EEE 221: Machine Vision
Course Syllabus - Spring 2015

Instructor: Fethi Belkhouche
Office: Riverside Hall 5028
E-mail: belkhouf@ecs.csus.edu
Phone: 8-7346
Meeting Time: Tuesday & Thursday 6:00-7:15pm
Meeting Place: RVR2010
Office Hours: Monday 09:00-10:00am & Thursday 8:00-9:00am & Friday 11:00-12:30pm

Reading:
- Carsten Steger, Markus Ulrich and Christian Wiedemann, Machine Vision Algorithms and Applications
- Linda G. Shapiro and George C. Stockman, Computer Vision.

Course description from catalog
Introduction to fundamental digital imaging processing concepts and their application to the fields of robotics, automation, and signal processing. Topics include: digital image filters, two dimensional transforms, boundary descriptors, Hough transform, automated visual inspection techniques, vision for robot control, 3-D vision, and hardware architectures to support vision. Units: 3.0

Learning outcomes
After successfully completing the course, students will be able to:
- Use mathematical modeling tools to represent digital images
- Perform transformations and filtering operations in the time and frequency domains to achieve desired outputs such as edge detection, noise removal, line and corner detection, and image smoothing.
- Apply morphological operations for shape recognition and template matching
- Use advanced algorithms such as support vector machines and artificial neural networks for object recognition and classification.
- Use stereo vision techniques and optical flow methods to study motion.
- Use contemporary numerical and simulation tools to implement methods and algorithms
- Communicate effectively in written and oral forms, and document and present results

Grading policy
Student performance in this course is evaluated based on homework, midterm exams, a project, and a final exam, weighted as follows:
- Homework: 10%
- Exam 1: 20%
- Exam 2: 20%
- Project: 25%
- Final exam: 25%
HOMEWORK

Homework is to be done individually. However, discussions about the homework between students are allowed and encouraged. Some homework problems require the use of Matlab or other numerical tools. Homework is assigned weekly and due in one week. Late homework will be returned without a grade.

PROJECT

The completion of a semester-long project is an important part of this course. Students are required to submit a written report and make a presentation at the end of the semester. Students are encouraged to choose their project. Students will work in groups of two to complete the project. Groups of three are allowed for more challenging projects.

EXAMS AND LETTER GRADES

There will be two midterm exams and a final exam. Schedule will be announced in class. The final exam is comprehensive. Make-up exams will not be given except in extraordinary circumstances. Letter grades ranges are:

- **A**: $A \geq 95; 90 \leq A- < 95$
- **B**: $87 \leq B+ < 90; 83 \leq B < 87; 80 \leq B- < 83$
- **C**: $77 \leq C+ < 80; 73 \leq C < 77; 70 \leq C- < 73$
- **D**: $67 \leq D+ < 70; 63 \leq D < 67; 60 \leq D- < 63$
- **F**: Below 60