CS 6670 Introduction to Computer Aided Geometric Design
Instructor: Professor Elaine Cohen

Goal:
To learn principles, current practices, and outstanding research issues in the area of Computer Aided Geometric Design, with emphasis on B-spline curve and surface representations, techniques in modeling. Discussions in class introduce application area problems and current solution methodologies. B-splines are seeing new uses in visualization, frequently for representation and smoothing filters and analysis, including the new engineering analysis approach "Isogeometric Analysis," based on using B-spline variants for both the design representation and the simulation basis.

The course introduces these additional areas as well as application areas such as creating models for laser cutters and issues in 3D printing models of sculptured surfaces.

		
Laser cut smiley face	3D printed links	Same model: machined and made into paper model.

Grading is based on assignments that evaluate written and programming homeworks, several projects with output to laser cutters and 3D printers, and a final exam.

Learning Outcomes:
The students should come away from this class with

- A knowledge of contemporary issues .
- An ability to apply knowledge of relevant mathematics to solve domain design engineering problems
- An ability to program the concept algorithms in order to apply to design problems.
- Sufficient knowledge of the representations and problem solution methodologies to apply them to research problems in other areas.

Syllabus for CS6670

Instructor: Elaine Cohen
Office: WEB 2891

Semester: Fall 2018
Draft as of 1 August 2018. Subject to change

References to chapters are to the course text: *Geometric Modeling with Splines*,
E. Cohen, R. Riesenfeld, and G. Elber,
A.K. Peters, pub.

Week	**Week of**			**Ch**	Assignments
1	Aug 20	2	Conics, Sec. 3.73.92, inclusive	3	Project Introduction
2	Aug 27	2	Bezier Curves;	5	Written Assignment 1: assigned 8/29, due: 9/12
3	Sep 3	1	*Mon: no class*, Wed:Bezier Curves	5	Programming Assignment 1 assigned 9/5, due 9/23
4	Sep 10	2	Bezier Curves;	5	
5	Sep 17	2	Curves to Laser Cut /B-splines	6	
6	Sep 24	2	B-Splines	6,7	Written Assignment 2: assigned 9/24, due 10/5, 11:59pm
7	Oct 1	2	B-Splines	8	Programming Assignment 2, Assigned 10/1, due 10/19, 11:59pm
8	Oct 8	0	*no classes: Fall Break*		
9	Oct 15	2	B-Spline Data fitting	9	
10	Oct 22	2	B-Spline Surfaces	13	Written Assignment 3: assigned 10/22, due 11/11, 11:59pm
11	Oct 29	2	B-Spline surfaces	13	Programming Assignment 3, assigned 10/29, due 11/26, 11:59pm
12	Nov 7	2	B-Spline surface fitting	14	
13	Nov 14	2	B-spline models to 3D printing/fittiing	14	
14	Nov 19	2	B-spline surface fitting	14	

15	Nov 26	2	Differential Geometry-Curves	4	
16	Dec 3	2	Differential Geometry - Surfaces	12	Final Project Due.
	Final		Wednesday, December 12, 2018, 1:00p to 3:00p		

Grading based on: Written Assignments , Programming Assignments , Project(s), and Final exam.