

## TTU Spring 10 advCONSTRtechCOURSE description arch5334

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**Course time:**  
T > 9-11.50 A.M.  
**Office Hours:**  
W 10-11 A.M. **Note:** please make appointment ahead of time via email  
**Server:**  
[\\archlab\arch\\_5334\\_SP10\\_Pongratz](#)

### **Course Information: ARCH 5334**

Advanced Studies in Construction Technology  
Credits: 3 semester credit hours

### **Course Information: ARCH 5301**

Building skins (ddf course)  
Credits: 3 semester credit hours

### **Catalog description**

Advanced Studies in Construction Technology (3:2:2). Prerequisite: ARCH 3355. Approved technology elective dealing with the advanced study of technical building methods and means.

### **Course Description:**

The course on building skins will engage students in research and development of fabrication strategies and material processes, and explore the potential for innovation in building components and their assemblies. In addition, it will focus on the workflow between design concept in the generative modeling phases and design output to fabrication, such as the transfer to rapid prototyping and other numerically controlled machines. Students will be introduced to CAD/CAM environments, the concept of file-to-factory, and may study the flow of projects in solid modeling and parametric software packages. An initial part of the course is dedicated to the analysis of design, engineering and manufacturing constraints related to innovative and high performance building envelopes. Case studies will explore the design of façade typologies through contemporary manufacturing methodologies and with regard to the materials of various cladding systems. Materials range from high-strength concrete, stone composites, extreme textiles to latest polymer and fiber composites. Advanced Structures, like shells or structural surfaces and monocoques are central to the geometrical investigation of skins and surfaces.

Each year the course will focus on a specific topic of material inquiry selected by the instructor. The notion of non-standard production will be explored through a material system driven research in two phases, surface design and assembly design. This semester long project engages the logic of patterns out of simple components, which drives complex three-dimensional surface assembly structures.

Students may be given a hands-on experience from small scale models to large scale mockups in different methods of fabrication, exploring material resistances and employing the equipment of the digital design and fabrication laboratory.

Readings extend works by Frei, Fuller, Piano, Sobek and others.

**Featured NAAB Student Performance Criteria for ARCH 5334:**

21. Building Envelope systems (F)

Understanding of the basic principles and appropriate application and performance of building envelope materials and systems.

26. Technical Documentation

Ability to make technically precise drawings and write outline specifications for a proposed design

24. Building Materials and Assemblies (P)

Understanding of the basic principles and appropriate application and performance of construction materials, products, components, and assemblies, including their environmental impact and reuse

(F) Featured

(P) Preparatory

**Learning Outcomes:**

Upon completion of this course the student will gain the following abilities:

*Building envelopes*

Ability to apply techniques related to specific building materials and systems and describe the components and assemblies technically.

*Digital Design / Fabrication Media*

Ability to use appropriate digital media and technology in the design and building process, including but not limited to emerging computational and fabrication methods.

**General Methods:** Arch 5334/5301 is an advanced technical course that requires a substantial dedication and investment of student time, skill, and critical thought both during and after official class hours. As a part of instruction, students are required to participate in all lectures, discussions, and where scheduled field trips, as well as group and individual critiques of assignments.

**Computers:** Latest student computer minimum specifications are available at <http://www.arch.ttu.edu/architecture/computers.asp> Technical difficulties, viruses, crashes, server and print bureau problems, or corrupted files will not be accepted as legitimate excuses. ALL WORK SHOULD BE CONTINUOUSLY SAVED AND REGULARLY BACKED UP. All work must be printed before class to be considered timely. Class time will not be used for printing.

**Software:** Software requirements will be given by the instructor at the beginning of the class. Students are to purchase student software licenses in the case these are not provided by the College of Architecture. Typically these are latest parametric design programs and afford additional study outside of class time.

Students may further be required to participate in workshops as indicated by the instructor. In the case additional outside instructors are invited to participate in workshops or group instruction an additional workshop fee will be established or added as a course fee.

**Recommended Texts Building Construction:**

determined by the semester topic and instructor

- Digital Design and Manufacturing: CAD/CAM Applications in Architecture and Design D. Schodek, M. Bechthold, K. Griggs, K. Kao, M. Steinberg, , John Wiley & Sons, Inc., 2004;
- H. Pottmann, A. Asperl, M. Hofer and A. Kilian: Architectural Geometry. Bentley Institute Press (2007), 724 pages, 2200 figures in color, ISBN 978-1-934493-04-5.

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**Required Texts Design:** There will be additional books required related to the research & design process phases, and will be indicated by the instructor in the course of the semester with the assignments.

### **Field Trip Requirements:**

All students are required to attend field trips if scheduled. Permission sheet will be signed beforehand. Attendance will be taken. There might be optional field trips at the instructors discretion.

### **Additional Requirements:**

There may be additional requirements, required materials, readings, and references as the semester progresses indicated by the instructor.

### **Academic Integrity:**

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. As such, the College of Architecture follows the university academic regulations pertaining to Cheating and Plagiarism as set forth in the Undergraduate and Graduate catalog, 2003-2004, page 49. Additionally, refer to the *Student Affairs Handbook* for the University definition and policy regarding plagiarism, disciplinary sanctions, conditions, and restrictions.

