Descriptives 1.Datos
Electronic Circuits
Tutorial - Student Information
Subject
Electronic Circuits
Matter
M11 - Specific Technology Electronic Systems
Department
responsible
Electronic Engineering
ECTS credits
3
Character
Compulsory
Degree
Diploma in Engineering Technology and Services
Telecommunication
Course
3rd
Specialty
N / A
Academic year
2012-2013
Semester in which
imparts
First
Language in which
imparts
Castilian
Website
http://celt.die.upm.es

DESCRIPTION OF THE COURSE
The aim of this course is to develop a practice of a system
complex analog-digital electronic starting with a description and a
basic specifications.
The course begins with a theoretical classes where students receive information
on decomposition in said system modules, the methods
convenient for design and recommendations for installation on the plate
insertion. Furthermore, in the above indicated classes are more procedures
suitable for detecting performance problems and their solution to
Throughout the development of the circuit.
During the course of the course, students will use the means available
laboratory B-043 for the development of the practice, with the
help of teachers. Some classes are regularly taught theoretical
short duration in the laboratory.
Finally, the student will have to write a memory circuit technique
performed.

2.Profesorado

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Previous 3.Conocimientos required to continue normally the subject

Subjects overcome	Other results learning necessary
•	• Circuit Analysis • Introduction to Electronics • Digital Electronics • Analog Electronics

4.
Learning Objectives.
LEGEND: Acquisition Level 1: Basic
Acquisition level 2: Middle
Acquisition Level 3: Advanced

Powers assigned to the subject and level of ACQUISITION	
Code	**Competition**
	Level
CG-6 Use of English.	2
CG-7 Teamwork	2
CG-8 Oral and written communication	2
CG-10 Creativity	2
GC-12 Organization and planning	2
EC-SE3 Ability to perform the specification, implementation, documentation and development of equipment and systems, electronics, instrumentation and control, considering both the technical and standards appropriate regulatory.	2
EC-SE5 Ability to design and analog electronic circuits digital, analog-digital conversion and digital to analog radiofrequency conversion and power electricity and telecommunication applications computing.	3
EC-SE8 Ability to specify and use instrumentation electronics and measurement systems.	3

LEARNING OUTCOMES OF THE COURSE

Codi go	**Learning result Competition**

ences
associated
Level
acquisition
tion
RA1
Interpret the operation, performance and limitations of the components through their leaves
Feature
CG-6
CESE3
2
RA2
Perform the modular design of an electronic circuit analog-digital complex from a specified
tions in a workgroup.
CG-7
GC-12
CESE5
3
RA3
Designing analog modules individually compose the system considering its interactions
CESE5
CESE3
3
RA4
Designing digital modules individually compose the system considering its interactions
CESE5
CESE3
3
RA5
Use the tools in the laboratory (generator functions, power supply and oscilloscope) for checking the operation of the modules designed
CESE8
2
RA6
Being able to solve problems over development of a complex electronic system.
CG-10
GC-12
CESE8
3
RA7
Perform a complete technical documentation on design made orally and explain its operation

ment and its details.
CG-8
CESE3
2
LEGEND: Acquisition Level 1: Knowledge descriptive
Acquisition Level 2: Comprehension / Application
Acquisition Level 3: Analysis / Synthesis / Implementation

5. System evaluation of the subject
ACHIEVEMENT INDICATORS
Ref
Indicator
Related
do with RA
I1
Interpret specifications of an electronic
RA1
I2
Decomposing a complex electronic system into modules, taking into account possible influences including
RA2
I3
In the case of analog circuit design based modules in real operational amplifiers: filters, oscillators, amplifiers, etc.. As basic passive circuits: voltage dividers, RC filters, etc.
RA3
I4
For digital circuits, digital circuit implementation of a synchronous proper synchronization between the modules and design and implement state machines.
RA4
I5
Properly handle laboratory instruments and measure signals namely periodicals and the oscilloscope.
RA5
I6
Perform the modules implemented measures to check for proper operation.
RA5
I7
Get operation diagrams approximate circuit for subsequent validation measures (Bode diagrams, schedules, etc).
RA2
RA5
I8
Interconnect modules designed gradually to

build a complex circuit, searching and solving problems that may arise during development.
RA2
RA6
I9
Writing a technical report specifying circuit clearly its design and operation. Also express orally operation.
RA7

Summative
Brief description of the activities evaluable
Time
Place
Weight in the calif.

