assigned to SE2 in order to favor those students with the right progress rhythm in the achievement of the milestones along the project. The students not following the continuous evaluation process may take a final examination graded up to 70% consisting in a laboratory exam where they have to demonstrate the assigned project's correct operation and understanding.

System:	Minimum weight	maximum weight
SE2	50%	80%
SE3	20%	40%

SE2

Individual or group works, including oral or written test made during the course.

SE3

Final exam

BASIC BIBLIOGRAPHY

- B.E.A. Saleh, M.C. Teich Fundamentals of Photonics, Wiley, 2007

- E. Hecht Optics, Addison-Wesley, 2002