1 Course Description

This class is an introduction to fundamental concepts in image understanding, the subdiscipline of artificial intelligence that tries to make the computers “see”. It will survey a variety of interesting vision problems and techniques. Specifically, the course will cover image formation, features, object and scene recognition and learning, multi-view geometry and video processing. The goal of the class will be to grasp a number of computer vision problems and understand basic approaches to tackle them for real-world applications.
## 2 Course Information

<table>
<thead>
<tr>
<th>Section</th>
<th>Location</th>
<th>Class Time</th>
<th>Tutorials</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEC2501 &amp; LEC5101 (Babak Taati)</td>
<td>BA 1130</td>
<td>Thursday 18:00 — 20:00</td>
<td>Thursday 20:00 — 21:00</td>
</tr>
<tr>
<td>LEC0101 (Sayyed Nezhadi)</td>
<td>RW 117</td>
<td>Thursday 13:00 — 15:00</td>
<td>Thursday 15:00 — 16:00</td>
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</tbody>
</table>

**Office Hours (online)**

Fridays 10:00-12:00 (all sections)

**Webpage**

[https://q.utoronto.ca/](https://q.utoronto.ca/)

Course material (lecture notes, reading material, assignments, announcements, etc.) will be posted on Quercus.

**Forum**

Quercus or Piazza (we will take a vote on the first day)

TAs will try to answer unanswered questions within 2 business days. **Do not expect immediate response** from the TAs. Do not expect answers during the weekends.

**Textbook**

[http://szeliski.org/Book/](http://szeliski.org/Book/) Richard Szeliski’s on-line textbook is a very good resource and is freely available online. We will assign readings from the Sept 3, 2010 version, but you can also check out the draft of the newer (2021) version on the same link. For newer topics we will assign papers and online material to read.

**Assignments**


Should be submitted on MarkUs.

You will automatically be added to MarkUs if you’re taking the course. Please do not email me or the teaching support staff if you are not on it yet at the beginning of the semesters. This will happen in a week or two.
3 Instructor

Name Babak Taati (Sections LEC2501 & LEC5101)
Sayyed Nezhadi (Section LEC0101)

Email csc420-2021-09@cs.toronto.edu (use this email if you want to reach both instructors)
taati@cs.toronto.edu (use this email if you want to reach BT (LEC2501 & LEC5101)
snezhadi@cs.toronto.edu (use this email if you want to reach SN (LEC0101)

We will not respond to CSC420 related emails sent to our other email addresses.
You must include CSC420 in the subject line.
Questions about the course material and assignments must be posted on the forum
or asked during office hours.
Do not attempt to send zip files via email, they will be deleted by the mail server.

4 TAs

(all 3 sections of the course)

Parsa Mirdehghan
Wenzheng Chen
Soroush Farghadani
Mohamed Khodeir
Kian Kianpisheh
Selena (Zihan) Ling
Abhishek Moturu
Balagopal Unnikrishnan
Dhruv Verma
Haoping Xu

Please do not email the TAs to ask questions. Answering email questions is not part of their contract
and they are instructed not to respond. Please post questions about the course material and assignments
on the forum, or ask them during the office hours.

5 Grading

Assignments 65%

There will be 4 assignments, posted every two weeks, starting
with the second week. Assignments 1, 3, and 4 will be
worth 15% of the grade. Assignment 2 will be worth 20%
of the grade. Assignments will consist of problem sets and
programming problems with the goal of deepening your un-
derstanding of the material covered in class.

Final exam 35%
6 Policy

Assignments
For each assignment, you are allowed to work together with one other student in class. However, you are still expected to write the solutions/code/report in your own words; i.e. no copying. If you choose to work together with another student, you must write this in your assignment submission. For example, on the first line of your report.pdf file (after your own name an information, and before starting your answer to Q1), you should have a sentence that says: “In solving the questions in this assignment, I worked together with my classmate [name & student number]. I confirm that I have written the solutions/code/report in my own words.”

Deadline
The solutions to the assignments should be submitted by 10:59:00 pm on the date they are due. The first hour (up to 11:59:00 pm) incurs no lateness penalty. After that, from 61 minutes late to 24 hours will count as one late day.

Lateness
Each student will be given a total of 3 free late days (grace tokens). This means that one can hand in three of the assignments one day late, or one assignment three days late. It is up to the student to make a good planning of his/her work. After one has used the 3 day budget, the late assignments will not be accepted.

Plagiarism
We take plagiarism very seriously. Assignments must represent your own work. Read how not to plagiarize: http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize.

Special considerations
Extensions will only be given with UofT approval (formal signed letter of accommodation from the university accessibility services office) and up to a maximum of 7 days.

Remark requests
Within 1 week only. Will not be accepted afterwards.
7  Deadlines

The table provides tentative dates on which assignments will be posted and their due date.

<table>
<thead>
<tr>
<th>Term Work</th>
<th>Post Date</th>
<th>Due Date</th>
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</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>Thursday Sep 16</td>
<td>Monday Oct 4</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>Thursday Oct 7</td>
<td>Monday Oct 25</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>Thursday Oct 28</td>
<td>Monday Nov 15</td>
</tr>
<tr>
<td>Assignment 4</td>
<td>Thursday Nov 18</td>
<td>Monday Dec 6</td>
</tr>
</tbody>
</table>

8  Course Schedule

A tentative schedule for this term is as follows:

<table>
<thead>
<tr>
<th>Week #</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep 9</td>
<td>Introduction &amp; linear filters</td>
</tr>
<tr>
<td>2</td>
<td>Sep 16</td>
<td>Edges</td>
</tr>
<tr>
<td>3</td>
<td>Sep 23</td>
<td>Image pyramids &amp;</td>
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<tr>
<td>4</td>
<td>Sep 30</td>
<td>Deep learning</td>
</tr>
<tr>
<td>5</td>
<td>Oct 7</td>
<td>Deep learning</td>
</tr>
<tr>
<td>6</td>
<td>Oct 14</td>
<td>Corner detection &amp; optical flow</td>
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<tr>
<td>7</td>
<td>Oct 21</td>
<td>Scale-invariant keypoints &amp; SIFT</td>
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<tr>
<td>8</td>
<td>Oct 28</td>
<td>Affine transformation &amp; RANSAC</td>
</tr>
<tr>
<td>9</td>
<td>Nov 4</td>
<td>Camera models &amp; homography</td>
</tr>
<tr>
<td>-</td>
<td>(reading week)</td>
<td>-</td>
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<tr>
<td>10</td>
<td>Nov 18</td>
<td>Homography (cont’d)</td>
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<tr>
<td>11</td>
<td>Nov 25</td>
<td>Stereo</td>
</tr>
<tr>
<td>12</td>
<td>Dec 2</td>
<td>Object detection</td>
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</tbody>
</table>