

IE 1052 – MANUFACTURING PROCESSES & ANALYSIS

Spring 2020

(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class)

Catalog Description

This is a 3 Credits undergraduate course in manufacturing processes and product development. At the beginning of the semester, student will learn the structure, physical property, mechanical behavior of Metal, Plastic, and Ceramic materials. Tradition manufacturing processes applied to those materials will be covered next. These processes include casting, forming, shaping, welding, machining, surface finishing and treatment. Students will also learn the fundamental principles of modern manufacturing processes, including ongoing developments in micro/nano fabrication, and additive manufacturing technologies. Students will appreciate how manufacturing processes transform materials into products and how manufacturing process influence the final product. In addition, students will gain appreciation for the influence of manufacturing processes on product design and on the role of manufacturing on product realization.

Schedule

Lecture, Room 3-106

Section 1:	Monday	8:15am – 11:00am
Section 2:	Wednesdays	3:40pm– 6:25pam
Section 3:	Friday	8:15am – 11:00 am

Lab, Engineering Training Center

Schedule TBA

Instructors

Office: TBA

Office Hours: Tuesdays, Thursday 1:00pm - 4:00pm

For consultation outside office hours, please send an email to make an appointment

Email: saichoeng.fok@scu.edu.cn

Teaching Assistants:

Section 1 – Tracy, Diyan Yang (contact: 1149304107@qq.com)

Section 2 – Yuan Ping (contact: 1291068322@qq.com)

Section 3 – Chloe, Yuxin Liu (contact: 2016141522046@stu.scu.edu.cn)

Textbook

Manufacturing Engineering and Technology, 6th Ed.

Serope Kalpakjian and Steven R. Schmid:, Prentice Hall, ISBN – 13: 978-0-13-608169-2.

Materials Science and Engineering, 9th Edition, International Student Version

W.D. Callister, Jr. and D.G. Rethwisch, 9th edition, John Wiley and Sons, Inc. (2014).

Additional references and supplementary materials will be posted on Blackboard.

Course Objective:

This course treats manufacturing practices through three primary elements: i) Material properties and their role in manufacturing schemes ii) Fundamental manufacturing processes and their analysis iii) Systemic conceptualization of manufacturing practice and its role in product development. It will cover various subjects in manufacturing through guided learning, discussion, assignments, quizzes, projects and laboratory. Practical exercises involve group participation in lab experiments, process demonstrations and team-based presentations. Projects will cover engineering analysis of products from functional intent to conceptual design to prototyping and process planning. Assignments will focus on case studies whereby students will conduct independent researches to better understand sustainability and environmental issues related to manufacturing process selection and end-of-life considerations.

Laboratories & Projects

'Safety First': It is critical and your responsibility to understand SCUPI Safety Policy and abide by the lab safety rules. Otherwise, you may not be allowed into the lab and/or undertake practical project exercises.

Project sections will be arranged by the TAs and will be announced at a later date.

Lab and project attendance: Absolutely mandatory. You must arrive on time.

Grading Policy

Your grade will be based on your overall performance in all assessment items as follows (note: the assessment items may be subjected to change):

ACTIVITIES	PERCENTAGES
Lab Performance and Reports	20%
Group projects	35%
Quizzes	25%
Assignments	20%

The quizzes will cover materials from the lectures.

All lab reports are due by 5 pm exactly one week after they have been assigned. Late submissions will not be accepted unless you have made prior arrangements with Technical Instructors, who will grade the lab reports.

Submission requirements (including due dates) for group projects and assignments will be announced to students in class or on Blackboard.

Tentative Course Schedule:

Week 1	Course introduction and Overview of Manufacturing Processes
Week 2	Materials in Manufacturing including Metal/Polymer/Ceramic and Composites
Week 3	Design, materials selection, and fabrication
Week 4	Casting Principles, Casting Processes and Casting Design
Week 5	Forming & Shaping Processes
Week 6	Plastic forming & Joining (welding)
Week 7	Machining
Week 8	Surface Finishing, treatment & cleaning
Week 9	Advances in Manufacturing
Week 10	Micro and Nano manufacturing
Week 11	Manufacturing system
Week 12	Term Project Presentation & Competition

Learning Outcomes

After the successful completion of this course students should:

- Have acquired basic knowledge and understanding of materials processes and their roles in a holistic approach to product design;
- Be able to effectively discuss, write, and present issues related to manufacturing, materials, processes, and product development.
- Trace the development and life of a product from its design function through material and process selection to reuse, repurpose, or recycle.

Class Policies:

Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Assessments will emphasize treatment of material covered in lectures.

In general, no late assignments will be accepted or makeup assessments given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend/submit an assessment or meet a due date, you must contact the instructor immediately. Arrangements will be made for students on a case by case basis. (Failure to contact the instructor will result in a zero on that assessment item.)

Honesty Policy: All students admitted to the SCUPI have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a SCUPI student.

ACADEMIC INTEGRITY

Students in this course will be expected to comply with the Sichuan University's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.