건축디지털디자인응용 _ 학생수행평가기준

작성인: 천장환

1. 수행평가기준 해당항목

건축적 사고						설 계										기 술						실 무			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
이해	이해	이해	이해	이해	이해	능력	능력	능력	능력	능력	능력	능력	능력	능력	능력	이해	이해	이해	이해	이해	이해	이해	이해	이해	이해
						■													■						

2. 항목별 교육내용 및 학습성과

평가기준 항목	교육 내용 및 / 학습성과(증빙자료)
07. 건축 소통 능력 건축설계과정에서 상황과 소통대상에 따라 구두, 문서, 스케치, 도면, 모형 등 적절하고 다양한 매체를 활용하여 단계별 과정에 맞게 표현(일부 설계안의 경우 영어등 외국어를 사용)할 수 있다.	건축적 아이디어를 스케치 등의 그림, 2차원 도면 및 3차원 형식의 자료, 이미지, 사진, 모형 등의 다양한 방법을 통해 표현할 수 있으며 이를 설계과정에 적용할 수 있는 능력이 요구된다.
	- 2차원 도면 작성 과제 성과물 - 3차원 모델 작성 과제 성과물
20. 디지털 활용기술 설계단계에서 컴퓨터를 이용한 다양한 디지털 활용기술을 이해한다.	설계의 각 단계에서 다차원 정보모델의 적용, 비정형설계 방식 습득, 건축분야의 컴퓨터 프로그래밍 응용기술을 이해한다.
	- 그래스하퍼 모델 생성 및 표현기법 과제 성과물

강 의 계 획 안

1. 교과목 정보

과목명	건축디지털디자인 응용		
학수번호	AR23101-02	개설학년도/학기	2023/2
학점/시수	3/3	개설학과/대상학년	건축학과/2학년
이수구분	전공필수	강의실	공대 176-3/4
선수과목	건축디지털디자인기초	요일/시간	월, 수요일/13:30 -14:45

2. 담당 교수 정보

담당교수	천장환, 석상용			
연구실	공대 471-3호	연락처	전화번호	010-8896-3530
상담 가능 시간	수업 후 30분		E-mail	syseok@khu.ac.kr
담당조교		연락처	전화번호	
조교실			E-mail	

3. 교과목 개요

본 교과목의 주요 목적은 디자인과 건축의 활용에 관계된 디지털 기술의 적용과 개념 이론들을 소개하기 위한 것이다. 이 과정에서 3차원 모델링, 디지털 패브리케이션을 포함한 디지털디자인 기본, 디자인 프리젠테이션과 같은 다양한 결과물에 대한 이해와 습득이 이루어질 것으로 예상되어진다. 디지털 모델링의 영역은 다양하지만 이번 교과목에서는 스크립트, 시뮬레이션 평가, 파라메트릭 디자인을 중점으로 진행되며, 나아가 BIM으로의 확장을 위한 기초 지식도 습득하게 된다. 이를 통해 현대 디자인 기술의 매락에서 디지털 기술들을 적용하는 방법을 습득할 것이며, 앞선 디지털 기술의 환경으로부터 전문화된 기술을 습득할 수 있게 될 것이다.

4. 강의내용 및 목표

Course Description

"Computers should be used not only as machines for imitating and appropriating what is understood but also as vehicles for exploring and visualizing what is not (yet) understood."
-Kostas Terzidis

The principal objective of this course is to introduce to 2nd year students the basic theories, concepts and applications of digital technology relevant to the design and practice of architecture. Through this course, students are expected to achieve advanced knowledge and comprehension about three-dimensional modeling (i.e. digital representation and simulation), digital design foundation, digital presentation strategies, and various output options including digital fabrication. This course offers a series of procedures that can function as building blocks for students to experiment, explore, or channel their thoughts, ideas and principles into computational mind. Specific areas of emphasis vary, but include performance-based simulations and parametric modeling. The course provide for learning and applying a select set of digital skills within the context of contemporary design techniques. Students are to develop a small subset of specialized skills developed from a critical perspective of the overall milieu of advanced digital techniques.

