

## COT 5930 Digital Image Processing

**Credits:** 3 credits

**Text book, title, author, and year:** Oge Marques “**Practical Image and Video Processing Using MATLAB**”

Wiley/IEEE Press, 2011 ISBN-10: 0470048158 | ISBN-13: 978-0470048153

**Reference materials:** N/A

**Specific course information:**

**Catalog description:** Introduction to image processing principles, tools, techniques, and algorithms. Includes topics in image representation, analysis, filtering, and segmentation, and pattern recognition. Use of image processing software tools for lab assignments and projects.

**Prerequisites:** COP 3530 or permission from instructor. Graduate-level elective course for computer science, computer engineering, and electrical engineering.

**Specific goals for the course:** To introduce the most important concepts, techniques, and algorithms for digital image processing, and implement them using image processing software tools, particularly MATLAB.

More specifically, it should enable students to:

- Assess and understand the challenges behind the design of machine vision systems.
- Understand the general processes of image acquisition, storage, enhancement, segmentation, representation, and description.
- Implement filtering and enhancement algorithms for monochrome as well as color images.
- Appreciate the challenges and understand the principles and applications of visual pattern recognition.

**Brief list of topics to be covered:**

List of topics (textbook chapters in parentheses)

1. Introduction to image processing and computer vision (1)
2. Image processing basics (2)
3. MATLAB basics (3)
4. The Image Processing Toolbox (4)
5. Image sensing and acquisition (5)
6. Arithmetic and logic operations (6)
7. Geometric operations (7)
8. Image enhancement in the spatial domain (8, 9, 10)
9. Frequency domain filtering (11)
10. Image restoration (12)
11. Morphological image processing (13)
12. Edge detection (14)
13. Image segmentation (15)
14. Color image processing (16)
15. Feature extraction and representation (18)
16. Visual pattern recognition (19)

The course uses Blackboard for notes, assignments, announcements, and all course information (restricted to enrolled students).