Oral evaluation of a first milestone consist in the realization of a portion complete system with a partial functionality
Week 7
Course
Laboratory
B-043
20

Oral evaluation of the complete system
Week 15
Course
Laboratory
B-043
60

Oral evaluation of improvements on the proposed circuit
Week 15
Course
Laboratory
B-043
20

Total: 100%

Qualification Criteria

Students will be evaluated, by default, through ongoing evaluation. The qualification of the subject will be as follows:
FINAL NOTE = 20% of the first oral evaluation MILESTONE + 60% Oral Assessment final circuit + 20% Development of improvements.
Laboratory evaluation is performed by controlling knowledge oral on practical design, functioning and adaptation to the specifications,

knowledge of the use of laboratory equipment and writing memory written.
In compliance with the Regulatory Evaluation of the Technical University of Madrid, students who wish to be evaluated by a single final exam provided that they inform the Director of the Department of Engineering Electronics on application in the register of the School Telecommunication Engineering. This request can be made until the day prior to the official announcement of the final exam. For eligible for final exam mode, the score will be obtained as follows:
FINAL NOTE = 80% oral evaluation of the complete system (memory, knowledge on the design and operation of the practice) + 20% Improvements. DATE: Week 15 of the course. PLACE: Laboratory B-043

6. Content and Learning Activities
SPECIFIC CONTENT
Block / Theme / Chapter Paragraph
Indicators Related two
Block 1: Description system electronic design
1.1 Description of the electronic system to be developed throughout the course.
I1
1.2 Analysis of decomposition into modules.
I2
1.3 Details of each module.
I2
1.4 Interactions between.
I2
1.5 Basic specifications must meet the system
I1
Block 2: Development analog part
2.1 Distribution of food:
2.1.1 star topology power
2.1.2 Decoupling Capacitors
2.1.3 LEDs alert shorts
2.1.4 Efficient insertion of plates
I3
2.2 Rules General Assembly:
2.1.1 Power Operational Amplifiers
2.1.2 Transportation of signals through the circuit

2.1.3 Noise reduction: parasitic capacitances and
radiation
I3
2.3 Implementation of the modules:
2.3.1 Effects of component tolerances
Load 2.3.2 Effects of other stages
2.3.3 Effects of the real character
operational amplifiers: gain-width
Band and "slew rate".
I3
2.4 Search and Troubleshooting
I5, I6, I8

SPECIFIC CONTENT
Block / Theme /
Chapter
Paragraph
Indicators
Related
two
Block 3:
Development
digital part
3.1 Power of the digital part:
3.1.1 Reduced switching noise
3.1.2 Decoupling Capacitors
I4
3.2 Generation of clock signals
3.2.1 The timer NE555
3.2.2 Obtaining defined flanks
I4
3.3 Implementation of the modules
3.3.1 Intended Use of integrated circuits
CMOS
3.3.2 Precautions sequential circuits:
times "setup" and "hold".
3.3.3 Synchronization signals
3.3.4 Logical status display: LEDs and displays
I4
3.4 Searching and Troubleshooting
I5, I6, I8
Block 4:
Preparation of
documentation
technique
4.1 Drafting of technical documentation
I9
4.2 Overview of measurements and theoretical diagrams
(Bode and timelines)

I7
4.3 Explanation of the differences between the data calculated and measured.
I9

7. Brief description of the organizational used and the teaching methods employed
Lectures
It exposes the electronics to be designed and its decomposition into modules. There will be a system breakdown by functional blocks for weeks, meaning that the Design must be incremental in that the individual blocks must operate connected to previously designed previous blocks. Indicate general assembly rules, search problems and development of complex systems.
CLASSES
PROBLEMS
No
CLASSES
DEMONSTRATIVE
No
PRACTICES
In the laboratory, the teaching will be more intense. Teachers will address the questions and problems that may arise during the development of proposed system.
WORK
SELF
Students who wish may participate actively in the course as instructors. His task will be to assist in the management of the laboratory and advise students on basic issues. These Students will be under the supervision of a Professor.
JOBS
GROUP
The labs will be conducted in groups 2 people.
TUTORING
The tutorials will conform to current legislation ensuring that a teacher is always present in the laboratory for a period of each shift.

