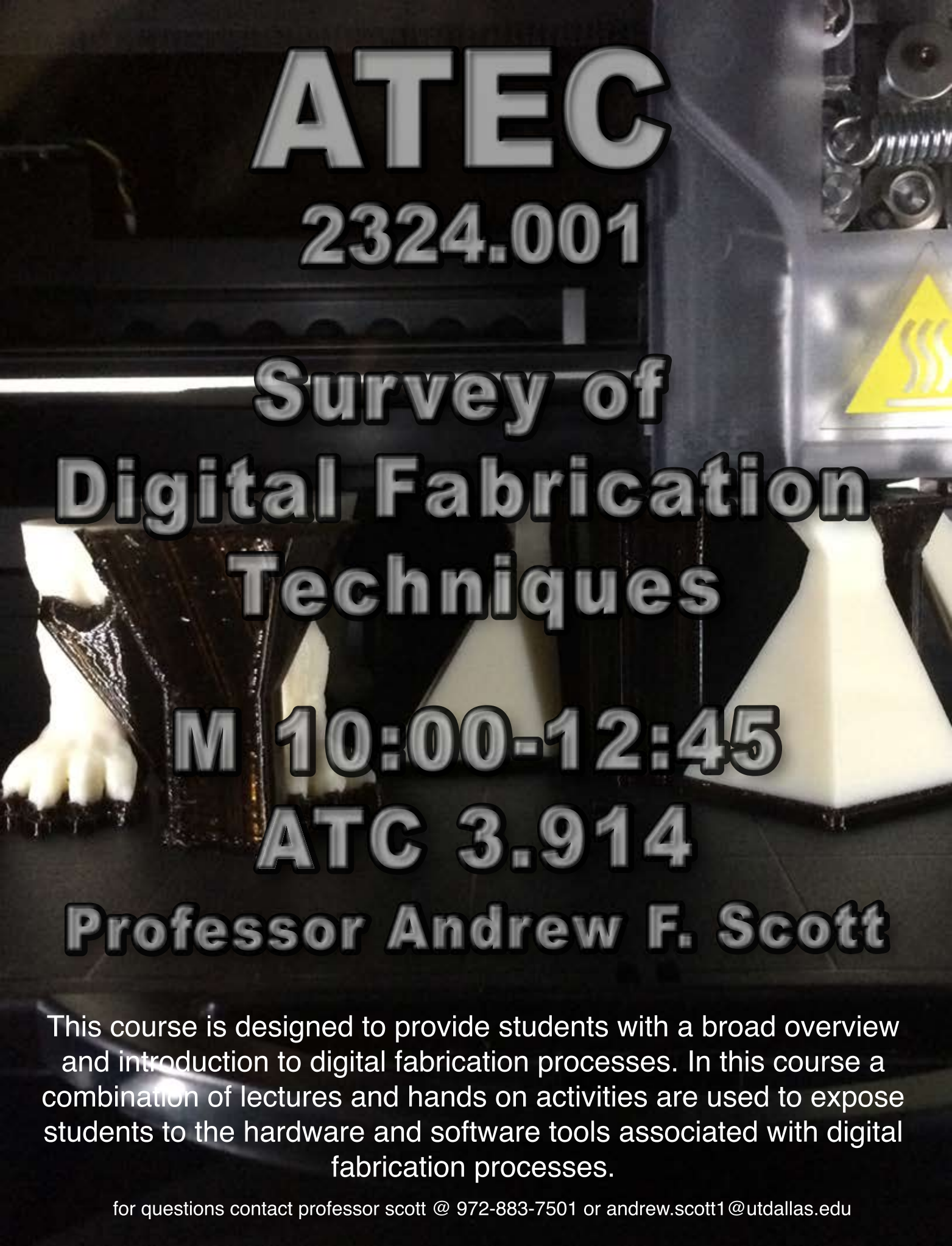

This course is designed to provide students with a broad overview and introduction to digital fabrication processes. In this course a combination of lectures and hands on activities are used to expose students to the hardware and software tools associated with digital fabrication processes.

for questions contact professor scott @ 972-883-7501 or andrew.scott1@utdallas.edu

Course Syllabus

Course Information

Course Number/Section	ATEC 2324.001 ATC 3.914
Course Title	Survey of Digital Fabrication Techniques *DIGITAL FABRICATION*
Term	Fall 2015
Days & Times	Mon : 10:00am-12:45pm

Professor Contact Information

Professor	Andrew F. Scott
Office Phone	7501
Email Address	andrew.scott1@utdallas.edu
Office Location	ATC 1.913
Lab Location	ATC 1.910
ATEC FAB-LAB Location	Art Barn
Office Hours	By appointment only

Course Pre-requisites **None**

Course Description

This course is designed to provide students with a broad overview and introduction to digital fabrication processes. In this course a combination of lectures and hands on activities are used to expose students to the hardware and software tools associated with digital fabrication processes.

