

AGRICULTURAL SYSTEMS MANAGEMENT (ASM)
ASM 291: **Additive Manufacturing (3D Printing)**

Class Information:

Credit – 1

Fall 2021

Class Room: ABEN 208

Time: 8:30 - 9:20 pm T and TH

Instructor:

Matt Olhoft

ABEN 204

Phone: 701-231-7269

E-mail: matthew.olhoft@ndsu.edu

Office Hours: By appointment or drop in. Usually available Tuesdays and Thursdays 8-5.

Bulletin Description: Overview of additive manufacturing and 3D printing. Will have hands on printing projects and lecture about industry use of additive manufacturing.

Course Description: Additive manufacturing is quickly taking over more traditional ways of making things through subtractive manufacturing methods. 3D printing is making more and more of the proto types, parts, and products we use everyday in a quicker, more responsible way. This course will explore how 3D printing started, generative design, how to 3D print, and how is it currently being used in industry.

TEXT: There is no text for this course, so show up for class and get your notes.

COURSE OBJECTIVES:

1. To develop an introductory understanding of additive manufacturing and 3D printing.
2. To develop good problem solving skills and to learn how use additive manufacturing methods as solutions to problems.
3. To learn how to 3D print and what that can be used for.
4. To provide an introduction to the remainder of the higher level of additive manufacturing that students will encounter in industrial settings.

REQUIRED RESOURCES: Text book, non-spiral letter size paper for homework, pencil, eraser, basic calculator, DOS based laptop computer is helpful

BLACKBOARD: Blackboard will be used for announcements, class presentations, assignments, and temporary grades presentation

GRADING

<u>Items</u>		Total Points
Tests	(Final test, 1@100 pt.)	100
Home work	(3 projects, 10 pts. each)	30
Report	(1 report about Additive Manufacturing, 40 pts.)	40

(There may be extra credits for students in addition to the formal grading. So the total grade points can be more than 200).

The cut off for letter grades: 100-90.00% = A; 89.99-80.00% = B; 79.99-70.00% = C;
69.99-60.00% = D; 59.99% or lower = F

(Students are encouraged to work projects together. Working together can be a good learning experience. But the solution and submission of home work projects should be individual.)

Exams and quizzes policies:

Students are expected to take the tests at the appointed time and date unless other arrangements are made with the instructor. The tests will be combinations of types of questions, which may include short answer, problems, multiple choice, and fill in the blank questions, depending on what works best for the material covered. Quizzes may be given throughout the semester and may be either announced or unannounced. There are no make-ups for quizzes or tests, except in medical, family emergencies, or interview cases. Missed tests, exams, and quizzes will receive zero points unless missed for an acceptable reason and with advance notification where possible. The final exam will be comprehensive. Marks will be deducted if steps are not shown in word problem(s) in the test(s).

MISSING HOMEWORK ASSIGNMENTS

Homework is an important learning tool and assessment for you. It helps to understand the concepts discussed in class and it helps to develop good problem solving skills, which will be important in later courses and in professional life. You are expected to complete all homework assignments and hand them in for grading on time. Homework will be collected at the beginning of class. **No late submissions of Homework are accepted for full credit.**

MISSING CLASSES

You are expected to attend all class periods but there is no roll-call. If a class is missed, contact the instructor or class mates for notes. The PowerPoint presentations will be posted in the blackboard.

If you are unable to attend the class, let the instructor know ahead of time by e-mail or other written formats.

IMPORTANT NOTIFICATION

Academic Honesty: All students taking any course in the College of Agriculture, Food Systems, and Natural Resources are under the Honor System (<http://www.ag.ndsu.edu/academics/honor-system-1>). The Honor System is a system that is governed by the students and operates on the premise that most students are honest and work best when their honesty, and the honesty of others, is not in question. It functions to prevent cheating as well as penalize those who are dishonest. It is the responsibility of the students to report any violations of the honor pledge to the instructor, honor commission or the Dean of the College of Agriculture, Food Systems, and Natural Resources.

The academic community is operated on the basis of honesty, integrity, and fair play. [NDSU Policy 335: Code of Academic Responsibility and Conduct](#) applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the [Office of Registration and Records](#). Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

Students with special requirements: Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor as soon as possible. The instructor may ask for verification and that, plus other assistance, can be requested from Disability Services in Wallman Wellness Center 170 (231-8463). <http://www.ndsu.edu/disabilityservices/>.
Veterans and military personnel: Veterans or military personnel with special circumstances or who are activated are encouraged to notify the instructor as early as possible.

Well-being Resources on Campus and in the Community

As a member of the NDSU community, resources are available for you should you need help in dealing with adverse reactions to things happening in the world today. A variety of resources are listed below:

For students on campus and remotely (telehealth):

Counseling Services: 701-231-7671

Disability Services: 701-231-8463

Student Health Service: 701-231-7331

In a crisis or emergency situation:

Call University Police: 701-231-8998

Call 911

Go to a Hospital Emergency Room

Go to Prairie St. Johns for a Needs Assessment: 701-476-721 (510 4th St. S.)

Call the FirstLink Help Line: 1-800-273- TALK (8255) or 2-1-1

Call Rape and Abuse Crisis Center: 701-293-7273

Syllabus Statements on Masking

Currently (or at the time of writing this syllabus or as of August 9, 2021), NDSU is strongly recommending that all people wear masks in indoor spaces when social distancing cannot be maintained. Further, faculty may require masks to be worn in their classes at their discretion. In case of any changes, you will be notified and this syllabus will be updated. Consistent

with NDSU's recommendations, **in this class all participants, including those who are fully vaccinated, are required to wear a face covering.** If you fail to properly wear a face covering, you will not be admitted to the classroom. Given the changing conditions associated with the pandemic, this class' faculty member has reserved the right to modify the mask status of the class during the semester. The following will be used as needed: referral to Dean of Students Office or administrative removal from class.

