

**1. General information****Course:** COMPUTER TECHNOLOGY**Type:** BASIC**Degree:** 347 - DEGREE PROGRAMME IN COMPUTER SCIENCE ENGINEERING (CR)**Center:** 108 - SCHOOL OF COMPUTER SCIENCE OF C. REAL**Year:** 1**Main language:** English**Use of additional languages:****Web site:****Code:** 42303**ECTS credits:** 6**Academic year:** 2020-21**Group(s):** 20 21 22 23**Duration:** First semester**Second language:** Spanish**English Friendly:** N**Bilingual:** Y**Lecturer:** ANTONIO ADAN OLIVER - Group(s): 20 22

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Lecturer: JESUS SALIDO TERCERO - Group(s): 22

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Lecturer: INOCENTE SANCHEZ CIUDAD - Group(s): 21 23

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2. Pre-Requisites

No prior knowledge on the subject is required.

3. Justification in the curriculum, relation to other subjects and to the profession

The main objective of this subject is to provide the technological base of the structure and operation of a computer. The contents are focused on the number systems, the Boolean circuits, the fundamental concepts of logical circuits and the analysis/design of digital circuits.

4. Degree competences achieved in this course**Course competences**

| Code | Description |
|-------|---|
| BA02 | Understanding and knowledge of basic terms about fields, waves and electromagnetism, theory of electric circuits, electronic circuits, physical principles of semiconductors and logic families, electronic and photonic devices and their use to solve engineering problems. |
| BA03 | Ability to understand basic concepts about discrete mathematics, logic, algorithms, computational complexity, and their applications to solve engineering problems. |
| CO09 | Ability to know, understand, and assess the structure and architecture of computers, and their basic components. |
| INS01 | Analysis, synthesis, and assessment skills. |
| INS04 | Problem solving skills by the application of engineering techniques. |
| INS05 | Argumentative skills to logically justify and explain decisions and opinions. |
| PER02 | Ability to work in multidisciplinary teams. |
| PER04 | Interpersonal relationship skills. |
| PER05 | Acknowledgement of human diversity, equal rights, and cultural variety. |

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Understanding of the behaviour of basic digital devices.

Understanding and knowledge about how to apply the basic procedures of analysis and design of circuits and digital systems.

Additional outcomes**6. Units / Contents****Unit 1: Introduction to Digital Circuits****Unit 2: Number systems and Representation of Information**

Unit 3: Logic Functions and Boolean Algebra

Unit 4: Combinational Circuits I. Gates

Unit 5: Combinational Circuits II. Modules & Modular Networks

Unit 6: Sequential Circuits I: Flip-flops

Unit 7: Sequential Circuits II: Analysis and Synthesis. Registers and counters.

Unit 8: Combinational circuits III: Arithmetic & Logic Circuits

| 7. Activities, Units/Modules and Methodology | | | | | | | |
|--|----------------------------------|---|----------|---|----|-----|--|
| Training Activity | Methodology | Related Competences (only degrees before RD 822/2021) | ECTS | Hours | As | Com | Description |
| Class Attendance (theory) [ON-SITE] | Lectures | BA02 BA03 CO09 | 0.9 | 22.5 | N | | Teaching of the subject matter by lecturer (MAG) |
| Class Attendance (theory) [ON-SITE] | Problem solving and exercises | BA02 BA03 CO09 INS04 PER02 PER04 PER05 | 0.48 | 12 | N | | Worked example problems and cases resolution by the lecturer and the students (PRO) |
| Laboratory practice or sessions [ON-SITE] | Practical or hands-on activities | BA02 BA03 CO09 INS04 PER02 PER04 PER05 | 0.54 | 13.5 | Y | Y | Lab practical preparation (PLAB) |
| Individual tutoring sessions [ON-SITE] | Guided or supervised work | BA02 BA03 CO09 | 0.18 | 4.5 | N | | Individual or small group tutoring in lecturer's office, classroom or laboratory (TUT) |
| Study and Exam Preparation [OFF-SITE] | Self-study | BA02 BA03 CO09 | 1.8 | 45 | N | | Self-study (EST) |
| Final test [ON-SITE] | Assessment tests | BA02 BA03 CO09 INS01 INS04 INS05 PER02 | 0.3 | 7.5 | Y | Y | Final test of the complete syllabus of the subject (EVA) |
| Writing of reports or projects [OFF-SITE] | Self-study | BA02 BA03 CO09 INS01 INS04 PER02 PER04 PER05 | 0.9 | 22.5 | Y | N | Preparation of essays on topics proposed by lecturer (RES) |
| Other off-site activity [OFF-SITE] | Practical or hands-on activities | BA02 BA03 CO09 INS01 INS04 PER02 PER04 PER05 | 0.9 | 22.5 | Y | Y | Lab practical preparation (PLAB) |
| Total: | | | 6 | 150 | | | |
| Total credits of in-class work: 2.4 | | | | Total class time hours: 60 | | | |
| Total credits of out of class work: 3.6 | | | | Total hours of out of class work: 90 | | | |

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

| 8. Evaluation criteria and Grading System | | | |
|---|-----------------------|----------------------------|--|
| Evaluation System | Continuous assessment | Non-continuous evaluation* | Description |
| Final test | 50.00% | 50.00% | Compulsory activity that can be retaken (rescheduling) to be carried out within the planned exam dates of the final exam call (convocatoria ordinaria). |
| Theoretical papers assessment | 15.00% | 15.00% | Non-compulsory activity that can be retaken. To be carried out before end of teaching period. |
| Laboratory sessions | 25.00% | 25.00% | Compulsory activity that can be retaken. Ordinary call: - Continuous evaluation: to be carried out during the lab sessions. - Non continuous evaluation: to be carried out within the planned exam dates of the final exam call (in January). Extraordinary call: Lab exam within the planned exam dates (in June) |
| Oral presentations assessment | 10.00% | 10.00% | Non-compulsory activity that can be retaken. Ordinary call: - Continuous evaluation: to be carried out at the end of the semester during the theory/lab sessions. - Non continuous evaluation: to be carried out within the planned exam dates of the final exam call (in January) using an alternative method. Extraordinary call: to be carried out within the planned exam dates of the final exam call (in January) using an alternative method. |
| Total: | 100.00% | 100.00% | |

