**Basic Course Information:** CS 5190

Course Title: Computer Vision

Units: 3 units

CS classification number: C-2

Component: Lecture

Instructional Mode: Face-to-Face and web-assisted

Grading Basis: Graded only

Repeated Basis: May be taken only once

Cross listed Course: N/A

Dual-listed Course: N/A

Major course/Service course/GE course: Major course

Date Prepared: March 31, 2015

Prepared by: Amar Raheja

# I. Catalog Description

Representation of images. Image data acquisition. Morphological Image Processing. Image Segmentation. Representation of visual knowledge. Methods of object recognition, boundary detection, and image texture.

**II. Required Coursework and Background**

Pre-requisite(s): CS 3310 or consent of instructor.

# III. Expected Outcomes

On successful completion of this course, students will be able to:

* Learn the fundamentals of digital image representation
* Comprehend algorithms used for image enhancement
* Master the concepts of linear filters an edge detection
* Gain experience in texture
* Learn the concepts of segmentation using various methods

Outcomes of this course will build student capacity in each of the following areas as defined by programmatic objectives for the computer science major.

P-SLO 4. A breadth of advanced knowledge and skills in applied areas of computer science.

# IV. Instructional Materials

Required text:

Computer Vision: A Modern Approach, 2nd Edition

Authors: Forsyth and Ponce

Publisher: Prentice-Hall, 2011

ISBN: 978-0136085928

References:

Computer Vision

Authors: Richard Szeliski

Publisher: Springer

ISBN: 978-1848829343

# V. Minimum Student Material

Textbook and class handouts

# VI. Minimum College Facilities

A classroom with a projection system and a computer lab

# VII. Course Outline

* Image fundamentals
* Image acquisition
* Sources, Shadows and shading
* Color
* Linear filters
* Edge detection
* Texture
* Stereopsis
* Affine structure from motion
* Segmentation by clustering
* Segmentation by fitting a model
* Model based vision
* Applications

# VIII. Instructional Methods

Lecture

In-class exercises

Hands on practice

Project-based learning

# IX. Evaluation of Outcomes

A. Student Assessment

1. Quizzes

2. Lab assignments

3. Programming projects

4. Midterm exam

5. Final exam

B. Meaningful Writing Assignment

Short answer essay questions on exams will require students to explain and justify their response in writing.

C. A Matrix of Course Student Learning Outcomes vs Methods of Assessment

If the course is being evaluated for accreditation purposes, approved department accreditation assessment tools will additionally be utilized.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Learning Outcomes | Methods of Assessment | | | | |
| Quizzes | Lab Assignments | Programming Projects | Midterm Exam | Final Exam |
| Learn the fundamentals of digital image representation | x | x | x | x |  |
| Comprehend algorithms used for image enhancement | x | x | x | x | x |
| Master the concepts of linear filters an edge detection | x | x | x | x | x |
| Gain experience in texture | x | x | x |  | x |
| Learn the concepts of segmentation using various methods | x | x | x |  | x |