- Students who cannot wear a face covering due to a medical condition or disability, or who are unable to remove a mask without assistance may seek an accommodation through the Disability Services (701-231-8463; <https://www.ndsu.edu/disabilityservices/>).
- In accordance with NDSU Policy 601, failure to comply with instructions, including the mask requirement, may be handled according to the Code of Student Conduct resolution process and may result in disciplinary sanctions.

See https://www.ndsu.edu/police_safety/covid_19_preparedness_and_response/ for current guidelines. For additional language that can be used to compose your syllabus statement see: https://www.ndsu.edu/fileadmin/provost/Forms/Faculty/Syllabus_Checklist_for_COVID.pdf

Important Dates

Fall 2021

Variable Length Session Drop/Add Deadlines

Date	Day	Description
Aug 23	Mon	Classes begin at 4:00 p.m.
Aug 24	Tue	First full day of classes
Aug 31	Tue	Last day for Campus Connection Wait Lists to run
Sep 1	Wed	Last day to Add classes via Campus Connection* Permit needed after this date.
Sep 1	Wed	Last day for no-record Drop of classes @ 100% refund*(full semester classes only)
Sep 1	Wed	Last day to Withdraw to Zero Credits @ 100% refund*(full semester classes only)
Sep 1	Wed	Attempted credits calculated for financial aid SAP (11:59 p.m.)**
Sep 1	Wed	Eligible Pell/TEACH/ND Grants/Scholarships based on enrollment at 11:59 p.m.
Sep 6	Mon	HOLIDAY — Labor Day (no classes, offices closed)
Sep 7	Tue	Financial aid applied to NDSU account balances
Sep 8	Wed	Payments due for NDSU account balances
Sep 13	Mon	Last day to submit requests to Audit, Pass/Fail
Sep 20	Mon	Last Day to Add Full Semester Classes. Permit & Appeal needed after this date.
Oct 1	Fri	Last day to Withdraw to Zero Credits @ 75% refund*(full semester classes only).
Oct First	Week	Spring/Summer registration schedule available

Oct	Second	Week	Spring/Summer registration appointment times available
Oct	15	Fri	Late fees applied to unpaid account balances (11:59 p.m.)
Oct	15	Fri	Undergraduate/Professional Fall Graduation Applications due
Oct	15	Fri	Graduate student Intent to Graduate survey
Oct	15	Fri	Grades of 'Incomplete' convert to 'F'
Oct	18	Mon	2nd half (8-week session) of Fall semester begins
Oct	28	Thu	Spring/Summer registration begins online based on total credits completed
Oct	31	Sun	Last day to Withdraw to Zero Credits @ 50% refund* <i>(full semester classes only)</i> . No refunds issued for withdraw to zero credits after this date.
Nov	11	Thu	HOLIDAY — Veterans Day <i>(no classes, offices closed)</i>
Nov	12	Fri	Last day to Drop classes with 'W' record*
Nov	12	Fri	Last day to Withdraw to Zero Credits for Fall
Nov	15	Mon	Late fees applied to unpaid account balances (11:59 p.m.)
Nov	19	Fri	Graduate student Initial Disquisition submission for December graduation
Nov	19	Fri	Fall Commencement Participation deadline
Nov	22	Mon	Open registration for spring
Nov	24-26	Wed-Fri	HOLIDAY — Thanksgiving <i>(no classes; offices closed Thursday, offices open Wednesday & Friday)</i>
Dec	6-10	Mon-Fri	Dead Week
Dec	7	Tue	Grade entry begins
Dec	10	Fri	Last day of Fall classes
Dec	13-17	Mon-Fri	Final Examinations
Dec	15	Wed	Late fees applied to unpaid account balances (11:59 p.m.)
Dec	17	Fri	Graduate student Final Disquisition copy due for December graduation
Dec	17	Fri	Application for Graduate Degree forms for students not submitting a master's paper, thesis or dissertation.
Dec	17	Fri	Commencement ceremony (2:00 p.m. in Sanford Health Athletic Complex)
Dec	21	Tue	Grades due (12:00 p.m.)
Dec	21	Tue	Fall grade access begins online (late evening)
Dec	24	Fri	HOLIDAY — Christmas Day Observed <i>(offices closed)</i>

These are tentative dates for tests and material covered, the actual dates and material may vary. **That is why attendance is important.** Any change in schedule will be notified ahead of time.

THE DATE FOR FINAL EXAM IS THURSDAY, 16TH DECEMBER, 2021; 3:30 – 5:30 PM

GENERAL CLASS SCHEDULE (subject to change)

Period	Date	Topic	Unit
1	Aug. 24	Introduction Additive Manufacturing-History	
2	26	History-Types of 3D printing	

3	31	Materials for 3D printing	
4	Sept. 2	Tour FAME 3D (Lulzbot)	
5	7	Generative Design	
6	9	Steps to 3D printing	
7	14	Thingiverse, Tinker CAD	
8	16	Cura and slicing	
9	21	3D printing	
10	23	Glowforge and Plasma CAM	
11	28	Glowforge cutting	
12	30	Tour 3D Fuel	
13	Oct. 5	Scanning	
14	7	Scanning print	
15	12		
16	14	Final exam	