

Applied Electronics

SYLLABUS

I. IDENTIFICATION

Program: Bachelor on Electrical Engineering		
Course: Applied Electronics		
Class hours: 90 hours/class	Academic year: 2025/1	Phase: Optative class
Professor: Pedro Bertemes Filho		
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II. SUMMARY

Special applications on operational amplifiers; Signal conversion and generation; Active Filters (theory and projects); Specific integrated circuits

III. DIDACTIC PROGRAM

1. Special applications on operational amplifiers
 - Logarithmic circuits
 - Modulators and demodulators
 - Multivibrators
2. Signal conversion and generation
 - Signal wave generators
 - Voltage controlled oscillator
 - Digital to Analog converters
 - Analog to Digital converters
 - Conversion errors
3. Active Filters: theory and projects
 - Filters theory
 - First and second order functions
 - Successive approximation function
 - Types of active filters
 - Impedance converters
 - Filters based on the Antoniou inductor
 - Sallen-Key structures
 - Biquadratic filters based on operational amplifiers
4. Specific integrated circuits
 - Variable gain amplifiers
 - Frequency synthesizer circuits
 - Special amplifiers for medical and biological engineering
 - Circuits based on instrumentation amplifiers
 - Circuits for control and automation applications
5. Practical experiments
 - Log e Antilog circuits
 - Modulation circuit
 - Multivibrator circuit
 - Wave form generator
 - A/D and D/A converters
 - Sallen-Key active filters
 - Biquadratic filters with 3 Opamps
 - Specific integrated circuit

IV. LEARNING METHODOLOGY

Expositive theoretical classes by using slides electronically projected and the white board; Pspice simulations; Practical experiments; final oral presentations related to a project based on a specific integrated circuit.

V. ASSESSMENT SYSTEM

The assessment will consist of one report based on a computer simulation (with weight 25%), 7 reports based on laboratory experiments (with weight 50% on average), and one seminar (with weight 25%) with group presentation at the end of the semester based on a specific integrated circuit experiment.

IV. BIBLIOGRAPHY

SEDRÁ, Adel S., SMITH, Kenneth C. Microeletrônica. 5ª Edição, São Paulo, Pearson Prentice Hall, 2007.

BOYLESTAD, Robert L., NASHIELSKY, Louis; Dispositivos Eletrônicos e Teoria de Circuitos, 8ª Edição, São Paulo, Pearson Prentice Hall, 2007.

PERTENCE, Antônio Jr. Amplificadores Operacionais e Filtros Ativos: teoria, projetos, aplicações e laboratório. 4ª Edição, São Paulo: McGraw-Hill, 1988.

MANUAIS E NOTAS DE APLICAÇÃO dos fabricantes de circuitos integrados (Texas Instruments, Motorola, Analog devices, Phillips, On Semiconductos, Atmel, Intersil, Maxim, National Semiconductors, Microchip, etc.)

OLIVEIRA, Luiz Alves de. Dispositivos eletrônicos e teoria de circuitos. 6ª Edição. Rio de Janeiro: Livros Técnicos e Científicos, 1999.

MALVINO, Albert, BATES, David J., Eletrônica, 7ª Edição, São Paulo, Mc Graw Hill, 2007.

HELFRICK, Albert D; MOREIRA, Antonio Carlos Inacio. Instrumentacao eletrônica moderna e tecnicas de medicao. 1 ed. Rio de Janeiro: Prentice Hall do Brasil, 1994. 324 p. : ISBN 8570540507

SOISSON, Harold E; Editora Hemus. Instrumentacao industrial. 1 ed. São Paulo: Hemus, 0. 687 p. ISBN 8528901459

BALBINOT, Alexandre.; BRUSAMARELLO, Valner João. Instrumentação e fundamentos de medidas. Rio de Janeiro: LTC, 2006. 1 v. : ISBN 8521614969

METROLOGIA & INSTRUMENTAÇÃO. São Paulo: EPSE,2001-. Mensal. ISSN 1519-1575