The University of Texas at Tyler
Department of Electrical Engineering

EENG 5322: Image Processing

Syllabus

Catalog Description:

Digital Image Processing Fundamentals: acquisition, representation, storage and processing of binary, gray scale and color images; Image enhancement in the spatial domain and frequency domain; Image transforms, filtering, compression, morphological operations and wavelets; Color image processing; Image analysis and segmentation techniques.

Prerequisites:	COSC 1336 – Programming Fundamentals and MATH 3203 – Matrix Methods and EENG 4311 – Signals and Systems

Credits:	3	(		hours lecture,	0	hours laboratory per week)

Text(s):	Gonzalez and Woods, **Digital Image Processing, 3/E,** Prentice Hall, 2008 ISBN-10: 013168728X, ISBN: 9780131687288 **OR** Gonzalez and Woods, **Digital Image Processing, 4/E,** Pearson, 2018 ISBN: 9780133356724
Additional Material:	MATLAB Tools
Course Coordinator:	Dr. Mukul V. Shirvaikar, Professor

Topics Covered: (paragraph of topics separated by semicolons)

Digital Image Processing Fundamentals: acquisition, representation, storage and processing of binary, gray scale and color images; Image enhancement in the spatial domain and frequency domain; Image transforms, filtering, compression, morphological operations and wavelets; Color image processing; Image analysis and segmentation techniques.

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes[1]: By the end of this course students will be able to:

1. Explain digital image processing fundamentals including the acquisition, representation, storage and processing of images. [1]
2. Outline the differences between binary, gray scale and color image processing. [5]
3. Implement image processing techniques in the spatial domain. [5]
4. Demonstrate image processing techniques in the frequency domain. [1]
5. Design techniques for image compression, analysis and segmentation. [1]

6. Utilize modern software to design, debug and test image processing projects. [4]
7. Write laboratory reports with experimental results demonstrating visual and written communication skills [3]

[1]*Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Program Outcomes (Student Learning Outcomes)[2]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. **Breadth and Depth:** Students will be able to apply knowledge at a graduate level in two of the following areas: electronics, power systems, controls, advanced engineering mathematics, signal processing, communications, real-time systems, computer systems, electromagnetic and power electronics. [1]
2. **Modern Engineering Tools:** Students will be able to use modern engineering tools for analysis and design as applied to engineering problems. [6]
3. **Advanced Engineering Mathematics**: Students will be able to apply principles of advanced engineering mathematics including probability and statistics to engineering problems. [4]
4. **Systems Design**: Students will be able to apply systems design approaches including modeling and simulation of interacting sub-systems to complex engineering problems. [2, 3]
5. **Design Methods**: Students will be able to demonstrate application of design methodology by comparing and evaluating solutions to engineering problems.[5]
6. **Communication Skills**: Students will demonstrate effective oral, visual and written communication skills from a technical perspective. [7]

[2]*Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	3	hours
General Education Component:		hours

Prepared By: Mukul Shirvaikar, Professor Date: 16 January 2018