

## Applied Electronics

### SYLLABUS

#### I. IDENTIFICATION

<b>Program:</b> Bachelor on Electrical Engineering		
<b>Course:</b> Applied Electronics		
<b>Class hours:</b> 90 hours/class	<b>Academic year:</b> 2025/1	<b>Phase:</b> Optative class
<b>Professor:</b> 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 técnicas 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

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