Student Learning Objectives/Outcomes

The following course goals articulate the general objectives and purpose of this course:

- Students will gain a historic, theoretic and practical understanding of digital fabrication technologies and their implications for contemporary artistic practice.
- Students will gain an understanding of the relationship between digital fabrication tools and computer software programs designed for developing three-dimensional forms, spaces and objects.
- Students will learn how to properly format files for digital fabrication processes
- Students will learn to use digital technologies to prepare schematic drawings, flat patterns for fabrication and to pre-visualize forms.

Required Textbooks and Materials

Required Texts

1. Lisa Iwamoto. Digital Fabrication. Architectural and Material Techniques.Princeton Architectural Press, New York. ISBN: 978-1-56898-790-3
2. Blackboard Course Website
3. SCPT 250/450 Course Blogsite: http://digitalsculpture250.blogspot.com/
4. ATEC-FAB UTD Blogsite: http://atecfabutd.blogspot.com/
6. Rhino Online Manual
7. NextEngine/Rapidworks Online Manual
7. Keyshot Online Manual

Required Materials
3D Printing Project
Plastic & Support Materials $150.00

Laser Cutting
Wood, Acrylic,Plexi-Glass, Paper, Cardboard $50.00

Suggested Course Materials
Suggested Readings/Texts
2. Greg Lynn: Form. Rizzoli. Nov 2008. ISBN: 9780847831029

Suggested Materials
There are always options and alternatives for materials that can be used for projects in this course. Almost all of the materials for this course can be sourced either at Home Depot or Smooth-On.com.

Assignments & Academic Calendar
Topics, Reading Assignments, Due Dates, Exam Dates

Week 1	Introduction Course Overview Modeling For Digital Fabrication: Boot Camp Rhino
Week 2	3d Printing Overview Modeling For Digital Fabrication: Boot Camp Rhino Blog Posting Overview NURBS Modeling Overview Rubber Duck Model Assigned
Week 3	3d Printing In Detail 3d Printing Powerpoint Assigned NURBS Modeling In Detail Modeling For Digital Fabrication: Boot Camp Rhino Keyshot 101 Render Duck and Castle Models. Post to Course Blogsite
Week 4	3d Printing Flashlight Model Assigned
Week 5	CNC Milling Overview Flashlight model in detail
Week 6	CNC Milling in Detail CNC Powerpoint Assigned Flashlight model complete Flashlight Blog Posting Due Prep for 3d printing Submission to FabLab Dropbox
Week 7	Laser Cutting Overview Midterm Critique Prep

Week 8	Midterm Critique 3d Printed Flashlight Due 3d Print Powerpoint Due CNC Powerpoint Due
Week 9	Laser Cutting Overview Laser Cutting Powerpoint Assigned Engraving Model Assigned
Week 10	Laser Cutting In Detail Engraving Models Due to Fab-Lab Laser Engraving Blog Posting Due Box Model Assigned
Week 11	Laser Cutting In Detail Box model Due to Fab-Lab Blog Posting Due
Week 12	Laser Scanning Laser Scanning Powerpoint Assigned Overview
Week 13	Laser Scanning in Detail Pepakura Workflow Overview
Week 14	Pepakura Workflow in Detail File Preparation Complete Pepakura Files Submitted to Fab-Lab
Week 15	Pepakura Assembly
Week 16	Final Presentations Pepakura Model Box Model Engraving

Grading Policy
Students must demonstrate satisfactory achievement of course objectives through fulfillment of course assignments and by contributing to class discussions and critiques. Course assignments will require students to use software and equipment available at the ATEC computer labs and actual objects that have been created by applying digital fabrication processes. Course evaluation will be based upon the following.

Assignment	Weight
Boot Camp Rhino&Keyshot Completion of Rhino Level1 Tutorial Series Completion of Keyshot Basic Tutorial Series • Castle Model Completed and Posted to the Course Blogsite 5 Points • Duck Model Completed and Posted to the Course Blogsite 5 Points	10 points
3d Printed LED Flashlight Model **10 Points** are awarded for a clean **STL** file that is completed on the due date for Submission to the Fab-Lab. A clean file for the 3d print project is a model	20 points

composed of closed polygonal surfaces without any naked edges or self-intersecting polygons. You should run **CheckMesh** on your file to identify any problems with your model. You will lose 2 points for each day after the deadline until your files are prepared properly.	
3D Scanning Student will scan, clean and output a three dimensional object and output it in Polygonal form (OBJ) and as a NURBS patch surface (IGS). This model may be used as the subject for future projects during the course.	20
Laser Studies There are six exercises **each worth 10 points.** Each of these projects is designed to teach techniques for format files for laser cutting and form exploration. 1. Engraving Exercise 2. Box Model Each File must be completed and Submitted to the FAB-LAB by the assigned due date.	20
Blog Posting This is one of the **most significant** aspects of the course and should be given great consideration. Your blog postings represent the documentation of the projects and research that you undertake during the course. it should contain: • Research • Techniques • Artistic Influences • Process Photos • Screen Shots • Renderings • Renderings in Context You should create a Blog stream for each projects that you add to as we move through the course. Note that the blog stream is used to confirm the completion of all projects. **If it is not documented on the blog, it did not happen.** **Model In Context: Rendering** Each project should have a rendering that presents the digital model in a sculptural context. These may be completed at any time during the quarter and posted to the Blogsite. The files will be graded on how well they are intergrated into their defined sculptural contex. things to consider: • Lighting • Material Applications • Shadows • Scale A good practice is to include them as a part of your blog postings. Blog Posting will be evaluated at (Midterm Week 8) and at finals (Week 16)	20
Pepakura Model Students will work in groups to create large scale chess pieces based on low-poly polygonal models that are formatted for laser cutting using the Pepakura Workflow. These models will be a part of the student's final presentation. Grading for this project will be based on the success of the team.	20