Goals & Objectives:

1. an understanding of basic theories and concepts in areas of digital technology as it relates to architectural design.
2. an ability using advanced digital techniques to assist in the design development at various stages of the design process.
3. an ability to use available digital technologies to generate various modes of architectural representation.

가. Format

The course is a lecture but it is structured as a hybrid seminar/lab. Students are expected not only to develop computational skills but also to be able to articulate, discuss, and criticize theoretical concepts.

Assignments

Project 1.0

Project 1.0 asks you to interpret limited information from projects – 2d plans, 2d sections, model pictures, and renders and to assemble a reasonably precise 3d digital model. You are then asked to extract renders and 2d dimensional 'line' output from the model and assemble the work into a layout for submission. You will be selecting the modeling projects from the list below. The listed projects are chosen to get you to exercise and explore some of the possibilities in the particular NURBS modeler (Rhino 5) that we will be using. At times the complexity inherent within these models and the ambiguity presented in the limited information will make modeling difficult. However the projects contain enough systemic logic so as to make reassembly possible.

SUBMISSION

- 2-3 (2 minimum 3 maximum) A2 (horizontal) pages with drawing and image layouts (must be printed). Formats should be designed, simple (don't make use of excessive collage . . but let the drawings/renders speak for themselves), with simple fonts & smaller-sized text. The panels will contain all the vector drawings (with line weight corrections + additional work) and raster images (with photo processing) from the previous assignment. The elegance of design, layout, and communication of the panels will form part of your final grade.

- cd with .pdf + original In Design file, + rhino model + rendered images (.jpf) all . . you will be graded on completeness and organization of the folders, images names, etc . . your folder/naming structure must easily communicate and be readily accessible by a third party.

Project Lists

The list contains sample projects which can be used for your Assignment 1.0 modeling projects. You may also substitute similarly complex models upon approval from your professor.

	PRADA STORE; Tokyo, Japan, 2003 _Herzog & De Muron
	'MEISO NO MORI' MUNICIPAL FUNERAL HALL; Gifu, Japan, 2004/2006 _Toyo Itto *Reference(s):* http://www.elcroquis.es/MagazineDetail.aspx?magazinesId=172&lang=en
	LFone / Landesgartenschau, Weil am Rhein, Germany, 1999 – Zaha Hadid *Reference(s):* El Croquis, 103, Zaha Hadid 1996 – 2001, 2001 El Croquis, ISSN: 0212-5683
	Palafolls Public Library, Barcelona, Spain_Enric Miralles *Reference(s):* http://www.elcroquis.es/MagazineDetail.aspx?magazinesId=163&lang=en
	**Swiss Re Tower London (the Gerkin), London, England – Foster's and Partners *Reference(s):*

	http://www.greatbuildings.com/buildings/30_St_Mary_Axe.html
	**City Hall, London, England, 2002, – Foster's and Partners *Reference(s):* http://www.fosterandpartners.com/Projects/1027/Default.aspx