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

In compulsory activities, a minimum mark of 40% is required in order to pass that activity and have the possibility to therefore pass the entire subject. The

evaluation of the activities will be global and therefore must be quantified by means of a single mark. If the activity consists of several sections, each section may be evaluated separately provided students are informed in writing of this evaluation criterion at the beginning of the academic year. In the case of the activities that may be retaken (i.e., rescheduling), an alternative activity or test will be offered in the resit/retake exam call (convocatoria extraordinaria). The final exam will be common for all the theory/laboratory groups of the subject and will be evaluated by the lecturers of the subject in a serial way, i.e., each part of the final exam will be evaluated by the same lecturer for all the students.

A student is considered to pass the subject if she/he obtains a minimum of 50 points out of 100, taking into account the points obtained in all the evaluable activities, and also has passed all the compulsory activities.

For students who do not pass the subject in the final exam call (convocatoria ordinaria), the marks of activities already passed will be conserved for the resit/retake exam call (convocatoria extraordinaria). The oral presentations assessment (non-recoverable activity) will be conserved for the resit/retake exam call even if it has not been passed. In the case of the passed recoverable activities, the student will have the opportunity to receive an alternative evaluation of those activities in the resit/retake exam call and, in that case, the final grade of the activity will correspond to the latter grade obtained.

The mark of the passed activities in any call, except for the final exam, will be conserved for the subsequent academic year at the request of the student, provided that mark is equal or greater than 50% and that the activities and evaluation criteria of the subject remain unchanged prior to the beginning of that academic year.

The failure of a student to attend the final exam will automatically result in her/him receiving a "Failure to attend" (no presentado). If the student has not passed any compulsory evaluation activity, the maximum final grade will be 40%.

Non-continuous evaluation:

- Students may request the Non-continuous evaluation modality at the beginning of the course. Requests to change the evaluation modality within the academic year will be evaluated and, where appropriate, conceded by the teachers of the subject.
- As in the continuous modality, 100% of the activities will be evaluated in the two calls according to the attached table in section 8. However, for students who do not pass the subject, the marks of the passed activities in any call (ordinary and extraordinary) will not be conserved for the subsequent academic year.

Specifications for the resit/retake exam:

Evaluation tests will be conducted for all recoverable activities.

Specifications for the second resit / retake exam:

Same characteristics as the resit/retake exam call.

| 9. Assignments, course calendar and important dates | |
|--|-------|
| Not related to the syllabus/contents | |
| Hours | hours |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 13.5 |
| Individual tutoring sessions [PRESENCIAL][Guided or supervised work] | 4.5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 45 |
| Final test [PRESENCIAL][Assessment tests] | 7.5 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 22.5 |
| Other off-site activity [AUTÓNOMA][Practical or hands-on activities] | 22.5 |
| Unit 1 (de 8): Introduction to Digital Circuits | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2 |
| Unit 2 (de 8): Number systems and Representation of Information | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Unit 3 (de 8): Logic Functions and Boolean Algebra | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 4.5 |
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 3.5 |
| Unit 4 (de 8): Combinational Circuits I. Gates | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2.5 |
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 2 |
| Unit 5 (de 8): Combinational Circuits II. Modules & Modular Networks | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3.5 |
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 2.5 |
| Unit 6 (de 8): Sequential Circuits I: Flip-flops | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2 |
| Unit 7 (de 8): Sequential Circuits II: Analysis and Synthesis. Registers and counters. | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 3 |
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 2 |
| Unit 8 (de 8): Combinational circuits III: Arithmetic & Logic Circuits | |
| Activities | Hours |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 2 |
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 2 |
| Global activity | |
| Activities | hours |
| Individual tutoring sessions [PRESENCIAL][Guided or supervised work] | 4.5 |
| Study and Exam Preparation [AUTÓNOMA][Self-study] | 45 |
| Final test [PRESENCIAL][Assessment tests] | 7.5 |
| Writing of reports or projects [AUTÓNOMA][Self-study] | 22.5 |
| Other off-site activity [AUTÓNOMA][Practical or hands-on activities] | 22.5 |

| | |
|--|------|
| Class Attendance (theory) [PRESENCIAL][Problem solving and exercises] | 12 |
| Laboratory practice or sessions [PRESENCIAL][Practical or hands-on activities] | 13.5 |
| Class Attendance (theory) [PRESENCIAL][Lectures] | 22.5 |
| Total horas: 150 | |

| 10. Bibliography and Sources | | | | | | |
|----------------------------------|--|------------------|------|-------------------|------|--------------|
| Author(s) | Title/Link | Publishing house | Citv | ISBN | Year | Description |
| Thomas L. Floyd | Digital Fundamentals: A Systems Approach | Pearson | | 978-0-13-293395-7 | 2014 | Theory book |
| A. Adán. I. Sánchez, B. Quintana | Circuitos Digitales: Problemas y Ejercicios Resueltos http://www.ra-ma.es/libros/CIRCUITOS-DIGITALES/99718/978-84-9964-761-6 | RaMa | | 978-84-9964-761-6 | 2018 | Problem book |