

Rhinoceros & Grasshopper

Course details



Rhinoceros

DESCRIPTION

Rhinoceros 3D: Modeling in 3D is the process of creating a mathematical representation of an object's surfaces. Rhino is a 3D modeling software that provides tools for creating, displaying and manipulating these surfaces. A surface in Rhino is fundamentally a NURBS based geometry, which is known by its flexibility to model any shape from 2D line to the most complex 3D free form organic surface or solid. Rhino is used in Marine, Aerospace, Automobile, Exterior design, Product design and many other applications.

Grasshopper: is a visual programming language developed by David Rutten at Robert Mcneel and Associates, It runs within the Rhinoceros 3D CAD applications. If Rhino alone offers the opportunity to 3D model objects, then Grasshopper and Rhino, in tandem, offer the opportunity to define parametric control over the model. Together they offer the capability to explore generative design workflow, a design method in which 2D and 3D forms are generated by set of rules and relations. Grasshopper has the power to explore design possibilities through quick, variable and desirable outcomes.

OBJECTIVES:

Rhinoceros 3D: This course will provide students with the essential skills and knowledge in key modeling techniques for using curves, surfaces and solids. The teaching flow will start with a quick overview of Rhino's functions, followed by set of case studies to elaborate how those functions can set together to build up a 3D model. By the end of this course, students will have gained basic skill in conceptualizing ideas and how to model them in 3D environment.

Grasshopper: This course will provide students with essential skills to be able effectively use Grasshopper. The course starts with overview of parametric design history and powerful applications in current professions. This to be followed by introduction to Grasshopper interface and seven sessions where students get training on various parametric concepts and ability to think algorithmically through lectures, case studies as well as home exercises. By the end of the course, students shall gain introductory knowledge to allow them dive in further in grasshopper and it is advanced applications within creative practices.

TRAINING STRUCTURE:

Rhinoceros 3D & Grasshopper

COURSE TEXTBOOKS AND OTHER READING MATERIALS:

Web Resources:

- [Rhino Help](#)
- [Rhino Community](#)

PREREQUISITES:

- Basic knowledge and skills about using computers.
- 2D AutoCAD Tool is Essential
- 3D Knowledge is Preference



+2 010000 50300

+2 010000 93429



Cairo: 2 Hassan Afify St., Makram Ebeid, Nasr City.

Alex: Mostafa kamel st., Smoha

Kuwait: Mubarak Al kabier., Sabah Al Salem.



www.cadmasters.org



COURSE GRADING:

To pass the course and receive both Rhinoceros certificate & CAD MASTERS certificate you should:

- Attend at least 80% of course hours
- Score more than 70% as a total score
 - Interactive Question in Class
 - Home Assignments
 - Course Exam

Course Outline:

This course including the following:

1. Rhinoceros

A. Know Rhinoceros 3D

1. Examples of Rhino Applications
2. Rhino Interface / Navigation / Selection / Object types
3. Rhino Transformation / Construction Plane
4. Accurate Modelling

B. Case Study 01: Solid Modeling

1. Work with Coordinates and Object Snap
2. Solid Modeling

C. Case Study 02: Curves and Surface Modeling

1. Curves Types Creation and Editing
2. Surface Types Creation and Editing

D. Case Study 03: Organic Form Modeling

1. Control Point Editing
2. Curve / Surface Creation
3. Curve / Surface Editing

E. Additional Modeling Techniques

F. Exercise in Class + Import/Export

1. Exercise to be completed during class.
2. Import Export file formats
3. Basic Rhino Render (to be decided)

2. Grasshopper

A. Know Grasshopper 3D

1. History of Parametric Design
2. Grasshopper UI and Anatomy of Definitions
3. Data Input, Output and Storage
4. Logical Flow



+2 010000 50300

+2 010000 93429



Cairo: 2 Hassan Afify St., Makram Ebeid, Nasr City.
Alex: Mostafa kamel st., Smoha
Kuwait: Mubarak Al kabier., Sabah Al Salem.



www.cadmasters.org



B. Work with Algorithm

1. Transfer from Rhino to Grasshopper
2. Through Grasshopper Tools
3. Design with List or Data Trees
4. Short Examples

C. Control Your Algorithm

1. Curve Geometry Primitive and Free Form
2. Data Matching
3. List management (List Item/Reverse List/Shift List/Merge, Etc.)
4. Short Examples

D. Design with Transformation

1. Basic Transformation (Scale/Rotate/Move/Orient)
2. Curve Analysis and Utilities
3. Vector
4. Series and Domain
5. Case Study

E. Design with Math + Course Project Launch

1. Math (Operators and Logics)
2. Functions and Expressions
3. Point List
4. Graph Mapper
5. List management (Weave and Sort)
6. Short Example

F. Project Discussion

1. Course students design their own definition for a parametric model
2. In class assessment and Feedback

G. Design Openings Pattern

1. Surface Subdivision
2. Surface Analysis and Utilities
3. Shape on Surface
4. Curve Pull / Project on Surface
5. Surface Split

Finalize Course Project

1. Course Students improved their model based on session 06
2. Course Students design pattern of surface openings
3. In class assessment and Feedback



+2 010000 50300

+2 010000 93429



Cairo: 2 Hassan Afify St., Makram Ebeid, Nasr City.
Alex: Mostafa kamel st., Smoha
Kuwait: Mubarak Al kabier., Sabah Al Salem.



www.cadmasters.org



**CERTIFIED
INDUSTRIAL
ENGINEER**
BY ISOL FOUNDATION