Miami Dade College

Course Description

ARC2178C| Introduction to Building Surfacing | 4.00 credits

A BIM course introducing building surfacing and form finding technology. Students will learn the practice of creating complex building models and non-traditional architectural geometries, exploring design intent modeling, and generating solid models from surface models through AEC related objects. Design drivers, computational geometry, and advanced assembly techniques are explored. Prerequisite: ARC 2180C

Course Competencies

Competency 1: Students will explore the theory of advanced surfacing by:

1. Exploring surface design in architecture, engineering, and construction models
2. Exploring the generative shape design workbench
3. Examining design intent in a surfacing strategy

Competency 2: Students will explore strategies for geometrical elements management by:

1. Utilizing graphical properties of a geometrical set, individual feature, and visualization techniques
2. Exercising feature management of geometrical sets, feature name, ordered geometrical sets, and managing groups
3. Investigating model structure and performing updating
4. Becoming familiar with operations tools, contextual menus, datum elements, multi-result management, and support work

Competency 3: Students will become familiar with advanced wireframe elements by:

1. Utilizing reference geometry, extremum and extremum polar elements
2. Applying projected geometry, combines and reflect lines
3. Utilizing offset geometry, parallel curves, and 3d curves offsets
4. Utilizing curve geometries, spirals, spines, and isoperimetric curves
5. Utilizing circle-conic geometry

Competency 4: Students will become familiar with swept and blend surfaces by:

1. Applying surface features in the work benches
2. Working with swept surfaces
3. Applying explicit profiles-with references surface and positioned profiles
4. Applying explicit profiles-with two guides curves
5. Utilizing line profile-two limits, length options, and second curves as a middle curve
6. Applying line profile with draft direction
7. Applying circle profiles-center and two angles
8. Utilizing adaptive sweep and blended surfaces

Competency 5: Students will become familiar with the concept of surface fillets by:

1. Creating surface fillets
2. Modifying shape fillet, hold curve and spine
3. Creating edge fillets, propagation types, edges to keep functions, limiting elements and trim ribbons
4. Utilizing variable radius fillets, propagation & transition types, edges to keep and limiting elements
5. Creating circle fillets
6. Creating face-to-fillets face, limiting element, hold curve and spine
7. Applying tri-tangent fillet and limiting element

Competency 6: Students will become familiar with law and the knowledge capture by:

1. Controlling parameters with a law
2. Utilizing law features, x-parameter and definition

Competency 7: Students will explore the process of duplication tools by:

1. Utilizing duplication tool bars
2. Utilizing repetition, object repetition, points and planes repetition, and planes repetition
3. Patterning surface features
4. Duplicating a geometrical set

Competency 8: Students will explore the process of element replacement and orientation by:

1. Comparing element replacement multi-model links to replace
2. Applying element direction and inversion, curve/surface orientation, identification, invert orientation and the downstream effects

Competency 9: Students will explore the process of surface analysis and repair by:

1. Explaining surface analysis and repaired tools
2. Analyzing surface error display, 3d accuracy, display mode, and color
3. Connecting checker, porcupine curvature, and surface curvature analysis
4. Performing temporary analysis and repairing surface geometry

Learning Outcomes:

- Solve problems using critical and creative thinking and scientific reasoning
- Use quantitative analytical skills to evaluate and process numerical data
- Demonstrate an appreciation for aesthetics and creative activities
- Describe how natural systems function and recognize the impact of humans on the environment