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8. Teaching resources
TEACHING RESOURCES

REFERENCES

• *"Practical aspects of design and extent Laboratories Electronics "(2nd* ed) (ISBN 84-7402-297-5), Javier Ferreiros Lopez, Javier Macias Guarasa, Juan Manuel Montero Martínez, Félix Moreno González, Juan Alberto Susín Munoz, Elena Palazuelos Cagigas Sira, Julio Pastor Mendoza, Ruben Hernandez San Segundo, Maria Jesus Carbayo Ledesma. Publications Department ETSIT

• *"Electronic Circuits: Analysis, Design and Simulation",* Norbert R. Malik, Prentice-Hall, 1996.

• *"Design with Operational Amplifiers and Analog Integrated Circuits "*, 3rd edition Sergio Franco, McGraw-Hill, 2002.

WEB RESOURCES

Website of the subject
http://lcel.die.upm.es

EQUIPMENT

Teaching Lab B-043

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9. Work schedule of the course

Week
Classroom Activities
Activities
Laboratory
Individual Work
Workgroups
Activities
Evaluation
Others

Week 1
• Select the group
laboratory through
website
subject
• Request the possibility
an instructor
Week 2
(4 h)
• Lecture on
Practice (2 h)
• Study and practice
understanding of its
operation (2 h)
Week 3
(6 h)
•
Measure,
checking and

purification
MODULE 1
circuit.
(4 h)
•
1 module design
circuit.
•
Mounting Module 1
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 4
(6 h)
•
Measure,
checking and
purification
MODULE 2
circuit.
(4 h)
•
2 module design
circuit.
•
Mounting Module 2
Circuit (2 h)
•
It will be held
in groups of 2
people.

13
Week
Classroom Activities
Activities
Laboratory
Individual Work
Workgroups
Activities
Evaluation
Others
Week 5
(6 h)
•
Measure,
checking and

purification
Module 3
circuit.
(4 h)
•
3 module design
circuit.
•
Mounting Module 3
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 6
(6 h)
•
Measure,
checking and
purification
MODULE 4
circuit.
(4 h)
•
Design module 4
circuit.
•
Mounting Module 4
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 7
(4.5 h)
• Exam Preparation
• Drawing from memory
(4 h)
•
The evaluation
perform the group
2 people
although the notes
individual will
according to their
knowledge.
•
MILESTONE Assessment
1. (0.5 h)
Week 8

(6 h)
•
Measure,
checking and
purification
Module 5
circuit.
(4 h)
•
Design Module 5
circuit.
•
Mounting Module 5
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 9
(6 h)
•
Measure,
checking and
purification
Module 6
circuit.
(4 h)
•
Design Module 6
circuit.
•
Mounting Module 6
Circuit (2 h)
•
It will be held
in groups of 2
people.

14
Week
Classroom Activities
Activities
Laboratory
Individual Work
Workgroups
Activities
Evaluation
Others
Week 10

(6 h)
•
Measure,
checking and
purification
Module 7
circuit.
(4 h)
•
Design Module 7
circuit.
•
Mounting Module 7
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 11
(6 h)
•
Measure,
checking and
purification
Module 8
circuit.
(4 h)
•
Design Module 8
circuit.
•
Mounting Module 8
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 12
(6 h)
•
Measure,
checking and
purification
MODULE 9
circuit.
(4 h)
•
Module design 9
circuit.
•

Mounting Module 9
Circuit (2 h)
•
It will be held
in groups of 2
people.
Week 13
(6 h)
•
Measure,
checking and
purification
improvements.
(4
h)
•
Possible Design
improvements on the circuit
proposed
•
Installation of these improvements
(2 h)
•
It will be held
in groups of 2
people.
Week 14
(6 h)
•
Measure,
checking and
purification
improvements.
(4
h)
•
Possible Design
improvements on the circuit
proposed
•
Installation of these improvements
(2 h)
•
It will be held
in groups of 2
people.

Classroom Activities
Activities
Laboratory
Individual Work
Workgroups
Activities
Evaluation
Others
Week 15
(6.5 h)
• Exam Preparation
• Drawing from memory
end (6 h)
•
The evaluation
perform the group
2 people
although the notes
individual will
according to their
knowledge.
•
Evaluation
complete circuit.
(0.5 h)
Note: For each activity specified in hours dedication to the student involved.
The weeks are outlined effective teaching (not calendar weeks)