COMP 3301 — VISUAL COMPUTING AND APPLICATIONS

Winter 2018

Department of Computer Science
Memorial University of Newfoundland

Instructor:
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Lectures:
Time slot: Monday, Tuesday, & Thursday 1:00 ~ 1:50pm
Room: EN-1051
Website: http://www.cs.mun.ca/~gong/Courses/comp3301/
Office hour: After lectures or by email appointments. Efforts will be made to respond to emails within 24h, with the exceptions of weekends and holidays.

Course Description:
Visual perception is responsible for most of our impressions about the world around us. This course introduces how computers are used to both mimic the human visual system (e.g., recognize shapes) and to create visual content (e.g. synthesize images). Related techniques on image processing, image analysis, and image synthesis are discussed under a unified framework. How visual computing principles were used to create visual effects in movies and commercials are also examined.

Prerequisite: COMP 2002

Evaluation:
Assignments (5): 40%
Midterm exam: 20%
Final exam: 40%

Note: If you missed the midterm or assignment deadline due to documented illness or emergency, notify the instructor within a week and the weights will be roll into the final exam.
The Desire2Learn website (https://online.mun.ca/) is used for posting all assignments and you are required to check regularly regarding to assignment
announcements and due dates. All assignments are due at the specified time and dates. Late submissions will not be accepted. Finished assignment must be submitted online via Desire2Learn. Physical submissions are not required.

Course Topics:

- **Introduction:**
  human perception; intensity & color; image acquisition; display hardware

- **Image basics:**
  image representation; intensity histogram; histogram operation; image blending;

- **Image filtering:**
  image filtering; smoothing & sharpening filters; Fourier transformation; frequency-domain filters;

- **Raster graphics:**
  line & circle generation; line clipping; polygon filling;

- **Binary images:**
  intensity thresholding; digital halftoning; morphology operation; distance transform;

- **Image analysis:**
  edge detection; Hough transform; region-based segmentation; corner detection;

- **Image synthesis:**
  geometric operations; warping & sampling; feature-based warping; image morphing;

- **Image matching**
  template matching; motion estimation; multiscale processing;

Teaching Schedule (Tentative):

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