

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

Course Syllabus

1. General Information:	
Alpha-numeric codification: INEL 5029 Course Title: TELECOMMUNICATIONS ELECTRONICS Number of credits: 3 Contact Period: Two hours of lecture per week and one two-hour laboratory per week Electives in INEL	
2. Course Description:	
English: Study of the theory of operation of radio frequency (RF) and microwave devices and components and fundamentals of RF design, with the purpose of understanding the operation of the different components of telecommunications systems	
Spanish: Estudio de la teoría de operación de dispositivos y componentes de radio frecuencia (RF) y de microondas y los fundamentos de las técnicas de diseño de sistemas de RF con el propósito de entender la operación de los diversos componentes de sistemas de	
3. Pre/Co-requisites and other requirements:	
Prerequisites: INEL 4301, INEL 4201, INEL 4152	
4. Course Objectives:	
After completing the course, the students should be able to use telecommunications theory principles, examine different applications and apply Fourier transforms, convolution, filtering, sampling, noise, modulation and demodulation, to solve communications electronics problems.	
5. Instructional Strategies:	
<input checked="" type="checkbox"/> conference <input type="checkbox"/> discussion <input type="checkbox"/> computation <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> seminar with formal presentation <input type="checkbox"/> seminar without formal presentation <input type="checkbox"/> workshop <input type="checkbox"/> art workshop <input type="checkbox"/> practice <input type="checkbox"/> trip <input type="checkbox"/> thesis <input type="checkbox"/> special problems <input type="checkbox"/> tutoring <input type="checkbox"/> research <input type="checkbox"/> other, please specify:	
6. Minimum or Required Resources Available:	
7. Course time frame and thematic outline	
Outline	Contact Hours
Radio communication systems	1
Two-port networks	5
Impedance matching	8
Noise in linear systems	2
RF filters	7
RF amplifiers	6
Oscillator circuits	4
Phase Lock loops	8
Mixer Circuits	7
Frequency Synthesizers	5
Modulators and Demodulators	4
Exams	3
Total hours: (equivalent to contact period)	60
8. Grading System	

Quantifiable (letters) Not Quantifiable

9. Evaluation Strategies (Suggested): The faculty member teaching the course will provide the student with the evaluation strategy he/she will be using throughout the semester. This will be done within the first week of classes.

	Quantity	Percent
<input checked="" type="checkbox"/> Exams	3	60
<input checked="" type="checkbox"/> Final Exam	1	20
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects		
<input type="checkbox"/> Journals		
<input checked="" type="checkbox"/> Other, specify: Lab work		20
TOTAL:		100%

10. Bibliography:

RF Circuit Design: Theory and Applications, Bogdanov, G., 2 Edition 2009, Prentice Hall.
 Practical RF Circuit Design for Modern Wireless Systems vol I, Besser and Gilmore, Artech House, 2003
 Practical RF Circuit Design for Modern Wireless Systems vol II, Gilmore and Besser, Artech House, 2003
 Microwave Circuit Design Using Linear and Nonlinear Techniques, Vendelin, Pavo and Rohde, John Wiley and Sons, 2005

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:

Math	Basic Science	General	Engineering Topic
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13. Course Outcomes

Map to Program Outcomes

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| 1. Describe the components of a communication system and explain the purpose of each component in the system | (b) |
| 2. Calculate the impedance, admittance, hybrid and scattering matrices for two-port networks | (a) |
| 3. Design impedance matching networks | (c) |
| 4. Calculate the noise parameters and the signal to noise ratio of communication systems | (a) |
| 5. Design lumped element RF filters and RF amplifiers | (c) |
| 6. Describe the operation of phase locked loops, frequency synthesizers, mixers and modulator and demodulator circuits | (b) |
| 7. Design simple mixers and oscillator circuits | (c) |
| 8. Design telecommunication electronics circuits using RF circuit simulators | (k) |
| 9. | |

Person(s) who prepared this description and date of preparation: Rafael Rodríguez, September, 2007.
 Submitted by: Rafael Rodríguez.