COSC4590- Selected Topics: Image Processing and Computer Vision
Department of Computer Science
Fall 2015

A. COURSE INFORMATION

Course number/section: COSC5590-002
Class meeting time: TR 11:00-12:15 AM
Class location: CI 126
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Maryam Rahnemoonfar
Office location: CI-332
Office hours: TBD
Telephone: 361-825-2448
e-mail: maryam.rahnemoonfar@tamucc.edu
Appointments: Available by email

C. COURSE DESCRIPTION

This course introduces concepts and techniques for image processing and computer vision. The objective of this course is to introduce the fundamental techniques and algorithms used for processing and extracting useful information from digital images. Particular emphasis will be placed on covering methods used for image sampling and quantization, image transforms, image enhancement and restoration, image segmentation, mathematical morphology, 3D vision and object recognition. In addition, the students will learn how to apply the methods to solve real-world problems in several areas including UAVs, medical, remote sensing and surveillance and develop the insight necessary to use the tools of digital image processing to solve any new problem.

D. PREREQUISITES AND COREQUISITES

Prerequisites
None

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References
Supplies
None

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:
1. Describe basic principles of digital image processing;
2. Design and implement algorithms that perform basic image processing (e.g., noise removal and image enhancement);
3. Design and implement algorithms for advanced image analysis (e.g., object recognition, image segmentation, 3D vision);
4. Apply image processing algorithms in practical applications.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

This course will be a mixture of lectures and discussions. The student is expected to actively participate in all class activities. The student is also expected to do outside work on assignments and reading.

H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>20%</td>
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<tr>
<td>Assignments</td>
<td>30%</td>
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<tr>
<td>Final exam</td>
<td>20%</td>
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<tr>
<td>Class activity and participation</td>
<td>5%</td>
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<tr>
<td>Final Project</td>
<td>25%</td>
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I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
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<tr>
<td>2</td>
<td>Digital Image fundamentals</td>
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<tr>
<td>3</td>
<td>Spatial Filtering</td>
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<td>4</td>
<td>Spatial Filtering</td>
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<td>5</td>
<td>Filtering in Frequency domain</td>
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<td>6</td>
<td>Image restoration - Midterm exam</td>
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<td>7</td>
<td>Image restoration</td>
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<td>8</td>
<td>Color Image Processing</td>
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<td>9</td>
<td>Color Image Processing</td>
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<td>10</td>
<td>Morphological Image Processing</td>
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<td>11</td>
<td>Morphological Image Processing</td>
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<td>12</td>
<td>Wavelet</td>
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<td>13</td>
<td>Image segmentation</td>
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<td>14</td>
<td>Image segmentation</td>
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<td>15</td>
<td>Final Project – Final Exam</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness

Success in this course depends on your attendance and participation. Attendance and active participation is included as part of your grade and are essential to successfully completing this course.

Late Work and Make-up Exams

Late work penalty: 25% if one day late; 50% if two days late; zero credit if more than two days.

No makeup exam without adequate doctor's excuse explaining your absence. Makeup exams will not be the same exam. If for any reason you have a conflict you must see me as soon as you know about the conflict!

Cell Phone Use

Please refrain from the use of electronic devices during class, as it is distracting to
not only you, but also to your instructor and peers. Turn off all cell phones and beepers when you enter the classroom!

**Laptop Use**

Please refrain from the use of electronic devices during class, as it is distracting to not only you, but also to your instructor and peers. Laptops will be permitted for particular activities as deemed appropriate. No electronic devices are allowed during exam time.

**Food in Class**

No food is allowed.

**K. COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
  See Full University Policy at [http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity](http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity)

- **Classroom/Professional Behavior**

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, April 10, 2015. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must be submitted. After April 10, 2015 a student will not be allowed to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science
and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to http://disabilityservices.tamucc.edu/

- **Academic Honesty:** You are expected to avoid all forms of academic dishonesty as defined in Catalog. In addition, students are expected to behave in an ethical manner in all class activities. All work submitted for grading must be the student's own work. Plagiarism will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work of any type is allowed. It is the student's duty to allow no one to copy his or her work. Anyone found cheating and/or copying, in the exams or assignments, in the instructor's opinion, may receive an automatic F for the course.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.