COURSE CONTENT

Course Code	DR3002
Course Title	Computer Aided Design II
Pre-requisites	DR2005
No of AUs	3
Contact Hours	39 hours lab contact

Course Aims

This course is designed to expose design students to an intermediate level of principles, concepts and techniques related to computer-aided design for concept development, presentation and technical documentation. Students will develop competencies in the use of modeling, rendering, animation, presentation and parametric software to support their design studio projects.

Intended Learning Outcomes (ILO)

By the end of the course, you should be able to:

1. Identify and discuss advanced surface modeling, sub-division modeling, parametric modeling, and key-frame animation principles and processes.
2. Demonstrate techniques in advanced surface modeling, sub-division modeling, parametric modeling, and key-frame animation.
3. Apply methods to develop 3D models and animations of product design concepts.
4. Present various computer aided design assignments in a clear and cohesive manner using 3D models, renderings, and animations.
5. Constructively discuss, critique, and contribute to problem solving of fundamental 3D modeling, rendering and animation techniques employed by peers.

Course Content

This course focuses on intermediate principles and techniques for the design, visualization and presentation of product designs such as consumer products, environments, and furniture amongst others.
Building on the content and assignments from the DR2005 Computer Aided Design I course, you will go through a series of assignments with increasing complexity and variety to bring your modeling and presentation skills to an intermediate level.

Advanced Surface Modeling
Intermediate level three-dimensional NURBS (Non-Uniform Rational B-Spline) surface modeling, with emphasis on curve and surface continuity.

Sub-division Modeling
Introduction to Sub-division modeling principles and techniques.

Animation

Introduction to keyframe animation of three-dimensional computer models.

Parametric Modeling workflow and documentation
Introduction to integrated workflow for associative parts, assembly and drawings creation using parametric modeling programs.

Class assignments
You will produce a series of increasingly complex assignments and develop your understanding of intermediate and advanced computer-aided design principles and techniques, through lectures, tutorials, class exercises and peer/instructor feedback sessions.

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Programme LO	Weighting	Team/ Individual
Continuous Assessment Advanced NURBS Surfacing Assignment Sub-Division Modeling assignment Animation Assignment	1,2,3,4	--	 15% 15% 20%	Individual
Final Project: Parametric Modeling Workflow & Documentation	1,2,3,4	--	30%	Individual
Continuous Assessment: Participation	5	--	20%	Individual
Total			100%	

Reading and References

REQUIRED TEXT

1. Robert McNeel & Associates. *Rhinoceros Level 2 Training Manual v5.0*, 2013.

RECOMMENDED TEXTS

1. Cheng, Ron KC. *Inside Rhinoceros 5*. Cengage Learning, 2013.
2. Tran, Paul. *SOLIDWORKS 2018 Basic Tools*, SDC Publications, 2017
3. Birn, Jeremy. *Digital lighting & rendering*. Pearson Education, 2014.
4. Danaher, Simon. *The complete guide to digital 3D design*. The Ilex Press Ltd, 2004.

Course Policies and Student Responsibilities

(1) General

You are expected to complete all assigned readings, activities, assignments, attend all classes punctually and complete all scheduled assignments by due dates. You are expected to take responsibility to follow up with assignments and course related announcements. You are

expected to participate in all project critiques, class discussions and activities.

(2) Punctuality

You are expected to be punctual for all classes. If you are more than 30 minutes late, you will be deemed as absent and will not be able to sign on the attendance register.

(3) Absenteeism

In-class activities make up a significant portion of your course grade. Absence from class without a valid reason will affect your participation grade. Valid reasons include falling sick supported by a medical certificate and participation in NTU's approved activities supported by an excuse letter from the relevant bodies. There will be no make-up opportunities for in-class activities.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Planned Weekly Schedule*

*Subject to adjustment by instructor according to the teaching situation, students' progress, public holidays and unforeseeable circumstances. A revised schedule will be issued to students at the start of the semester.

Week	Topic	Course LO	Readings/ Activities
1 -2	**Rhinoceros Advanced Surface Modeling 1** Introduction to advanced modeling principles and techniques	1, 2, 3,	**Lecture & Tutorial** Curvature Continuity Curve evaluation Surface Continuity Surface Evaluation Surface Hierarchy **ASSIGNMENT 1 issue**

3	**Assignment 1 presentation**	1,3,4,5	**Student Presentations** on Assignment 1 with critique and feedback
4-5	**Sub-division Modeling** Wk4 - Introduction to Sub-division modeling principles and techniques Wk5 – Application of Sub-division modelling to the assignment	1, 2, 3	**Lecture & Tutorials** Basic Interface Sub-division principle Modeling Techniques Symmetry **ASSIGNMENT 2 issue**
6	**Assignment 2 presentation**	1,3,4,5	**Student Presentations** on Assignment 2 with critique and feedback
7	**Animation** Introduction to Product Animation principles and techniques	1, 2, 3	**Lecture & Tutorial** Animation Principles Animation Transforms Animating views Animation Rendering **ASSIGNMENT 3 issue**
8	**Assignment 3 presentation**	1,3,4,5	**Student Presentations** on Assignment 3 with critique and feedback
9	**Integrated Parametric Workflow & Documentation** Introduction to part, assembly and drawings using parametric solid modeling. Apply processes to assignment.	1, 2, 3	**Lecture & Tutorial** Introduction to workflow Basic Software Interface Part Creation Sketch and Feature Modeling Assembly Creation Drawing Creation **ASSIGNMENT 4 issue – Main Project**
10 - 12	**Assignment - studio work.** Applying process to assignment		**Independent and project-based learning**
13	**Assignment 4 presentation** **Portfolio Submission**	1,3,4,5 1, 2, 3	**Student Presentations** on Assignment 4 with critique and feedback **Digital Folio due** Softcopy Submission