Powerpoint Presentations • 3d Printing 5 points • CNC Milling 5 points • Laser Cutting 5 points • Laser Scanning 5 Points Students will prepare a 10-page Power Point presentation that focuses on a specific use and application of each digital fabrication process outlined above. The applications may come from any field in which the tools are used. • The first page should be the title page • The last page should contain links to the source materials	20 points

Project Evaluation Standards
The following is a list of the basic criteria used to evaluate the design aspects of all your projects. You should seek to attend to all of the following in your work.

Project objectives
1) Timely Completion of Project Objectives. Work that is not complete at the time of critique will be considered late. Work must be presented by the student at the critique to be considered "on time". Work sent to class in your absence is unacceptable unless prior arrangements have been made with the professor. Verbal presentation at the critique is a part of the grade for each project.

2) Objective
Does the work fulfill the objectives and skills to be learned as outlined in the project?

3) Originality:
Does the work go beyond the parameters of the individual assignment?

Formal Standards

1) Composition:
Is the composition structured in such a way that it holds the viewer's interest? What sort of natural and mechanical devices have been employed to create a sense of a complete image? Is the format (horizontal, vertical, diagonal) appropriate? Does the composition work with the surrounding space to create a holistic feeling? Does the work feel complete?

2) Scale:
Is the scale of the work and its relationship to the viewer appropriate? How is activated and negative space used to enhance the work? Is the work easy to read or is it lost because it's too small? How does scale affect the way the viewer engages the work?

3) Proportion:
Is the interplay of components in the work appropriate to one another. Does the work have a feeling of being in proportion to the space it is displayed in and its relationship to the viewer?

4) Value/Color:

Are value and/or color being used to enhance the work's sense of volume, form, and mass? How does the work's visual impact change in different types of light and dark? Does value or color help us to see specific visual or emotional content in the work?

5) Texture:
Does mark making enhance the quality of the work by unifying the entire work? Is the mark making appropriate to the subject matter? Does the overall patterning of the mark feel finished, developed?

4) Presentation:
Is the work professional in its appearance? Is the presentation of the work thoughtfully designed? No work will be accepted that is not properly finished.

5) Craftsmanship:
Is the work professionally executed? Is it built with integrity and permanence? Do model files employ proper layer management?

Points Required for Grade:

A	B	C	D	F
90-100	80-89	70-79	60-69	Below 59 is failing

Course Policies

Make-up exams
Makeup exams are available only to students who have a legitimate excuse for missing an exam, such as illness, scheduled job interview out of town, athletic team event out of town, death in the immediate family, etc. If you know in advance that you must miss an exam, give a written notice to the instructor in advance, and bring documentation to support your anticipated absence.

Late Work
Adherence to deadlines is expected. It is the individual student's responsibility to keep track of the goals and deadlines and to present the work to the class and instructor on the specified dates. For most assignments, late submissions will have one letter grade deducted *for each day late*. No late assignments will be accepted for the Final Project.

Class Attendance
All students are required to be on time and in attendance for each and every class. Two (2) absences are allowed as personal or sick leave for this semester. Students will receive one letter grade reduction for three (3) absences and an additional letter grade reduction for four (4) absences. Students who accumulate five (5) absences or more should withdrawal from the course due to five (5) absences resulting in a failing grade ("F ") for the course.

Punctuality
It is important to attend class on time. Persistent and reoccurring tardiness is disrespectful to the instructor and to your peers. Arriving to class more than 15 minutes late twice will be counted as one (1) absence. Every additional late arrival will result in one (1) absence.

Classroom Citizenship
Cell phones and pagers must be powered off during formal class hours. Do not talk when others (the instructor, guests, and fellow students) are talking. Students will not use the computers for

personal reasons (e.g, check personal email, surf web) during class time. Participate in class discussions.

Student Conduct and Discipline:
The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations, which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3, and in Title V, Rules on Student Services and Activities of the university's Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrates a high standard of individual honor in his or her scholastic work.

Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.

Copyright Violations:
It is a federal crime to reproduce copyrighted software. Anyone caught reproducing software from the UTD labs will be subject to disciplinary action. In addition, anyone caught reproducing outside software in the lab will automatically lose all lab privileges and will be subject to other disciplinary action as deemed necessary.

Email Use:
The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.