Displays Technologies

Academic Year: (2022 / 2023) **Review date: 19-05-2022**

Department assigned to the subject: Electronic Technology Department

Coordinating teacher: SANCHEZ PENA, JOSE MANUEL

Type: Electives ECTS Credits : 3.0

Year : Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Components and Electronic Circuits

OBJECTIVES

The goal of the course is to allow the student knowing the basic electro-optical parameters related to emissive and non-emissive displays and acquiring the ability to select the optimum display for each specific application in the scope of new industrial and multimedia systems.

To achieve this goal, the following competences related to the program outcomes will be acquired:
- Know the basic electro-optical parameters related to emissive and non-emissive displays.
- Know how different display technologies active as well as passive and their main applications
- Measure and evaluate the most relevant parameters from an electrical and optical viewpoint.
- Select the best technology for specific applications (industrial systems, portable systems, among others).

DESCRIPTION OF CONTENTS: PROGRAMME

- State-of-the-art and new trends in displays technologies
- Quality parameters of displays: brighness, contrast ratio, color gamut, response times, etc.
- Emissive displays (CRTs, LEDs, OLEDs, PDPs, ...): electrooptical characteristics and applications
- Non Emissive displays (LCDs, e-ink, ECs, SPDs, ...): electrooptical characteristics and applications
- 3D Technologies, HUD & e-books
- New high-end applications

LEARNING ACTIVITIES AND METHODOLOGY

The training activities are organized as following:
- Lectures (1 ECTS) where the main concepts are presented on the basis of mathematical tools and basic optic's Laws/Theorems (PO a). The learning materials include the lecture notes, the classroom documentation, and the basic bibliography that is used as a reference for completing the themes and study them in depth.
- Practical classes (1 ECTS) that are focused on solving exercises and practical cases related different displays technologies. These classes are completed with the exercises and practical problems that are solved by the students at home. The methods of solving this cases are complemented with the use of computer simulation tools
- Practical work (1 ECTS), where the student characterizes from the electrical and optical point of view different types of screens, both emissive and non-emissive.

ASSESSMENT SYSTEM

The evaluation is based on the following criteria:
- 1 partial exam comprising a complete thematic block related to different displays technologies.
- The mark of this thematic block is 40% of the whole mark.
- The student will develop several theoretical and practical assignments. The knowledge acquired by the student will be evaluated, as well as the use of display screens or photonic devices (20% of the final grade).
- Final Exam: The students knowledge of all contents of the course is evaluated as a whole in this activity. Additionally, practical problems that involve several practical cases will allow evaluating the ability of the student to apply them to solve different engineering problems related to the use of different display technologies in real operation conditions (40%).

Percentage of Final Exam (mandatory): 40
Percentage of Evaluation of Other Activities: 60

% end-of-term-examination:	40
% of continuous assessment (assigments, laboratory, practicals…):	60

BASIC BIBLIOGRAPHY

- E. Kaneko Liquid Crystal TV Displays: Principles and Applications of Liquid Crystal Displays, KTK Scientific Publishers, Tokio (1987)..
- J.A. Castellano Handbook of Display Technology, Academic Press, San Diego (1992)..
- M.A. Karim Ed Electro-optical Displays, Marcel Dekker Inc, New York (1992)..
- S. Sherr Electronic Displays, John Wiley & Sons, Inc, New York (1993)..

ADDITIONAL BIBLIOGRAPHY

- B. Bahadur Ed. Liquid Crystals: Applications and Uses Vol. I, II y III,, World Scientific, Singapore (1990, 1992 y 1993)..