EE/CS-712: Image Processing (Fall 2019)

Meeting Time: Wed 5:30pm-8:15pm
Room: EMS E145

Instructor: Prof. Zeyun Yu
Office: EMS E327
Office Hours: Weds 11:00am-noon or by appointment
E-mail: yuz(at)uwm.edu


Tentative Schedule (The course materials will be available on D2L with your epantherID):

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>Readings</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>09/04</td>
<td>Overview of the Course</td>
<td>Chapter 01</td>
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<tr>
<td></td>
<td>Image Formation, Sensing, and Digitization</td>
<td>Chapter 2.1 - 2.4</td>
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<tr>
<td>09/11</td>
<td>Basic Mathematical Operations on Images</td>
<td>Chapter 2.5, 2.6</td>
<td>proj-1</td>
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<td>Basic Intensity Transformations</td>
<td>Chapter 3.1, 3.2</td>
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<td>09/18</td>
<td>Histogram Processing</td>
<td>Chapter 3.3</td>
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<td>Spatial Filtering</td>
<td>Chapter 3.4</td>
<td>proj-1 due</td>
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<tr>
<td>09/25</td>
<td>Spatial Filtering (Cont'd)</td>
<td>Chapter 3.5, 3.6</td>
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<tr>
<td></td>
<td>Fourier Transform and Convolution</td>
<td>Chapter 4.1, 4.2</td>
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<td>10/2</td>
<td>Sampling Theorem</td>
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<td>2D Fourier Transform</td>
<td>Chapter 4.4, 4.5</td>
<td>proj-2 due</td>
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<td>10/9</td>
<td>Discrete Fourier Transform (Cont'd)</td>
<td>Chapter 4.6</td>
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<td>Image Filtering in Frequency Domain</td>
<td>Chapter 4.7</td>
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<td>10/16</td>
<td>Image Smoothing Using Frequency Domain Filters</td>
<td>Chapter 4.8</td>
<td>hw</td>
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<td>Image Sharpening Using Frequency Domain Filters</td>
<td>Chapter 4.9</td>
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<td>10/23</td>
<td>Noise Models in Images</td>
<td>Chapter 5.1, 5.2</td>
<td>hw due</td>
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<td>Image Restoration via Spatial Filtering</td>
<td>Chapter 5.3</td>
<td>proj-3</td>
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<td>10/30</td>
<td>Midterm Exam</td>
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<td>11/06</td>
<td>Estimation of Degradation and Wiener Filters</td>
<td>Chapter 5.6 - 5.8</td>
<td>proj-3 due</td>
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<td>Image Reconstruction from Projections</td>
<td>Chapter 5.11</td>
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<tr>
<td>11/13</td>
<td>Edge Detection</td>
<td>Chapter 10.1, 10.2</td>
<td>term project idea due</td>
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<td>Image Thresholding</td>
<td>Chapter 10.3</td>
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<td>11/20</td>
<td>Region-based Image Segmentation</td>
<td>Chapter 10.4, 10.5</td>
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<td>Morphological Image Processing</td>
<td>Chapter 9.1 - 9.5</td>
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<td>11/27</td>
<td>No class (Thanksgiving holiday)</td>
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<td>12/04</td>
<td>Introduction to Image Compression</td>
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<td>Color Image Processing</td>
<td>Chapter 6.1, 6.2, 6.6</td>
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Important Notes:

- **Homeworks/Quiz:**
  There will be one written homework assignment.

- **Exams:**
  There will be one exam.

- **Projects:**
  There will be three individual projects and a final term project.

- **Grading Scheme:**
  *Class Attendance:* 5 points.
  *Homeworks:* 10 points.
  *Midterm Exam:* 30 points.
  *Individual projects:* 30 points (three individual projects).
  *Term Project:* 25 points.

- **Late Submissions:**
  All written homeworks should be submitted in class on the due dates.
  All project files should be submitted on D2L by midnight of the due date.
  Late submissions for projects are allowed for up to two days but will be marked down as follows: 10% for one day and 20% for two days.
  No late submission is permitted for homework assignments.

- **Working with Others:**
  You must write/code your homeworks/projects on your own. Copying from others' work (including Internet) without proper citation is prohibited and subject to penalties according to the University policy.

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Last updated by Zeyun Yu on August 28, 2019