

Syllabus **Material Synthesis and Manufacturing** **MME 4404**

Course Description:

This course is an introduction to a variety of manufacturing processes. The properties, design and manufacturing of ceramics, polymers and composite products will be studied. Specialized metallic manufacturing concepts, surface treatments and joining of metallics will also be covered.

Prerequisites: MME 4303 or MET 4304, with a grade of "C" or better and junior standing.

Measurable Student Learning Outcomes:

At the completion of this course, students will have a thorough understanding of manufacturing processes of ceramics, polymers, composites and some specialized topics in metallics and modern materials.

Professor:

Dr. Shalayna Smith, PE

Office: M-201H Metallurgy Suite, Engineering-Science Complex
E-mail: shalaynal@utep.edu
Phone: 747-6904

Office Hours:

Tues & Thurs after 3pm. These may change so please feel free to talk with me in my office, in the class or email me with any questions or to schedule an appointment.

Meeting Times and Places:

Class: Tuesday and Thursday, 1:00 to 2:50 pm, Room 314, Physical Science
Lab: Tuesday, 4:30 to 6:20 pm, Room 210, Liberal Arts

There will be meetings in other places -- for laboratory demonstrations, experiments, design activities or making and testing specimens. I will announce these both in class and on Blackboard when necessary.

Deliverables and Grading:

30%	Homework, Labs & Quizzes
30%	Tests (three)
30%	Topic Report(s) and Projects
10%	Final Exam – Thursday May 12, 2016 1:00 - 3:45pm

- Late work will NOT be accepted, quizzes, labs and test cannot be made up. If you have a valid excuse for an absence please talk to me.
- Quizzes will be given at the beginning of each class and will serve as a topic check from the previous lecture.
- Homework and labs will be provided as necessary and will help increase your understanding of topics from the text.
- Topic reports/projects will be assigned on a biweekly schedule and will cover modern

manufacturing methods.

- Tests and the Final Exam will assess your understanding of covered topics. Tests will contain multiple choice and short answer questions.

Course Outline of Subject Matter:

Introduction: families of materials, properties and applications
Solidification Processes: Glassworking and Polymers
Particulate Processing: Powder Metallurgy and Ceramics
Property Enhancement and Surface Treatment
Metal forming and Sheet Metalworking
Joining and Assembly Processes
Special Processes: Rapid Prototyping etc.

Textbook and Other Readings:

Required: Fundamentals of Modern Manufacturing: Materials, Processes and Systems, Fifth Edition, by Mikell P. Groover, Wiley (2013). ISBN: 978-1-118-231463

Other Reading: Available electronically from UTEP library.

Ceramic Materials: Science and Engineering, by C. Barry Carter and M. Grant Norton, Springer (2007). ISBN-10: 0-387-46270-8

You will need to use the Internet extensively for some assignments and books available in the library.

Group Work, Cheating, Plagiarism and Quality:

I encourage you to work together in groups to solve homework problems. Discussing problems in groups is an effective way to learn difficult concepts. Put all names of collaborators on the assignment when you have worked in a group, however everyone must turn in their own assignment. Copying another person's work is cheating and will be treated as such.

You must work alone when completing quizzes and exams.

Your work must be professional. If you would be embarrassed to hand your homework to your supervisor, please do not hand it to me. Work that is deemed unprofessional or unreadable will be returned ungraded.

Late work is generally not accepted. Work can be turned in at the beginning of class.

Please Note: NO programmable calculators will be allowed for exams!

Cheating/Plagiarism:

Cheating is unethical and not acceptable. Plagiarism is using information or original wording in a paper or reference without giving credit to the source of that information or wording: it is also not acceptable. You may not submit work for this class that you did for another class. If you are found to be cheating or plagiarizing, you will be subject to disciplinary action, per UTEP catalog policy. Refer to <http://www.utep.edu/dos/acadintg.htm> for further information.

Disabilities:

If you have a disability and need accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Schedule:

Topic	Chapter	Date
Syllabus and Introduction	1, 2	1/19
LAB	3	1/19
Properties and Measurements	3, 4, 5	1/21
Ceramics and History	7 & Ceramics book	1/26
LAB	---	1/26
Ceramics and Processing of Ceramics	7, 16 & Ceramics book	1/28
Processing of Ceramics	16 & Ceramics book	2/2
LAB		2/2
Glassworking	12	2/4
Polymers	8	2/9
LAB		2/9
Polymer Shaping	13	2/11
Polymer shaping	13	2/16
LAB – TEST REVIEW		2/16
TEST 1		2/18
Composites	9	2/23
LAB		2/23
Processing of Composites	14	2/25
Metals	6	3/1
LAB		3/1
Fundamentals of Metal Forming	17	3/3
Metalworking Processes	18	3/15
LAB		3/15
Sheet Metalworking	19	3/17
Powder Metallurgy	15	3/22
LAB		3/22
Heat Treatment	26	3/24
Surface Processing	27	3/29
LAB – TEST REVIEW		3/29
Test 2		3/31
Welding Intro	28	4/5
LAB		4/5
Welding Processes	29	4/7
Welding Processes	29	4/12
LAB		4/12
Brazing, Soldering	30	4/14
Rapid Prototyping	32	4/19
LAB		4/19
Processing of Electronics	33, 34	4/21
Nanofabrication	36	4/26
LAB TEST REVIEW		4/26
Test 3		4/28
Presentations		5/3
LAB - presentations		5/3
Final Review		5/5
FINAL		5/12