	Centre Pompidou, Metz , France– Shigeru Ban *Reference(s):* http://archrecord.construction.com/projects/portfolio/archives/1007pompidou-metz-1.asp
	Orange Cube, Lyon, France_Jakob+MacFarlance *Reference(s):* *http://archrecord.construction.com/projects/portfolio/2011/05/Orange_Cube.asp*
	Al Hamra Fibrous Tower, Kuwait City, Kuwait, 2008 – SOM Architects *Reference(s):* SOM Website
	Renovations to Santa Caterina Market, Barcelona, Spain 2005 – Enric Miralles *Reference(s):* El Croquis, 2009, ARCH NA 5 C7 no. 144
	Strata Tower, 2008 – Asymptote Architecture *Reference(s):* Architectureal Design (AD), ARCH NA A563 V79 NO. 1-2, 2009
	Micromultiple House, Emergent, Tom Wiscomb *Reference(s):* http://www.emergentarchitecture.com/
	Reebok Flagship Store, Shanghai, China, 2004 – Ali Rahim *Reference(s):* *Catalytic Formations Architecture and Digital Design, Taylor & Francis 2006, ISBN 0-415-39087-7 (hb), ISBN 0-415-39089-3 (pb)*
	Linked Hybrid – Steven Holl Architects *Reference(s):* http://archrecord.construction.com/projects/portfolio/archives/1001linkedhybrid-1.asp
	Chapel of St. Ignatius, Seattle, Washington, 1997 – Stephen Holl *Reference(s):* El Croquis, 88-89, Worlds One, 1998 El Croquis, ISSN: 0212-5683 http://www.stevenholl.com/project-detail.php?id=40&search=Chapel%20of%20St.%20Ignatius
	0-14 Tower, Business Bay, Dubai, UAE_Reiser +Umemoto *Reference(s):*http://archrecord.construction.com/projects/portfolio/2011/08/0-14-Tower.asp

	MAXXI/National Museum of XXI Century Arts – Zaha Hadid *Reference(s):* http://archrecord.construction.com/projects/portfolio/2010/10/maxxi.asp

The references listed for the projects are for your use. However, you will/may need to reference additional resources to obtain further information, images, plans, sections for your modeling project. In each case, you will not necessarily locate fully scaled plans. Part of the assignment is to get you to interpret limited information while still working within proportional scales and managing to model appropriate levels of detail. START RESEARCH NOW TO FIND ADDITIONAL INFORMATION. You will be asked to keep a bibliography of your references . . so if you photocopy or scan make sure to note your reference.

YOU MAY ALSO CHOOSE SIMILAR TYPE PROJECTS and bring these to your professor for approval. In all cases, you must be able to find enough information on the project and the project must be both suitable and challenging for NURBS modeling.

Project 2.0

For Project 2.0, students are asked to create collection of Grasshopper definitions which will be published as pdf format. The book's objective is to develop and archive, in an open source environment, definitions which serve as generative tools for design development, optimization and performance-based design. Rather than remain abstract digital process, the objective is to develop these definitions as design instruments or tools. To this end, students are required to use grasshopper definition for their studio projects.

Over the course of the semester, we will create architecture through experiments rather than aiming fixed goal. This course will be an intensive environment for research of emergent technologies and the reciprocal relation with the material conditions of construction.

Evaluation and Grading:

Project 1.0:	25%
Project 2.0:	50%
Attendance & weekly assignment:	25%

Grade A

The student completes all the requirements, on time, in an excellent manner. The required representations are creative, provocative, well developed, exquisitely executed and of impeccable craft. The student generates studies that are not explicitly assigned, but contribute to the development of the project or to their own understanding.

The student is actively involved in questioning and deliberating upon the theoretical issues involved and makes worthy original contributions to the studio investigation. The student makes excellent, consistent progress. Quantitative range: A-=90-92, A=93-97 A+=97-100

Grade B

The student completes all requirements, on time, in a good manner. The required representations are creative, well developed and carefully executed. The student generates studies, that are not explicitly assigned but which contribute to the development of the project(s) or to their own understanding. The student is involved in questioning the issues involved. The student makes good, consistent progress. Quantitative range: B-=80-82, B=83-86, B+=87-89

Grade C

The student completes all requirements, on time, in an average(acceptable) manner. The required representations are average in development and craft. The student is involved in questioning the issues involved. The student makes average progress. Quantitative range: C-=70-72, C=73-76, C+=77-79

Grade D

The student completes all requirements in a poor manner. The required representations are under-developed and without dedication. The student is passive in desk crits and group discussions. The student makes poor progress. Quantitative range:

D-=60-62, D=63-66, D+=67-69

Grade F

The student who submits unacceptable o/or late work will receive this grade. The required representations are not developed and without dedication. The student makes unacceptable progress and is therefore unprepared to complete the professional program.

