MEMS0040 –Manufacturing Processes and Analysis Course Syllabus

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Catalog 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.

Mode of Delivery	On campus
Workload	3 hours of lectures/tutorials and 8 hours of private study per week.
Prerequisites	ENGR 0022
Campus	Zone 3 Room 102
Instructor Email	Grace Chen grace.chen@scu.edu.cn
Teaching Assistant	Mr Menghe Chen, also known as Marvin (Monday Session) Mr Shuwan Lu, also known as Mark (Friday Session)
TA Emails	Marvin: 2017141522040@stu.scu.edu.cn Mark: 2017141522001@stu.scu.edu.cn

ACADEMIC OVERVIEW

Course Goals

- To understand the fundamental principles of materials processes and manufacturing
- To gain knowledge of various manufacturing processes and related technical analysis
- To gain proficiency in communication through written and oral reports
- To practice solving problems through teamwork
- To understand the importance of economic considerations in the selection of manufacturing processes

Teaching and Learning Method

The unit consists of lectures and problem classes. Learning in the unit is mainly through attending the lectures, problem classes and completing the assignments and field trip reports.

Textbook

1. *Manufacturing Engineering and Technology*, 7th ed, by Serope Kalpakjian Steven R Schmid (published by McGraw Hill).
2. Fundamentals of modern manufacturing_4th ed by MP Groover

Software

You will also use Microsoft Word to write up your assignments, Microsoft Excel to draw scientific curves, and Power Point to deliver presentations. Learn how to use the equation editor in Word and how to format documents, and how to draw engineering data curves.

Topical Coverage

Week	Topic	Chapter
1	Manufacturing Properties	1, 2
2	Fundamentals of Casting	10
3	Casting Processes	11
4	Casting Analysis	12
5	Field Trip on Casting Processes	12
6	Fundamental of Metal Forming Rolling	13
7	Forging	14
8	Extrusion and Drawing	15
9	Polymer Processing	19
10	Powder Metallurgy	17
11	Ceramic/Glass Forming	18
12	Heat Treatments	4
13	Fundamentals of Welding	30
14	Welding Operations	31
15	Fundamentals of Machining	23
16	Field trip of Machining Operations	24

Grading Policy

Assessment Task	Value
1. Attendance and Answer questions in class	10 %
2. Homework	40 %
3. Mid-semester examination	20 %
4. Field Trip report	10 %
5. Final Examination	20 %

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

Prepared by: Grace Chen Date: 01 March 2021