Computer Engineering 5460: Machine Vision
Prior Number – Computer Engineering 347

Credit and Contact Hours
3 credit hours lecture (Three 50-minute or two 75-minute sessions per week are typical).

Instructor
Randy Moss, Ph.D.

Text(s)

Course Information
Course Description
Image information, image filtering, template matching, histogram transformations, edge detection, boundary detection, region growing and pattern recognition. Complementary laboratory exercises are required.

Prerequisites
Computer Engineering 2210 (111) and preceded or accompanied by Electrical Engineering 3410 (215). (Co-listed with Electrical Engineering 5460(347))

Required or Elective
Selected elective

Course Goals
General Outcomes
1. Learn about image sensing and how images are formed.
2. Learn what a binary image is, and about geometrical and topological properties of binary images.
3. Learn about image regions and different methods of image segmentation.
4. Learn selected topics in image processing necessary in machine vision.
5. Learn what constitutes an edge in an image and learn about various edge-finding techniques.
**Relationship of Course to Program Outcomes**

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<tr>
<th>ECE Outcome</th>
<th>Course Outcomes</th>
<th>Comments</th>
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<td>Lab exercises and semester project.</td>
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<td>Semester project teams might be somewhat multidisciplinary.</td>
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<td>Lab reports, class presentations and semester project reports all stress communication skills.</td>
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S – strong connection; M – medium connection; W – weak connection

**Topics Covered**

1. Introduction (1/3 week)
2. Image formation and sensing (2 weeks)
3. Binary images
   - Geometrical properties (1 1/3 weeks)
   - Topological properties (1 2/3 weeks)
4. Regions and image segmentation (1 week)
5. Image processing
   - Continuous images (1 2/3 weeks)
   - Discrete images (1 2/3 weeks)
6. Edges and edge finding (1 2/3 weeks)
7. Pattern classification (1 week)
8. Exams (2/3 week), Exam Review (2/3 week)