Note that this course requires intensive programming in Javascript or C/C++. This course is about the programming of 3D computer graphics. During the first half of this course, we will focus on the high-level programming of 3D graphics applications using the WebGL. (This approach, as the author of the textbook describes it, is like leaning to drive a car without having to know what's under the hood.) Some publicly available digital 3D models will be provided as input to your 3D rendering programs. Then, during the second half of this course, we will study the fundamental theory and advanced topics such as texture mapping, curve surfaces, and global illumination. There is also a final project with the goal of achieving high performance and better rendering quality in your 3D rendering programs.

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Textbooks:  

References:  

Grading (subject to change): Assignments: 50%, Exams: 15%, Final Project: 30%, Class Participation: 5%

Topics and Schedule: (subject to change)

Part I: Leaning to Drive -- Writing 3D Applications  
- Overview (1 week)  
- WebGL & OpenGL Programming (2 weeks)  
- Transformations (1 week)  
- Viewing (1 week)  
- Lighting (1 week)  
- Shadow (1 week)

Part II: Under the Hood: Implementation of a Renderer  
- Geometric Processing (1 week)  
- Hidden Surface Removal (1 week)  
- Scan Conversion (2 weeks)  
- Texture Mapping (1 week)

Part III: Advanced Topics  
- GPU Programming, Curves and Surfaces, Animations, Global Illuminations, …etc. (3-4 weeks)