**Computing Science Course Outlines**  
**2018 Spring**

**CMPT 888 - G200 Special Topics: Computational Photography**

**Instructor(s):** Yasutaka Furukawa  
**SFU Burnaby**

**Calendar Objective/Description:**
Examines current research topics in computer graphics, human computer interaction (including audio), computer vision and visualization.

**Instructor's Objectives:**
This course is cross-listed with CMPT 469

The aim of this course is to study ways in which samples from the real world (images and video) can be used to generate compelling computer graphics imagery. We will learn how to acquire, represent, and render scenes from digitized photographs. Several popular image-based algorithms will be presented, with an emphasis on using these techniques to build practical systems. This hands-on emphasis will be reflected in the programming assignments, in which students will have the opportunity to acquire their own images of indoor and outdoor scenes and develop the image analysis and synthesis tools needed to render and view the scenes on the computer.

**Prerequisites:**
None

**Topics:**
- Cameras, Image Formation  
- Image and Video Processing (filtering, anti-aliasing, pyramids)  
- Image Manipulation (warping, morphing, mosaicing, matting, compositing)  
- Data-driven Synthesis  
- Visual Perception  
- High Dynamic Range Imaging and Tone Mapping  
- Image-Based Lighting  
- Image-Based Rendering  
- Non-photorealistic Rendering

**Grading:**
Programming assignments (60%), final project report (30%), and final project presentation (10%).

**Recommended Books:**

**Academic Honesty Statement:**
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).