

University of Puerto Rico  
Mayagüez Campus  
College of Engineering  
Electrical and Computer Engineering  
Bachelor of Science in Electrical Engineering

**1. General Information:**

Alpha-numeric codification: INEL 4075  
Course Title: Fundamental of Electrical Engineering  
Number of credits: 3  
Contact Period: 3 hours of lecture per week  
Contact Period: Required to selected engineering programs  
Course coordinator's name: Academic Affairs Committee

**2. Course Description**

English: Laws and fundamental concepts that govern the behavior of electric and magnetic circuits; ideal models of resistors, voltage and current sources, capacitors and inductors; three-phase circuits and transformers.

Spanish: Leyes y conceptos fundamentales que gobiernan el comportamiento de los circuitos eléctricos y magnéticos; modelos ideales de resistencias, fuentes de voltaje y corriente, condensadores e inductores; circuitos trifásicos y transformadores.

**3. Pre/Co-Requisites**

**Pre-requisites**  
(MATE 3063 or MATE 3185) and (FISI 3172 or FISI 3162).

**4. Course Objectives:**

The objective of this course is to introduce students to electric circuit analysis techniques, including the Kirchhoff's Laws. Basic circuit's elements such as, transformer, operational amplifiers, resistors, inductors, capacitors, dependent and independent sources are introduced. Simplification of electrical circuits is considered using various techniques, including Thevenin's and Norton's theorems. Single-phase circuits power analysis and first-order linear circuit analysis techniques are also presented.

**5. Instructional Strategies:**

Conference  
Discussion

**6. Minimum or Required Resources Available:**

P-Spice, MATHLAB, and demonstration of Practical Drive Systems in Laboratory

**7. Course time frame and thematic outline:**

Outline	Contact Hours
Circuit variables and units.	2.0

Electric circuits, current, voltage, power, energy, active and passive circuits, resistors, Ohm's law, independent sources, connecting voltmeter and ammeter, dependent sources, transducer, switches.	5.0
KCL, KVL, seriesresistor, voltage divider, parallel resistor, current divider	4.0
Techniques of circuit analysis: resistance equivalence, node voltage analysis, mesh analysis, superposition, Thevenin's theorem, and Norton's equivalent circuit	12.0
The ideal operational amplifier and applications	3.0
Inductance (L), Capacitance (C) and first ordersystems	4.0
AC, sinusoidalsources, phasors, impedance and admittance	6.0
Power; instantaneous, average (P), reactive (Q), complex (S) and power factor (pf). Maximum power transfer.	3.0
Coupled inductors, ideal transformer.	2.0
Three phase voltages, sequence, Y-Y circuit, analysis of Y-Y balanced circuit	1.0
Exams	3.0

## 8. Grading System:

Quantifiable (letters)

## 9. Evaluation Strategies:

	Quantity	Percent
Exams	3	20.00
Final Exam	1	20.00
Short Quizzes		10.00
Homework		10.00

## 10. Bibliography: text book, title, author and year and other supplement materials

Hambley, Allan R., Electrical Engineering Principles and Applications, 6th Edition, Prentice Hall, 2014.

## 11. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Chemistry Building, room 019) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

## 12. Contribution of Course to meeting the requirements of Criterion 5:

Engineering Topic

### Specific goals for the course

#	Course Outcomes	ABET Student Outcomes
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Person (s) who prepared this description and date of preparation: Raúl E.Torres, June 17, 2008

**Grading System:** A:100-90, B:89-80, C:79-70, D:69-60, F:59-0.

**Evaluation Strategies:**

Quizzes	10 pts
Assignments	50 pts
Partial Exams	300 pts (3 @ 100 pts each)
Final Exam	100 pts
Total Points:	460 pts

**Partial Exams:** All during class period. [Feb 15](#), [Mar 20](#), [Apr 22](#).

**Instructor:** José M. Rosado Román, PhD

Phone: 787-832-4040 x5832 (VoIP)

Office Hours: MWV 7:30-8:20, 10:30-11:20 in OF-327

E-mail: [jrosado@ece.uprm.edu](mailto:jrosado@ece.uprm.edu)

WWW: <http://ece.uprm.edu/~jrosado/>

**RULES IN CLASS:**

- Students are not allowed to leave the classroom during class except in exceptional circumstances.
- Exam attendance is required unless you have a medical excuse or equivalent documented emergency. The final exam will serve as reposition for any missed partial exams.
- Class attendance is required. You are expected to arrive on time to class. I reserve the right to lock the door after 5 minutes of class start for the benefits of the other students.
- Dishonest behavior, as commonly understood, which includes exam cheating or plagiarism, will result in at least a zero for the item, and for an aggravated incident, failure in the course and initiation of University disciplinary action. In research, you expect to build on others' work, but it should be very clear what is yours and what is theirs, clearly referenced or acknowledged.
- If there is a conflict with my Office Hours => schedule by appointment.
- No beepers and/or cellular phones are allowed during exams, and their use during classes should be limited to emergencies. Leave the room if the need to use it arises.
- No baseball caps allowed during quizzes or exams.
- No "special" projects will be given to anyone to improve grades or for any other reason.
- Disabilities: Reasonable accommodations will be coordinated in accordance with the needs of the student.
- Read your email frequently: I communicate announcements like quiz cancellation and changes by email.