



**ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL**  
**Faculty of Electrical and Computer Engineering**  
**COURSE SYLLABUS**  
*Electronics III*

**1. CODE AND NUMBER OF CREDITS**

<b>CODE</b>	FIEC01388	
<b>NUMBER OF CREDITS : 4</b>	<b>Theoretical: 4</b>	<b>Practical: 0</b>

**2. COURSE DESCRIPTION**

The course on Electronics III presents a set of basic configurations and applications of analog integrated circuits arrangements, useful at different stages of design and control using analog electronics. Furthermore, this course reviews the use and design of filters and their variants, for example: lowpass, highpass, bandpass and notch filters. Finally, the fundamental principles of oscillator circuits, focusing on the design criteria for practical field applications.

**3. PRE-REQUISITES AND CO-REQUISITES**

<b>PRE-REQUISITES</b>	FIEC00190 Electronics II
<b>CO-REQUISITES</b>	

**4. CORE TEXT AND OTHER REQUIRED REFERENCES FOR THE TEACHING OF THE COURSE**

<b>CORE TEXT</b>	1. J. M. Jacob. Application and design with analog integrated circuits. Prentice Hall, 1 <sup>st</sup> edition. 1999.
<b>REFERENCES</b>	1. R. F. Coughlin, F. F. Driscoll, Operational Amplifiers and Linear Integrated Circuits. Prentice Hall, 5 <sup>th</sup> edition. 1999. 2. A.Larco. Application problems of operational amplifiers and circuits integrated multifunctional. Espol, 1 <sup>st</sup> edition. 1994.

**5. COURSE LEARNING OUTCOMES**

At the end of the course, the student will be able to:

1. Analysis and design of analog electronic circuits using discrete and integrated devices.
2. Resolve practical problems by applying the techniques learned.
3. Design techniques and simulation of electronic circuits by using specialized software.
4. Elaborate technical reports, using modern methods of design, simulation and implementation of applied electronic subsystems.

**6. COURSE PROGRAM**

- I. Operational Amplifiers and feedback (sessions - 11 hours)
  - Principle of feedback.
  - Principle of positive feedback.
  - Saturation operation.
  - Hysteresis applications.
  - Control applications.
- II. Active Filters (Sessions - 11 hours)
  - First and second order filters.
  - Low Pass Filters.
  - High Pass Filters.
  - Band Pass Filters.
  - Notch Filters.
  - Higher orders Filters.
- III. Linear and Switching Power Supplies (Sessions -11 hours)
  - Analysis and design of linear power supplies with opamps.
  - Analysis and design of linear power supplies with Three-Terminal Regulators.
  - Over current protections, and over-voltage transients protection systems.
  - Switching Power Supplies analysis.
  - Applications with the LM2576.



**IV. Waveform Generators (Sessions - 11 hours)**

- Square wave generators.
- Triangle wave generator.
- Sawtooth wave generators.
- Sine wave generators.
- 555 timer.
- VCO: IC LM566 and IC MC1648
- IC function generator XR2206.
- AM, FM, PM modulation applications using IC LM1496 and IC MC1648.
- PWM, FSK modulation: fundamentals.
- Phase locked loop fundamentals (PLL).
- PLL applications with IC CD4046 y LM565.

**V. Nonlinear circuits. (Sessions - 12 hours)**

- Clipper, precision rectifier, absolute value, peak detector.
- Transfer curve synthesizer.
- Applications and fundamentals of mathematical and operational circuits: multiplier, divider, square root and Logarithmic amplifiers.
- Analog multiplier integrated circuit: AD633.

**7. WORKLOAD: THEORY/PRACTICE**

2 sessions per week for 2 hours each.

**8. CONTRIBUTION OF THE COURSE TO THE EDUCATION OF THE STUDENT**

Electronics III is aimed at engineering design.

BASIC TRAINING	PROFESSIONAL TRAINING	SOCIAL SKILLS DEVELOPMENT
	X	

**9. THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES OF THE COURSE AND THE LEARNING OUTCOMES OF THE DEGREE PROGRAM**

STUDENT OUTCOMES OF THE DEGREE PROGRAM*	CONTRIBUTION (High, Medium, Low)	STUDENT OUTCOMES OF THE COURSE**	THE STUDENT MUST:
a) An ability to apply knowledge of mathematics, science and engineering.	High	1, 2	Apply the knowledge acquired previous courses on analog electronic circuits.
b) An ability to design and conduct experiments, and to analyze and interpret data	Medium	2	Analyze the results of a simulation or experiment.
c) An ability to design a system, component or process to satisfy realistic constraints.	Medium	1	Design several electronic amplifier circuits.
d) An ability to function on multidisciplinary teams.	Medium		
e) An ability to identify, formulate and solve engineering problems.	High	3, 4	Select the appropriate electronic circuit depending on the problem.
f) An understanding of ethical and professional responsibility.	Low		
g) An ability to communicate effectively.	Medium		Support the design criteria and analysis used in tests and exams.



h) A broad education necessary to understand the impact of engineering solutions in a social, environmental, economic and global context.	low		
i) A recognition of the need for, and an ability to engage in life-long learning.	Medium		Be prepared to use new components and technologies.
j) A knowledge of contemporary issues.	Medium	4	Recognize new challenges and schematics in electronics modern.
k) An ability to use the techniques, skills, and modern tools necessary for engineering practice.	Medium	4	Use simulators.
l) Capacity to lead, manage and undertake projects.	Medium	3	Understand the application of technical in socially useful projects.

**10. EVALUATION IN THE COURSE**

Evaluation activities	
Exams	X
Tests	X
Homework/tasks	X
Projects	
Laboratory/Experiments	
Class participation	
Visits	
Other	

**11. PERSON RESPONSIBLE FOR THE CREATION OF THE SYLLABUS AND THE DATE OF ITS CREATION**

<b>Created by</b>	Master Carlos Salazar López.
<b>Date</b>	17 de mayo 2013

**5. APPROVAL**

ACADEMIC SECRETARY OF THE ACADEMIC DEPARTMENT	DIRECTOR OF TECHNICAL ACADEMIC SECRETARY
NAME: Mrs. Leonor Caicedo G.	NAME: Eng. Marcos Mendoza
SIGNATURE: 	SIGNATURE:  ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL
Date of approval by the Directive Council: 2013-537 2013-10-7	<b>Ing. Marcos Mendoza V.</b> DIRECTOR DE LA SECRETARIA TÉCNICA ACADÉMICA

**6. VALIDITY OF THE SYLLABUS**

RESOLUTION OF THE POLYTECHNIC BOARD:	13-12-343
DATE:	2013-12-12