**Course:** Manufacturing Processes – RMET-120-02 Fall 2023 Semester

**Hours:** Tuesday & Thursday
5:00 PM – 6:15 PM
SHED (SHD) Building, Room 4350

**Professor:** Alan Zoyhofski
585.698.9907
Email: arzmet@rit.edu
Office Hours: Please email me for an appointment time.

**Assistants**:

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**Required Textbook:** Fundamentals of Modern Manufacturing
7th Edition
Mikell Groover

## Learning Outcomes:

By the end of this course you will be able to;

1. Describe the techniques, advantages, disadvantages, and applications of basic manufacturing processes,
2. Describe how these manufacturing processes work and under what conditions they are optimized,
3. Complete a class project emphasizing how a product is designed & manufactured,
4. Work in a project team emphasizing teamwork required to successfully complete a class project.

## Semester Outline:

*Manufacturing Introduction*
Ch 1 Science of Manufacturing, Ch 3 Mechanical Properties of Materials, and Ch 26 Heat Treatment Processes.

*Casting Processes:*
Ch 10 - 11 Casting Fundamentals, Expendable-Mold Casting, and Multiple Use Molds, and Ch 15 Powder Metallurgy.

*Forming Processes:*
Ch 17 Fundamentals of Metal Forming, Ch 18 and Ch 19 Hot and Cold Working Processes, and Ch 13 Plastic Molding.

*Mechanical Material Removal Processes:*
Ch 20, 21, 22 Fundamentals of Chip Type Machining Processes, Cutting Tools, Turning and Boring Processes, Drilling and Hole Making Processes, Milling, and Broaching, Sawing, and Filing.

*Joining Processes:*
Ch 29 & 30 Gas Flame and Arc Processes – Welding Processes, and Brazing and Soldering,
Ch 31 Adhesive Bonding and Mechanical Fasteners
Ch 28 Manufacturing Concerns in Welding and Joining.

## Learning Assessment:

- Two Tests (Midterm & Final) (15 points each) **30%**
- Project **40%**
- Homework **20%**
- Three Surprise Quizzes **10%**

## Class Policy:

- When professor lectures, it is expected that class **remain quiet and attentive**. Feedback from last semester was clear – noise and distractions are bothersome to fellow students, and the professor. I expect class to remain attentive during lecture portion of class.

- Communication from me will be through RIT email. Check your email often & routinely.

- Handwriting counts. If I can't read your writing, I will take points off submitted materials.

- When you send me class correspondence via email, **do not** use 'google read'. Send correspondence to me as a **word or a pdf document.**

- Once you join a work table, you are required to remain at that numbered work table for semester duration.

- Work table attendance will be taken by teacher aid (TA) during every class period.

- Due to research travel this semester, there may be occasion where the existing class schedule will require modification. On those dates of travel, a zoom class may be scheduled in lieu of RIT on-campus class, or a class may be cancelled, or TAs will conduct scheduled class. Please read your email for class announcements.

- There are two tests in this class (there is no final exam). These tests will be open book and and open notes, **and adminsitered on-line via mycourses**.

- Quizzes are open book and open notes and will be admisitered on line via mycourses, **OR** hardcopy (on paper) during class. You will need to execute basic trigonometric and natural log function calculations on quizzes.

- Class lecture and discussion will consist of notes, visual presentations, demonstrations, your questions, and class participation.

- If you have a grading concern, request a grading modification, assignment due date concern, or any other question regarding grades for any portion of this class, you are responsible to talk to professor for a resolution. **TAs will not respond to any grading questions or grade resolution.**

- Seven homework assignments are posted on mycourses. Homework will consist of ten questions that you must research an answer for. Anwsers can be found in the text book or researched on line.

    - Homeworks are to be completed and **HARDCOPY OF COMPLETED HOMEWORK** is to be handed in at beginning of class on those dates defined in class schedule.
    - There are no exceptions for homework being late. However, if you believe you have a legitiment reason, you are to talk to professor and not TAs. Professor, and only the professor, make a determination of of a late assignment acceptance.
    - If not handed in on due date, you will receive a score of 0 for that assignment.
    - Homeworks will be graded and returned to you.
    - Homework recitation will follow in sebsequent weeks where students will be selected at random to answer homework questions.
    - Homeworks submitted to me or TAs via email will not be accepted for credit.

- **Class Project**

- Project teams will be formed as a function of the worktable you've joined. **One table will form one project team.** As a reminder, once you join a worktable, you are to remain with that worktable for the entire semester.

- Each team will nominate a product, from within a family of products directed by professor. Past examples have been ski boot walkers, turntables, transmissions, dryer, 3D-Printer, Bicycle, Microwave, pool pumps, electric pressure washers, and a car engine. See mycourses for exampes of previous projects.

- **Project teams must receive approval from professor on the product the team wishes to research before the project starts.** A submitted powerpoint or word document, and oral presentation is required at semester end in which each project team will make a formal presentation to the class. See course outline for presentation dates. Presentation length should be planned for 15 to 20 minutes including questions. All group members are required to present.

- It is required that all students within a project team contribute equally. A peer evaluation of your individual contributions will be administered at semester end. This evalution will form 10% of your total project score.

## Project Grading Rubric:

a. **5 Points**
Written nomination (and apporval) of project, with team name, and student names. This approval is required to ensure project chosen by the team is of sufficient complexity. Your candidate product must have no less that 20 piece parts. Project will not be approved if this piece part requirement is not met.

1. **THIS IS DUE ON OR BEFORE THE END OF THE 4th WEEK OF CLASS, THURSDAY, 21 SEPTEMBER.**
2. **IT IS YOUR RESPONSIBILITY TO MEET WITH PROFESSOR TO SEEK PROJECT APPROVAL.**

b. **15 Points**
Bill of Material or BOM. This will be reviewed and approved by Teacher Assistant (TA). BOMs must be created by you. There is no internet copying allowed or copying from any other source. You must create the BOM in its entirity.

1. **THIS IS DUE ON OR BEFORE 9TH WEEK OF CLASS, THURSDAY 26TH OCTOBER**

c. **15 Points**
An exploded view of product. Drawings must be created by you. There is no internet copying allowed or copying from any other source. You must create the drawing(s) in entirity.

1. This will be reviewed and approved by TA.
2. **THIS IS DUE ON OR BEFORE 9TH WEEK OF CLASS, THURSDAY, 26th OCTOBER.**

d. **15 Points**
Class delivery & presentation.

| Objectives | Points |
|---|---|
| Should include a functional introduction to what the product is | 3 |
| Complete summary of processes used to manufacture the product | 3 |
| Active part played by every member of the team in presentation delivery | 3 |
| Effective answers to questions during the presentation | 3 |
| Summary of what you learned in this project | 3 |

e. **40 points**
Submitted paper. Note that your oral presentation can be a summary of your submitted paper.

| Objectives | Points |
|---|---|
| Paper must describe all manufacturing processes you think were used to make the product | 20 |
| Paper must futher include an introduction | 5 |
| BOM and Exploded view | 2 |
| References | 5 |
| Team Member Names and Conclusion | 8 |

f. **10 Points**
Peer evaluation of each individual and their contributions on your project team. You will receive an excel sheet consisting of certain criteria regarding how effective everyone was in your team. Everyone in the team will submit an individual form. Details on how to fill this form will be explained later in the semester.

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