

Syllabus

Course Description

Course Title	Drawing 3D CAD
Course Code	97096
Course Title Additional	
Scientific-Disciplinary Sector	CEAR-10/A
Language	English
Degree Course	Bachelor in Design and Art - Major in Design
Other Degree Courses (Loaned)	
Lecturers	Sig. Ofer Kristal, Ofer.Kristal@unibz.it https://www.unibz.it/en/faculties/design-art/academic-staff/person/49270
Teaching Assistant	
Semester	All semesters
Course Year/s	1st
CP	8
Teaching Hours	240
Lab Hours	0
Individual Study Hours	80
Planned Office Hours	24
Contents Summary	The course introduces students to the fundamentals of representing a project in its geometric and spatial components and to digital design, modelling and 3D visualization techniques.
Course Topics	The course Drawing 3D CAD I & II introduces first-year students to digital modeling through an integrated computational workflow combining explicit modeling in Rhinoceros, algorithmic control in Grasshopper, high-fidelity AI visualization via Vizcom, and digital fabrication preparation. The aim is to equip future designers with fluid cross-platform spatial reasoning, essential digital geometry vocabulary, robust 2D/3D representation skills, and an enduring

	passion for computational tools as creative mediums. Before touching software, students develop a disciplined visual intelligence to analyze, deconstruct, and synthesize forms—learning to master spatial logic prior to digital execution. Rather than separating platforms by semester, Rhino, Grasshopper, Vizcom, and complementary tools are taught continuously across both semesters as a unified, evolving toolkit. During the first semester, students focus on foundational form analysis, precision NURBS modeling, core geometric terminology, and introductory parametric logic, grounding these digital concepts through additive and formative fabrication principles. The second semester advances into complex data structures, algorithmic geometry generation, and surface rationalization, culminating in subtractive fabrication logic. Throughout the year, hybrid CGI visualization, rigorous representation techniques, and file-to-factory workflows prepare students for advanced design challenges and professional portfolio development.
Keywords	Rhinoceros, Grasshopper, Digital Morphology, Computational Design, Parametric Logic, Form Analysis, Digital Fabrication, Spatial Representation, CGI Visualization, Cross-Platform Workflows
Recommended Prerequisites	
Propaedeutic Courses	none
Teaching Format	The course is delivered through an interactive, studio-based learning environment structured around the following formats: Frontal Lectures & Software Labs: Direct instruction on digital morphology theory, geometric principles, and live demonstrations of Rhinoceros, Grasshopper, Vizcom, and fabrication workflows. Applied Exercises: Individual hands-on tasks to immediately practice and reinforce class concepts, software techniques, and spatial logic. Individual Reviews & Desk Critiques: One-on-one feedback during lab hours to troubleshoot digital definitions, refine precision, and guide physical prototyping.

	Intermediate Pin-Ups: Scheduled group reviews each semester to present work-in-progress, analyze peer projects, and practice spatial communication. Independent Studio Work: Self-directed study dedicated to experimenting, modelling, algorithm refining, rendering, portfolio layout, and physical prototyping.
Mandatory Attendance	Not compulsory but recommended
Specific Educational Objectives and Learning Outcomes	Disciplinary competence Knowledge and understanding - have acquired the basic knowledge necessary to realise a project in the field of 3D CAD; - have acquired the basic knowledge necessary for further Master's studies in all components of project culture as well as in technical subjects, with a particular attention to the field of 3D CAD. Applying knowledge and understanding - use the basic knowledge acquired in the technical fields to realise a mature project; - make use of the skills acquired during the course of study in the event of continuing studies in a Master's degree programme and to develop them further. Transversal competence and soft skills Making judgements - Be able to make independent judgements for the purpose of developing their own design skills and in relation to all those decisions that are necessary to bring a project of 3D CAD to completion. Communication skills - present an independently realised project in the field of 3D CAD in the form of an installation, orally as well as in writing in a professional manner.

