Georgia Tech Europe

CS 6476 Computer Vision

Credits	3 Lectures hours Semester Credit Hours: 3 0 Lab hours
Instructor	Prof. Cédric Pradalier, GTL, Adjunct in SOIC No other instructor of record at GTL
Bibliography	The main book will be the Ponce and Forsyth. Now that there is a second edition, it covers more of the material that makes up this course. The Szeliski book is a great reference but really more of a modern review of the state of the art methods – more appropriate for a graduate class.. There is a (legal!) on-line PDF of the Szeliski book so we will strongly recommend buying the Forsyth and Ponce and using Szeliski's digital version. FP: Forsyth & Ponce, Computer Vision: A Modern Approach (2nd Edition), Prentice Hall, 2011, ISBN-10: 013608592X, ISBN-13: 978-0136085928 (on Amazon) SZ: Richard Szeliski, Computer Vision: Algorithms and Applications (book Web site)
Learning Objectives:	As part of this class, students will learn about the computational tools, mostly from the machine learning toolbox, useful for the development of robotic applications. The objective is to get a hands-on experience with these tools through some theoretic background and a lot of project work.
Format:	We will use the Flipped Classroom paradigm. For each lecture, a slide set will be posted on Canvas, with a list of discussion questions. You need to read the slides and prepare the questions. The class will consist in

discussion of all the questions by randomly selected students, completed by the faculty.

Assessment

2 written exams: 2 x 10%, based on the questions discussed in class.

7 problems sets to be addressed individually: 80%

Academic integrity:

Students are encouraged to discuss the problem sets and readings outside of class. Projects are to be done individually but you may collaborate at the white board level. You may help each other with algorithms and general computation, but your code must be your own. REPEAT: THE CODE MUST BE YOUR OWN. ANYTHING TAKEN FROM THE WEB IS NOT YOUR OWN!!!!

Suspected cases of honor code violations will be handled through the Office of Student Integrity. If you have a question about collaboration policy, please ask.

Learning accommodations:

If needed, we will make classroom accommodations for students with documented disabilities. These accommodations must be arranged in advance and in accordance with the Office of Disability Services (http://disabilityservices.gatech.edu).

Excused absences policy:

http://www.catalog.gatech.edu/rules/4/

Pre-requisites:

This is a CS class, hence it assumes a familiarity with programming and computers, as well as a reasonable background in maths, in particular linear algebra and geometry. Support will always be available for technical issues.

Linear Algebra: being at ease with manipulating matrices, inverting matrices, extracted eigen values

Programming: The project and problem sets are designed to be developed in matlab, but most students are doing them in python, in jupyter notebooks.

Georgia Tech Europe

Description and Class Schedule:

Class Nr	Week	Topic
1	34	Introduction to computer vision Filters and convolution
2	35	Canny and edges Hough transform
3	36	Frequency, Fourier transform and compression Camera Models
4	37	Stereo vision 3D Vision
5	38	Photogrammetry Calibration
6	39	Two-View Geometry
7	40	Features
8	41	**QUIZZ 1** RANSAC
9	42	Optic Flow Motion Model
10	43	Tracking
	44	**RECESS**
11	45	Structure from Motion Classification (1)
12	46	Classification (2)
13	47	Classification (3) Introduction to CNN
14	48	Human Vision System Project Presentations
15	49	**QUIZZ 2**