

FNR 48410 – SUSTAINABLE WOOD PRODUCTS, FURNITURE DESIGN AND MANUFACTURING

Instructors Rado Gazo, Professor
(E-mail: gazo@purdue.edu, Ph.: 765-494-3634, Office : FPRD 103b)

Teaching Assistant Charlie Warner, Laboratory Technician, warner88@purdue.edu

Office Hours student consultations by appointment

Weekly Format Monday at 1:30 pm, FPRD 110
Wednesday at 1:30 pm, FPRD 110
Laboratory - by appointment in FPRD 103

Credit Hours 3

Instructional Modality: Face-to-Face

Course Description:

This project-based course explains the principles of wood products development, furniture construction, strength design, performance testing, and product sustainability (life cycle analysis and end-of-life options). It will use modern design, rapid prototyping, and manufacturing methods, such as Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), and CNC machining to build an actual product.

Learning Outcomes

- Students will be able to use rapid prototyping methods to produce products while using CNC technology.
- Students will be knowledgeable about principles of sustainable product development and will apply this knowledge in the design, manufacturing, and construction of their products.

Textbooks

Wood Handbook: Wood as an Engineering Material. 1999, Forest Products Society, Reprinted from Forest Service, U.S. Department of Agriculture. Online version is available at: <http://www.fpl.fs.fed.us/documnts/FPLGTR/fplgtr113/fplgtr113.htm>
(One copy is on reserve in the instructor's office. See the instructor about ordering a hard copy if desired).

Furniture Manufacturing Equipment. 1987, B.L. Clark, T. A. Ekwall, C. T. Culbreth and R. Willard. North Carolina State University, Department of Industrial Engineering. (One copy is on reserve in the instructor's office. See the instructor about ordering a hard copy if desired).

Furniture Manufacturing Processes. 1981, A. L. Prak and T.W. Myers. North Carolina State University, Department of Industrial Engineering. (One copy is on reserve in instructor's office. See instructor about ordering a hard copy if desired).

Course and Laboratory Outline

<u>Week</u>	<u>Topic</u>
1	Shop safety
2	Project 1 (Product development theory)
3	Project 2 (Furniture construction theory)
4	Project 2 (Strength design theory)
5	Project 2 (Product performance testing)
6	Project 2 (Products sustainability theory)
7	Project 2 (Life Cycle Analysis demo)
8	Project 2 (End of Life Options)
9	Project 2 (Environmental Finishes)
10	Last week to work on CNC router
11	Sanding
12	Assembly (<i>Thanksgiving weekend</i>)
13	Finishing
14	Exhibition - class presentations (product, oral, poster)
15	Last day to turn in your project and poster

Deliverables & Grading:

	<u>% of grade</u>
Project 1	20
Project 2 (Final)	40
Poster	20
Exhibit Presentation	20
Attendance	0

Grade	Range (%)
A+	98-100
A	93.0 - 97.9
A-	90.0 - 92.9
B+	87.0 - 89.9
B	83.0 - 86.9
B-	80.0 - 82.9
C+	77.0 - 79.9
C	73.0 – 76.9
C-	70.0 – 72.9
D+	67.0 – 69.9
D	63.0 – 66.9
D-	60.0 – 62.9
F	< 60.0

Student grades, status and progress can be discussed at any time upon request of either the student or the instructor. Grade appeal procedures are available by university policy.

WARNING: No assignments will be accepted late and no make-up exams will be given unless arrangements are made with the instructor prior to the due date of the assignment or exam.

Academic guidance in the event a student is quarantined/isolated:

If you become quarantined or isolated at any point in time during the semester, in addition, to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you with academic support during this time. Your Academic Case Manager can be reached at acmq@purdue.edu and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email or Brightspace. We will make arrangements based on your particular situation. The Office of the Dean of Students (odos@purdue.edu) is also available to support you should this situation occur.

Class attendance:

Students are expected to attend every lecture and lab. It is the student's responsibility to know what was covered (including lectures, notes, handouts, and homework) in class during any absence. Contact the instructor if you anticipate extended absence.