	Learning skills - have learned a work methodology at a professional level - in the sense of being able to identify, develop and realise solutions to complex problems by applying the acquired knowledge in the different fields, with a particular attention to the field of 3D CAD - in order to start a professional activity and/or continue their studies with a master's degree programme; - have developed a creative attitude and learned how to enhance it and develop it according to their own inclinations; - have acquired basic knowledge in the field of 3D CAD as well as a study methodology suitable for continuing studies with a Master's degree programme.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	Digital & Physical Submission Protocols: Ten days prior to the official final exam date, every student must submit a digital portfolio of their course work to the designated Microsoft Teams folder. Project documentation is an integral component of the exam. Final deliverables must include physical fabrication prototypes, visual documentation, computational scripts, and a written project abstract. Attending Students: Mid-Term Evaluation (Winter Semester): An intermediate portfolio review and oral discussion covering exercises from the first semester. Students receive a provisional grade that accounts for 50% of the final mark. Students who do not pass or miss the mid-term review will be evaluated on the complete year-long body of work during the final exam. Final Exam (Summer Semester): The exam comprises a practical software review, an oral presentation, and a physical/digital portfolio display. Students present their complete portfolio and physical models. The oral examination tests theoretical knowledge, digital geometry principles, script logic, and design evaluation. Non-Attending Students:

	Final Exam: Non-attending students must submit a portfolio covering all exercises developed across the entire academic year, alongside produced physical objects. The final exam includes a practical assessment, physical prototype review, and an oral examination covering digital geometry principles, Grasshopper definitions, and course handouts. *N.B. All non-attending students must contact the professor to confirm course content and expectations prior to the exam.
Evaluation Criteria	The final grade is based on the quality of individual exercises developed throughout the academic year, the final portfolio submission, and the final presentation/oral exam. Grading Scheme & Weighting: Attending Students: Mid-Term Evaluation (50%): Assessment of Semester I exercises, spatial logic, and intermediate portfolio presentation. Final Evaluation (50%): Assessment of Semester II exercises, computational rationalization, physical prototypes, final presentation boards, and oral exam. Passing Threshold: 18/30 cumulative average across both partial evaluations. Non-Attending Students: Final Evaluation (100%): A single comprehensive grade evaluating the full year-long portfolio, physical deliverables, algorithm definitions, and final oral examination. Core Assessment Criteria: Spatial Observation & Critical Form Analysis: Ability to deconstruct, analyze, and synthesize physical forms prior to digital execution, establishing spatial logic before facing software constraints. Digital Environment & Geometric Fluency: Independent navigation within 3D space, command over digital geometry vocabulary, and precise application of NURBS tools.

	Computational & Algorithmic Literacy: Mastery of Grasshopper data structures, complex transformation logic, and parametric definition control. Interoperability & Representation: Fluidity across platforms (Rhino, Grasshopper, Vizcom) and advanced 2D/3D spatial representation skills. Rationalization & Materialization: Technical rigor in applying digital geometry to real-world fabrication constraints across additive (3D printing), formative (molds/unrolling), and subtractive (CNC milling) processes. Process Communication & Documentation: Clear, professional articulation of design strategies, computational workflows, and physical outcomes from initial concept to final portfolio presentation.
Required Readings	Course handouts, technical guides, algorithm definitions, and reading materials covering each topic will be uploaded regularly to the official Microsoft Teams class page. • Attending Students: Accessing Microsoft Teams is highly recommended for accessing weekly lecture files, exercise briefs, and project upload links. • Non-Attending Students: Active participation on Microsoft Teams is mandatory to stay updated on course content, access required handouts, and coordinate project deliverables. <i>(The official link to the Microsoft Teams class page will be provided at the start of the semester.)</i>
Supplementary Readings	
Further Information	
Sustainable Development Goals (SDGs)	Quality education, Industry, innovation and infrastructure, Decent work and economic growth