Computer Vision COSC 6326
Department of Computing Sciences
Spring 2020

A. COURSE INFORMATION

   Course number/section: COSC-6326.001
   Class meeting time: TR 5:30 - 6:45 PM
   Class location: CI-109
   Course Website: Blackboard

B. INSTRUCTOR INFORMATION

   Instructor: Dr. Mohammed Yassine Belkhouche
   Office location: CI 305
   Office hours: MW 09:30-11:00 AM
                TR 03:00-04:00 PM
   Telephone: 825-3492
   e-mail: mohammed.belkhouche@tamucc.edu
   Appointments: By e-mail

C. COURSE DESCRIPTION

   Catalog Course Description
   This graduate course introduces concepts and techniques for machine vision. Particular
   emphasis will be placed on methods used for object recognition, machine learning, content-
   based image retrieval, image matching, 3D vision, tracking and motion analysis.

   Extended Course Description
   None.

D. PREREQUISITES AND COREQUISITES

   Prerequisites
   COSC 6324(Digital Image Processing)
   Corequisites
   None.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

   Required Textbook(s)
   1848829345)

   Optional Textbook(s) or Other References
      Prince(ISBN-10:1107011795)
   2. Multiple View Geometry in Computer Vision, 2nd Edition, By Richard Hartley and
Andrew Zisserman, (ISBN:0521540518)


**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. Understand the fundamentals of computer vision;
2. Select and apply the appropriate algorithms to solve computer vision related problems;
3. Describe various methods used in computer vision (e.g., object recognition, image registration, 2D/3D vision and objects tracking)
4. Apply machine learning algorithms to solve computer vision related problems.
5. Design and implement computer vision applications.

Assessment of objectives will be conducted through exams, laboratory exercises, and programming assignments.

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

This is a graduate-level core course. Students are expected to attend all classes. Regular completions of all homework/project assignments on time are essential for success in this course. Please note that this course has a heavy programming workload.

**H. MAJOR COURSE REQUIREMENTS AND GRADING**

Your course grade will be decided on your performance in the homework assignments, quizzes, and exams. The distribution of points is as follows:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exam I</td>
<td>15</td>
</tr>
<tr>
<td>Exam II</td>
<td>15</td>
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<tr>
<td>Final Exam</td>
<td>15</td>
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<tr>
<td>Homework assignments</td>
<td>30</td>
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<tr>
<td>Term Project</td>
<td>15</td>
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<tr>
<td>Quizzes</td>
<td>10</td>
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**Grading scale:** A: 100-90, B: 89-80, C: 79-70, D: 69-60, and F: 59-0.
Homework/Programming Assignments: Approximately 6-8 assignments will be given. No late homework assignments will be accepted. Partial credit will be given for incomplete assignments. There will be one term project.

Quizzes: Approximately 3-5 pop-up quizzes (dropping one or two). Each quiz is about 10 minutes long.

Exams: The first exam will be given on February 25, 2020, the second exam will be given on March 24, 2020 during the scheduled class time, and the final exam will be given on May 12, 2020 from 04:30 PM – 07:00 PM.

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Review of image processing</td>
<td>Chapter 3</td>
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<tr>
<td>Week 2</td>
<td>Review of image processing</td>
<td>Chapter 3</td>
<td>HW1</td>
</tr>
<tr>
<td>Week 3</td>
<td>Review of image processing</td>
<td>Chapter 3</td>
<td></td>
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<tr>
<td>Week 4</td>
<td>Feature detection and matching</td>
<td>Chapter 4</td>
<td>HW2</td>
</tr>
<tr>
<td>Week 5</td>
<td>Feature detection and matching</td>
<td>Chapter 4</td>
<td></td>
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<tr>
<td>Week 6</td>
<td>Segmentation</td>
<td>Chapter 5</td>
<td>HW3</td>
</tr>
</tbody>
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**Exam 1:** Wednesday, February 24, 2020

| Week 7 | Stereo correspondence                | Chapter 11 |             |
| Week 8 | Stereo correspondence                | Chapter 11 | HW4         |
| Week 8 | **Spring Break** - No Classes        |            |             |
| Week 9 | 3D reconstruction                    | Chapter 12 |             |

**Exam 2:** Wednesday, March 24, 2020

| Week 10| 3D reconstruction                    | Chapter 12 | HW5         |
| Week 11| 3D reconstruction                    | Chapter 9  |             |
| Week 12| Machine learning for computer vision | Chapter 9  |             |
| Week 13| Machine learning for computer vision | Chapter 14 |             |
| Week 14| Recognition                          | Chapter 14 | HW7         |
| Week 15| Recognition                          | Chapter 14 |             |
| Week 16| Recognition                          | Chapter 14 |             |

**Final Exam:** Tuesday, May 12, 2020 from 04:30 PM - 07:00 PM

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
Students are responsible for all materials covered in class and assigned. Should a student be absent from class, it is his/her responsibility to get the notes, etc. for that missed class. More important, should there be assignments, it is the student responsibility to obtain such assignments. No excuse will be accepted for assignments not turned in because the student was absent when it was due.

Late Work and Make-up Exams
There is a penalty for late submissions. Late assignments will be counted 20% off for each day after the due time. 100% penalty (i.e. no credit) if submitted after 5 days. If you have not completed your assignment by the due date, you should submit the work you have done for partial credit. No work will be accepted once the graded work has been returned or the solution has been disclosed to the class, except for unusual circumstances which the instructor feels reasonable. If you cannot attend the class to take the exam due to some emergency or some unavoidable situation (such as serious illness, death in the family, participation in university sports, religious observations, and so on) you must notify me as soon as possible before the exam and also you must validate your absence by providing me a document (e.g., with a letter from your doctor). Once your cause is validated a make-up exam will be given.

Cell Phone Use
Please refrain from using electronic devices during class, as it is distracting to not only you, but also to your instructor and peers. Silence your phones and put them away so you are not tempted to stray off task.

Laptop Use
Laptops, Tablets cannot be used in the class.

Food in Class
No food in the classrooms or labs.

Missed Exam
In the event, if you cannot attend the class to take the exam due to some emergency or some unavoidable situation (such as serious illness, death in the family, participation in university sports, religious observations, and so on) you must notify me as soon as possible before the exam and also you must validate your absence by providing me a document (e.g., with a letter from your doctor). Once your cause is validated a make-up exam will be given.

K. COLLEGE AND UNIVERSITY POLICIES

- Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject
to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day 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](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**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.
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.