

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

**Course Syllabus**

<b>1. General Information:</b>	
Alpha-numeric codification: INEL5327 Course Title: Image Processing Number of credits: 3 Contact Period: 3 hours of lecture per week Elective in INEL and ICOM	
<b>2. Course Description:</b>	
English: Mathematical representation of 2-D digital signals. 2 D-filter design. Image coding standards. Image filtering, enhancement and comprensiion.	
Spanish: Representación matemática de señales digitales de dos dimensiones. Diseño de filtros de dos dimensiones. Codificación de imágenes. Filtraje, rextantación y comprensión de imágenes.	
<b>3. Pre/Co-requisites and other requirements:</b>	
INEL 5309, Digital Signal Processing	
<b>4. Course Objectives:</b>	
<b>5. Instructional Strategies:</b>	
<input checked="" type="checkbox"/> conference <input checked="" type="checkbox"/> discussion <input type="checkbox"/> computation <input 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:	
<b>6. Minimum or Required Resources Available:</b>	
<b>7. Course time frame and thematic outline</b>	
<b>Outline</b>	<b>Contact Hours</b>
Introduction	5
Digital Image fundamentals	5
Image Enhancement in Spatial domain	9
Image Enhancement in Frequency domain	8
Image Restoration	10
Image Compression	8
<b>Total hours: (equivalent to contact period)</b>	<b>45</b>
<b>8. Grading System</b>	
<input checked="" type="checkbox"/> Quantifiable (letters) <input type="checkbox"/> Not Quantifiable	
<b>9. Evaluation Strategies</b> (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	2	40
<input checked="" type="checkbox"/> Final Exam	1	25
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input checked="" type="checkbox"/> Projects	2	35
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

Gonzalez, Rafael and Woods, R. Digital Image Processing, 3rd Edition, 2007, Prentice Hall.  
M. Sonka, Image Processing, Analysis and Machine Vision, 2<sup>nd</sup> Ed. PWS Publishing, 1999  
D.J.Daniels, Surface Penetrating Radar, The IEE Print, London, England, 1996  
GSSI Inc. SIRveyor SIR-20 Equipment, GSSI Systems Inc. 2006

**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
			√

**13. Course Outcomes**

1. Sensing, acquisition, sampling, and relationships in Digital image
- 2.
3. Describe relationships in Digital image
4. Ability to enhance images using spatial transformations & spatial filters
5. Ability to smoothen & sharpen images using frequency domain filters
6. Restoration of images due to noise and degradations
7. Compression of images using different coding techniques
- 8.

**Map to Program Outcomes**

- (a)  
(b)  
(k)  
(k)  
(k)  
(k)

Person(s) who prepared this description and date of preparation: Hamed Parsiani. Submitted by: Miguel Vélez, Julio 07