

# Manufacturing Processes (EGR-240)

Block 3 – 2019

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## General Information:

**Instructor:** Brian Johns  
**Office:** 105 West Science  
**Phone:** 319-895-4368  
**Email:** bjohns@cornellcollege.edu  
**Office Hours:** 11:00 am – 12:00 pm MWF

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### Prerequisites:

EGR131: Introduction to Engineering Design  
EGR 231: Engineering Mechanics

### Course Meeting Times (times may vary):

M-F 8:00 am – 9:00 am in West Science 106  
9:00 am – 11:00 am and 1:00 pm – 3:00 pm in Fabrication/Machine Shop

### Required Textbook:

Kalpakjian, S., Schmid, S.R. (2014). Manufacturing Engineering and Technology (7th Edition). Pearson. ISBN: 978-0-13-312874-1.

### Other Required Course Materials:

Engineering Computation Pad  
Calculator

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## Course Description & Objectives:

### Course Description:

Explores the processes and decisions involved in manufacturing commercial products, from everyday items to futuristic gadgets. Topics include machining, injection molding, casting, welding, and additive manufacturing. Emphasizes material and process selection for real-world applications. Students will use the computer lab for 3D design and will learn to operate computerized numerical control (CNC) machines and 3D printers for prototype production.

### Course Objectives:

The course is designed to support the *Educational Priorities and Outcomes* of Cornell College.

- Understand and apply core manufacturing processes to create original components.
- Communicate and collaborate in small group settings to discuss and plan manufacturing processes.
- Adjust manufacturing processes on modern engineering machines to accommodate the various materials.
- Solve real-world problems by designing and building equipment through the application of engineering knowledge.

**Performance Indicators for Student Outcomes:**

- 2a. Convert open-ended problems to design specifications.
- 2b. Construct a prototype which meets design specifications
- 2c. Design a product (system, component, or process) that solves a real-world problem.
- 2d. Demonstrates ability to build and assemble complex devices.
- 2e. Construct a bill of materials for a prototype which meets specifications.
- 4c. Understand and practice safety regulations in design, manufacturing, and assembly.
- 5a. Adopt leadership roles to accomplish team objectives.
- 5b. Perform delegated tasks and actively participate in group meetings.
- 5c. Encourage the participation of others.
- 5d. Respond objectively to conflict within a team.
- 5e. Foster constructive climate within and between teams.
- 7a. Independently finds and evaluates engineering resources.
- 7b. Accurately self-evaluates work for future improvement.
- 7c. Takes personal initiative to learn independently

**Course Outline:**

Class sessions will primarily consist of projects and problem solving. Students will work in both individual and group settings.

**Class Topics (subject to change):**

- Machining Processes and Machine Tools
- Behavior and Manufacturing Properties of Materials
- Joining Processes and Equipment
- Metal-Casting Processes and Equipment
- Sheet-Metal Forming
- Rapid Prototyping

**Grading**

**Grading Criteria:**

Component	Percentage
Attendance/Teamwork	20%
Exams	30%
Homework	15%
Projects	35%

**Grading Scale:**

A	95-100
A-	90-94
B+	87-89
B	84-86
B-	80-83
C+	77-79

C	74-76
C-	70-73
D+	67-69
D	64-66
D-	60-63
F	<60

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## Course Requirements & Policies:

### **Attendance and Teamwork:**

As a student you are required to attend all sessions of class. You are also required to be a contributing member to your team. Please inform me of any planned absences at the beginning of the block so we can make arrangements.

### **Exams:**

There will be three exams throughout the course. Each exam will cover approximately 4-5 chapters.

### **Projects:**

There will be several small projects throughout the duration of the course. Projects will require teamwork, communication, and design. Furthermore, the team will demonstrate their projects using both written and oral communication.

### **Homework:**

Homework will be periodic throughout the course. Homework is due at the beginning of class. No late homework will be accepted.

### **Academic Honesty Policy:**

Cornell College expects all members of the Cornell community to act with academic integrity. An important aspect of academic integrity is respecting the work of others. A student is expected to explicitly acknowledge ideas, claims, observations, or data of others, unless generally known. When a piece of work is submitted for credit, a student is asserting that the submission is her or his work unless there is a citation of a specific source. If there is no appropriate acknowledgement of sources, whether intended or not, this may constitute a violation of the College's requirement for honesty in academic work and may be treated as a case of academic dishonesty. The procedures regarding how the College deals with cases of academic dishonesty appear in The Catalogue, under the heading "Academic Honesty."

### **Students with Disabilities:**

Cornell College makes reasonable accommodations for persons with disabilities. Students should notify the Coordinator of Academic Support and Advising and their course instructor of any disability related accommodations within the first three days of the term for which the accommodations are required, due to the fast pace of the block format. For more information on the documentation required to establish the need for accommodations and the process of requesting the accommodations, see <http://www.cornellcollege.edu/academic-support-and-advising/disabilities/index.shtml>.