Plagiarism includes offering the work of another student as one's own, work drawn, made or designed by another student or design work copied from any other person and source without full and clear acknowledgement. It is quite OK to use precedent as long as you give attribution. Students are expected to have done the work that is claimed as their own. **As a matter of course, you will acknowledge your sources with the appropriate footnote or endnote.**

**Attendance Policy:** The College of Architecture follows the class attendance policy set out in the Undergraduate Catalog, 2004-2005. Students are responsible for attending class. Four absences are considered excessive and constitute cause for having the student drop the class or receive a grade of "F". Whether absence is excused or unexcused is determined solely by the instructor with the exception of absences due to religious observance and officially approved trips in the semester. Students are expected to comply with TTU rules for reporting student illness requiring absence from class for more than one week or immediate family deaths. Students are required to work in studio during studio hours. Work in studio requires students to have their computer, printer, drawing tools, materials and supplies available at all times. Work includes participation in pinups, lectures, and discussions. **Note:** *Failure to work in class with undivided attention, the lack of appropriate tools and materials, any tardiness, leaving early, lack of participation, general socializing, goofing around, disruptive behavior, etc. will be regarded as absences. You are not allowed to work on assignments from other classes during this class.*

**Civility in the classroom:** Students are expected to assist in maintaining a classroom environment (during or after hours) that is conducive to learning. In order to assure that all students have the opportunity to gain from time spent in class, unless otherwise approved by the instructor, students are prohibited in engaging in any other form of distraction. Inappropriate behavior in the classroom shall result, minimally, in a request to leave the class.

**Room requirements:** Studio room - keep the studio doors locked at all times  
Students need to comply with Architectural building policy.

### **ADA, Equal Opportunity and Access to Facilities:**

The University is committed to the principle that in no aspect of its programs shall there be differences in the treatment of persons because of race, creed, national origin, age, sex, or disability, and that equal opportunity and access to facilities shall be available to all. If you require special accommodations in order to participate, please contact the instructor. Students should present appropriate verification from Disabled Students Services, Dean of Students Office. No requirement exists that accommodations be made prior to completion of this approved University process. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. Contact office 335, West Hall, or 806-742-2405.

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**Academic Regulations:** Please consult the Texas Tech University 2004-05 Catalog, (pp. 52-56) for information about *Semester Hours and Course Loads, Dropping a Course, Class Attendance, Reporting Illness, Absence Due to Religious Observance, Academic Integrity, Civility in the Classroom, and Grading Practices*; *Equal Opportunity statement is on p. 2*. Students must comply with ALL requirements of the **Architecture Building Policy** posted on the college web site at <http://www.arch.ttu.edu/Architecture/>

**Method of Assessment:** Grades from finished assignments, process work, regular interaction with instructor, critiques, final documentation, participation in class and readings are factors of grading and accessing accomplishment and understanding of above criteria. Production and hard work lead to improvement. Growth is key. There will be individual and team assignments, both may require digital and physical modeling. There is no final exam.

### **Methods for Assessing the expected Learning Outcomes:**

The expected learning outcomes will be assessed through:

20% Presentation & Finished assignments A1 – *SKIN non standard*

20% Presentation & Finished assignments A2 - *NC technique*

35% Finished homework A3 – SKIN component/ stacked wall

5% model homework A3 – SKIN component/ stacked wall

10% participation in class discussions and readings

10% Quiz, response paper or other techniques

Assignments need to be submitted in proper format & layout in print and digitally on server and cd. All files need be submitted.

This is not a quantifiable, exact, or mathematical assessment.

**Assignment Requirements:** Each assignment will have specific requirements and deadlines. All Assignments must be completed in a timely manner. All assignments are considered late if they are not submitted at the beginning of class the day they are due. For each day (not including weekends) that assignments are late, a 10% deduction in the overall grade for that assignment will be enforced.

### **Grading**

Grading is a certification that the student has clearly demonstrated a level of expertise as required in each assignment or exercise.

"A" indicates that the level of expertise is superior (excellent work.)

"B" indicates the project task or problem is clearly resolved but lacks in-depth study or resolution in one or two areas.

"C" indicates the level of work is satisfactory; perhaps somewhat mediocre.

"D" indicates the level of expertise is minimal and weak. (This is a passing grade for the University; however, a minimum grade of "C" is required to proceed to the next design level.)

"F" grade indicates a failure to respond to adequately

Plus and minus marks may be used to indicate higher and lower rating in each grade division for the purposes of averaging progress reports and final grades. A student who has shown her or his clear successful improvement throughout the semester may be given the advantage in the case of borderline final grade averages.

### **Grade equivalencies**

**A+= 98-100      B+= 87-89      C+= 77-79      D= 65-69**

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<b>A=</b>	<b>94-97</b>	<b>B=</b>	<b>84-86</b>	<b>C=</b>	<b>74-76</b>	<b>F=</b>	<b>Below 65</b>
<b>A-=</b>	<b>90-93</b>	<b>B-=</b>	<b>80-83</b>	<b>C-=</b>	<b>70-73</b>		

### **Final Documentation:**

All assignments being digital and physical, and any kind of drawings will be documented in high quality digital forms and printout in portfolio format for the end of the semester. This will be weighted with the rest of the semester's work towards the final grade.

**Student work:** The College of Architecture reserves the rights to retain, exhibit, and reproduce work submitted by students. Work submitted for grade is the property of the college and remains as such until it is returned to the student. For exhibition purposes keep all material available for the instructor at the end of semester.

**For further information on schedules, deadlines and other requirements, see project statements, handouts, or web postings by your studio instructor.**