

MEMS 0040: MANUFACTURING PROCESS AND ANALYSIS

2023 Spring

Instructor: Shan Gong	Time: Section 1 Mondays 8:15am - 11:00am
Email: shan.gong@scupi.cn	Section 2 Thursdays 15:40pm - 18:25pm
Office: Rm 4-221	Section 3 Fridays 8:15am - 11:00am

Note: This syllabus may be subject to change. Please follow updates announced during class and posted on Blackboard website.

Course Pages:

- <https://pibb.scu.edu.cn>

Office Hours:

- Mondays: 13:00 PM – 16:00 PM & Thursdays: 13:00 PM – 15:30 PM
- By appointment via Email: shan.gong@scupi.cn
- Online via QQ Group: 364928445

Teaching Assistant:

- Xinyu Xu; Contact: alyssa@stu.scu.edu.cn
- Yujie Li; Contact: liyujie@stu.scu.edu.cn
- Xuyi Zhang; Contact: 2019141520052@stu.scu.edu.cn
- If you have any question regarding to homework grading, please contact TA within one week after the homework is returned to you.

When emailing the instructor or TAs, include MEMS 0040 in the subject field of your message. Use your university email account (student_ID_number@stu.scu.edu.cn), since mails from other accounts might be stopped by the SCU spam filter.

Course Description

This is an undergraduate course in manufacturing processes and analysis. Topics include: manufacturing properties, casting, metal forming (rolling, forging, extrusion, and drawing), polymer processing, particulate processing (powder metallurgy and ceramic/glass forming), heat treatment, welding, and machining. Prerequisite: Materials Structures-Properties. 3 Credit hours.

Course Objectives

1. To understand the fundamental principles of materials processes and manufacturing
2. To gain knowledge of various manufacturing processes and related technical analysis
3. To gain proficiency in communication through written and oral reports
4. To understand the importance of economic considerations in the selection of manufacturing processes

Applicable ABET Outcomes

1. An ability to apply knowledge of mathematics, science and engineering
2. An ability to analyze and interpret data
3. An ability to identify, formulate and solve engineering problems
4. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Textbook

- Lecture Slides

Assessments

Attendance and Answer Questions in Class	5%
Field Trip Report (subject to change)	5%
Homework:	30%
Midterm Examination:	30%
Final Examination:	30%
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	100%

- The Instructor reserves the right to moderate the assessment policy. This process may occur at the end of the semester.

Grade

90.00 – 100.00	A	85.00 – 89.99	A-	80.00 – 84.99	B+	76.00 – 79.99	B	73.00 – 75.99	B-
70.00 – 72.99	C+	66.00 – 69.99	C	63.00 – 65.99	C-	60.00 – 62.99	D	0.00 – 59.99	F

Class Policy

Regular attendance is essential and expected. Important dates and plans will be announced during class. **It is imperative that you come to class prepared.** This will generally involve reading one or more chapters of the textbook, viewing tutorial videos, thinking, engaging with fellow students, practice and performing preliminary calculations. This is a three credit hour class, which means you should expect to devote at least 9 to 12 hours of effort outside the scheduled class time every week.

Homework and Other Assignments

Homework problems and other assignments will be assigned periodically and are due as stated in the assigned paper. All work will be submitted electronically through the Blackboard system. Late submission **WILL NOT** be accepted. **Students' names and ID numbers** must be listed on the first page. It is **your duty** to make sure that submission through Blackboard has been properly processed. Unless specifically requested, emailed homework will not be accepted.

All of the homework scores will be used in your grade computation. Unless otherwise indicated, you can work with your fellow classmates in the class, but you must submit a distinct and independent write-up to receive credit. If plagiarism is caught, zero score for all homeworks.

If you have a compelling emergency that prevents you from turning in the homework on time, email Dr. Shan Gong.

If you believe an error has been made in the grading of an assignment, bring it to the attention of your TA **within ONE WEEK** from its return.

Please adhere to these **homework guidelines**:

- Put your name, ID number (last four digits), and class section at the top of the first page.
- All work must be shown for each solution to receive full credit. Present your solution in a logical fashion, showing and explaining all steps in detail.
- Obtaining the correct answer includes getting the correct quantity, **number of significant digits**, sign, and **unit**.

Exams

There will be two exams (one Midterm and one Final), all are **CLOSED-BOOK**. Students can bring **one** A4 page note and it must be **hand-written** on **two sides** of the paper. It cannot be a photocopy. If you must miss an exam, you **MUST** make alternative arrangements with the instructor before the exam is given. If you miss an exam without prior notification, you will receive a score of **ZERO** for that exam except under extenuating circumstances.

Make-Up Exams

Students who have not taken either the midterm or the final exam are **NOT** eligible to take the make-up exam. Only 75% of the make-up exam grade can be used to **replace** the final exam grade. Students taking make-up exams can only attain at most a **D** grade.

Avoiding Plagiarism

1. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called **plagiarism** and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
2. Paraphrasing, when the original statement is still identifiable and has also no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together Unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.

Tentative Topics

Week	Topic
1	Introduction
2	Materials and Manufacturing Properties
3-4	Casting
5-8	Deformation Processes
9	Powder Metallurgy
10	Forming of Ceramics and Heat Treatment
11-12	Welding
13-14	Machining
15-16	Additive Manufacturing
17	Review