Range: 0-59

Retention of work:

DAKHU has the right to retain any student project in its entirety whether it is for display, accreditation, documentation, recruitment or any other educational or legal purpose.

The software that will be used in this course is Rhino 5.0, Grasshopper.

References

Terzidis, K., *Algorithms for Visual Design*, Wiley, 2009

Terzidis, K., *AlgorithmicArchitecture:AConceptualApproachtoComputationalDesign*, London: Spon Press/Routledge, 2003

Jonhson, S., *Emergence*,Touchstone,2002

Wolfram S., *ANewKindofScience*, Champaign: Stephen Wolfram, 2002

Maeda, J., *Maeda&Media*, Universe, 2000

Cheng, Ron K C, *InsideRhinoceros4*, Delmar Cengage Learning, 2008

Edward R. Tufte, *Envisioninginformation*, Graphic Press 1990

Iain Fraser, Rod Henmi, *EnvisioningArchitecture,AnAnalysisofDrawing*, Van Nostrand Reinhold 1994

Schumacher, Patrik, *Parametricism,pg14–23*Leach,Neil(Editor),DigitalCitiesAD:ArchitecturalDesign,JohnWiley&Sons(June26,2009)

Silver, Mike, ADProgramming Cultures: Architecture, Art and Science in the Age of Software Development,AcademyPress,2006

RESOURCES

RHINO & GRASSHOPPER

www.rhino3d.com/tutorials.htm

http://designreform.net

8. 강의방법

강의방법	강의	세미나	발표	실험/실습	기타	계
비율	50%			50%		

9. 평가방법

평가항목	중간과제	기말과제	출석	기타	계
비율	25%	50%	25%		100%

10. 주별강의계획서

주	날짜	강의주제	강의내용	강의방법	필요 기자재	과제 및 성과물
1	9/4,6		-Introduction about the course -Interface & 3d Modeling Basics: Rhino_01	이론/실습		
2	9/11,14		-3d Modeling – Intermediate: Rhino_02	이론/실습	Rhino	
3	9/18,20		-3d Modeling – Advanced: Rhino_03 -3d Modeling – Advanced: Rhino_04	이론/실습	Rhino	
4	9/25,27		-3d Modeling – Advanced: Rhino_05 -Q&A	이론/실습	Rhino	
5	10/2,4		-Lecture_01 -Project_01 마감	이론/실습	Rhino	A2패널(pdf) 제출
6	10/11		-Grasshopper_01_basic	이론/실습	Rhino/Grasshopper	
7	10/16,18		-Grasshopper_02_basic -Grasshopper_03_basic	이론/실습	Rhino/Grasshopper	
8	10/23,25		-Grasshopper_04_intermediate -Grasshopper_05_intermediate	이론/실습	Rhino/Grasshopper	
9	10/30,11/1		-Grasshopper_06_intermediate -Grasshopper_07_intermediate	이론/실습	Rhino/Grasshopper	
10	11/6,8		-Grasshopper_08_intermediate -Grasshopper_09_intermediate	이론/실습	Rhino/Grasshopper	
11	11/13,15		-Grasshopper_10_intermediate -Grasshopper_11_intermediate	이론/실습	Rhino/Grasshopper	
12	11/20,22		-3d printer, laser cutter 사용법(모형 제작실) -booklet 사례 / Grasshopper_12_ advanced	이론/실습	Rhino/Grasshopper	
13	11/27,29		-Grasshopper_13_advanced -Grasshopper_14_advanced	발표	Rhino/Grasshopper	
14	12/4,6		-booklet 주제 발표	이론/실습	Rhino/Grasshopper	
15	12/11,13		-Lecture_02 -Grasshopper_15_advanced	발표	Rhino/Grasshopper	
16	12/18,20		-작업 발표 및 최종 과제 제출(12/20)	이론	-	booklet 제출