You should stay home and contact the Protect Purdue Health Center (496-INFO) if you feel ill, have any symptoms associated with COVID-19, or suspect you have been exposed to the virus. In the current context of COVID-19. A medically excused absence

will not be a factor in the final grades, but the student still needs to inform the instructor of any conflict that can be anticipated and will affect the submission of an assignment or the ability to take an exam. Only the instructor can excuse a student from a course requirement or responsibility.

When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflict, when advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email, through Brightspace, or by phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via [email](#) or phone at 765-494-1747. Our course Brightspace includes a link on Attendance and Grief Absence policies under the University Policies menu.

Classroom guidance regarding Protect Purdue:

The [Protect Purdue Plan](#), which includes the [Protect Purdue Pledge](#), is campus policy and as such all members of the Purdue community must comply with the required health and safety guidelines. Required behaviors in this class include: staying home and contacting the Protect Purdue Health Center (496-INFO) if you feel ill or know you have been exposed to the virus, properly wearing a mask [in classrooms and campus building](#), at all times (e.g., mask covers nose and mouth, no eating/drinking in the classroom), disinfecting desk/workspace prior to and after use, maintaining appropriate social distancing with peers and instructors (including when entering/exiting classrooms), refraining from moving furniture, avoiding shared use of personal items, maintaining robust hygiene (e.g., handwashing, disposal of tissues) prior to, during and after class, and following all safety directions from the instructor.

Students who are not engaging in these behaviors (e.g., wearing a mask) will be offered the opportunity to comply. If non-compliance continues, possible results include instructors asking the student to leave class and instructors dismissing the whole class. Students who do not comply with the required health behaviors are violating the University Code of Conduct and will be reported to the Dean of Students Office with sanctions ranging from educational requirements to dismissal from the university.

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

Cost of Materials

While limited supply of materials and tools will be available free of charge, students are expected to pay for cost of custom tools and materials required to complete their projects.

Academic Integrity

Your work in this class should be your own. Cheating on quizzes and exams and plagiarism will not be tolerated.

The student is obligated to solve home problems on his own; however, assistance (working together) is legal and sometimes necessary for learning efficiency. Sloppy repeat of another person's errors will not be overlooked.

The penalty for any form of academic dishonesty, cheating, or plagiarism is "F" for the course. Scholastic dishonesty includes, but is not limited to, cheating, use of illegal crib notes, copying during examinations, copying of assignments, exercises, and computer programs, plagiarism, and knowingly furnishing false information. Moreover, knowingly aiding and abetting, directly or indirectly, other parties in committing dishonest acts is in itself dishonest. All incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered. If you observe issues of academic integrity, you can report it either through the Office of the Dean of Students (purdue.edu/odos), call 765-494-8778 or email integrity@purdue.edu.

It is expected that students will follow the Purdue Honors Pledge in this class: "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue." For more information:

<http://www.purdue.edu/odos/osrr/academic-integrity/index.html>

What is Plagiarism?

The Council of Writing Program Administrators states that plagiarism "occurs when a writer deliberately uses someone else's language, ideas, or other original (not common knowledge) material without acknowledging its source". Thus, whenever a person chooses to repeat the exact words written by another author, that person must mark them with quotation marks and provide a citation to the original source. Two excellent sources of additional guidance are:

1. Michael Harvey, *The Nuts and Bolts of College Writing* (Hackett Publishing Co.)
2. Gordon Harvey, *Writing with Sources: A Guide for Students* (Hackett Publishing Co.)

Use of Electronic Devices:

Electronic devices may be brought with you to class, but they are to be closed and off/silent during class lectures unless otherwise instructed. Repeat offenders will be

marked as absent and lose corresponding attendance points. Keep your cell phone on silent so that you can still receive emergency messages.

Use of Artificial Intelligence:

You can use AI tools to complete your assignments with the following expectations:

- 1 – AI written text, image, and design must be properly cited
- 2 – no more than 50% of text can be AI written
- 3 – AI written fact must be checked for accuracy by you

Professional Attitude in class:

No tobacco products. No feet on the table. No sleeping. No texting.

Mental Health

Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.

Campus Emergency policy:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course: my email address: gazo@purdue.edu, and my office phone: 494-3634. In addition, you can go to Purdue's home page (<http://www.purdue.edu>) for emergency information and updates.

Diversity Statement

In this course, each voice in the classroom has something of value to contribute. Please take care to respect the different experiences, beliefs and values expressed by students and staff involved in this course. We support Purdue's commitment to diversity, and welcome individuals of all ages, backgrounds, citizenships, disability, sex, education, ethnicities, family statuses, genders, gender identities, geographical locations, languages,

military experience, political views, races, religions, sexual orientations, socioeconomic statuses, and work experiences.

Nondiscrimination

The existing Purdue University Nondiscrimination Policy: Purdue University is committed to maintaining a community, which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life.

Purdue University prohibits discrimination against any member of the University community on the basis of race, religion, color, sex, age, national origin or ancestry, marital status, parental status, sexual orientation, disability, or status as a veteran. The University will conduct its programs, services and activities consistent with applicable federal, state and local laws, regulations and orders and in conformance with the procedures and limitations as set forth in (http://www.purdue.edu/purdue/ea_eou_statement.html) which provides specific contractual rights and remedies.

Anti-Harassment Policy

Strictly following and interpreting existing University Policy: Purdue University is committed to maintaining an environment that recognizes the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding and mutual respect; and encourages its members to strive to reach their potential. The most effective way to work toward preventing Harassment is through education that emphasizes respect for every individual.

Harassment in the workplace or the educational environment is unacceptable conduct and will not be tolerated. Purdue University is committed to maintaining an educational and work climate for faculty, staff and students that is positive and free from all forms of Harassment. This policy addresses Harassment in all forms, including Harassment toward individuals with legally protected status for reasons of race, gender, religion, color, age, national origin or ancestry, genetic information or disability and Harassment toward individuals for other reasons such as sexual orientation, gender identity, gender expression, marital status or parental status. The University will not tolerate Harassment of its faculty, staff or students by persons conducting business with or visiting the University, even though such persons are not directly affiliated with the University.

Purdue Anti-Harassment Policy (III.C.1):

<http://www.purdue.edu/policies/ethics/iic1.html>

Accessibility and Accommodations

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247. <http://www.purdue.edu/drc/faculty/syllabus.html>

Basic Needs Security:

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday.

EMERGENCY PREPAREDNESS SYLLABUS

ATTACHMENT

EMERGENCY NOTIFICATION PROCEDURES are based on a simple concept – if you hear a fire alarm inside, proceed outside. If you hear a siren outside, proceed inside.

- **Indoor Fire Alarms** mean to stop class or research and immediately evacuate the building.
 - Proceed to your Emergency Assembly Area away from building doors. **Remain outside** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.
- **All Hazards Outdoor Emergency Warning Sirens** mean to immediately seek shelter (Shelter in Place) in a safe location within the closest building.
 - “Shelter in place” means seeking immediate shelter inside a building or University residence. This course of action may need to be taken during a tornado, a civil disturbance including a shooting or release of hazardous materials in the outside air. Once safely inside, find out more details about the emergency*. **Remain in place** until police, fire, or other emergency response personnel provide additional guidance or tell you it is safe to leave.

**In both cases, you should seek additional clarifying information by all means possible...Purdue Emergency Status page, text message, email alert, TV, radio, etc...review the Purdue Emergency Warning Notification System multi-communication layers at http://www.purdue.edu/ehps/emergency_preparedness/warning-system.html*

EMERGENCY RESPONSE PROCEDURES:

- Review the **Emergency Procedures Guidelines**
https://www.purdue.edu/emergency_preparedness/flipchart/index.html
- Review the **Building Emergency Plan** (available on the Emergency Preparedness website or from the building deputy) for:
 - evacuation routes, exit points, and emergency assembly area
 - when and how to evacuate the building.
 - shelter in place procedures and locations
 - additional building specific procedures and requirements.

EMERGENCY PREPAREDNESS AWARENESS VIDEOS

- **"Run. Hide. Fight.®"** is a 6-minute active shooter awareness video that illustrates what to look for and how to prepare and react to this type of incident. See:
https://www.youtube.com/watch?v=5mzI_5aj4Vs
- All Hazards Online Awareness training video (on Webcert & Blackboard.) A 30 minute computer based training video that provides safety and emergency preparedness information. See the [EP website](#) for sign up instructions.

MORE INFORMATION

Reference the Emergency Preparedness web site for additional information:
https://www.purdue.edu/ehps/emergency_preparedness/