

M.S. in Metallurgical and Materials Engineering

The Metallurgical and Materials Engineering Department offers a Master of Science with a major in Metallurgical and Materials Engineering and an undesignated Master of Science with a major in Engineering.

Admission Requirements

General requirements for admission are described in the Admissions section of the Graduate Catalog. Specific admission requirements for the Master's Program in Metallurgical and Materials Engineering are described below.

1. Undergraduate or graduate degree in Metallurgical and Materials Engineering or a related field from an ABET accredited institution in the United States, or proof of equivalent education from an international institution.
2. Demonstration of academic achievement and potential as indicated by the results of the Graduate Record Examination (GRE), and upper-level undergraduate and graduate coursework. The GRE requirement is waived for students from UTEP.
3. Three letters of recommendation.
4. A written statement of intent, describing his/her career goals and describing his/her vision of the path to those goals (including a summary of previous preparation and of his/her expectations from the graduate program).
5. Submission of a CV/resume summarizing, professional and academic experience and any other evidence of background, knowledge, research, or work experience in Metallurgical and Materials Engineering that may be available.
6. Applicants from countries where English is not the first language are required to demonstrate English proficiency. Please consult the graduate school (<http://catalog.utep.edu/admissions/graduate/graduate-student/>) website for required scores.

Applicants whose undergraduate degrees are not in Metallurgical or Materials Engineering (i.e., a related engineering or physical sciences field) might need to successfully complete specific undergraduate deficiency work as recommended by the Graduate Program Director or Committee.

Additionally, applicants must submit evidence of successful completion (or equivalent) of coursework that includes:

Code	Title	Hours
MME 3306	Rate Processes	3
MME 3308	Appl Chemical Thermodynamics	3
MME 3406	Nanofuctnl Physical Metallurgy	4
MME 3407	Mechanical Behavior of Matls	4

Degree Requirements

Two options are available for students: Thesis and Non-Thesis (Project or Course Only):

Program	Requirement
Thesis Program	24 semester hours of coursework
	6 semester hours of thesis (MME 5398 and MME 5399)
	30 total semester hours minimum
Project Program	30 semester hours of coursework
	6 semester hours of project (MME 5396 and MME 5397)
	36 total semester hours minimum
Non-Thesis (Course Only) Program	36 semester hours of coursework
	36 Semester hours minimum

Specific Requirements for Thesis Program

Students in the Thesis Option must take 30 credit hours, which includes MME 5398 Thesis I and MME 5399 Thesis II. MME 5399 Thesis II must be repeated until the thesis is defended and submitted to the Graduate School for approval. The thesis courses cannot be counted toward requirements in the Non-Thesis Options. All students must take at least 24 hours of Metallurgical and Materials Engineering courses (15 core credits and 9 elective credits). The student is allowed to enroll in three (3) credit hours of approved coursework in areas outside the Metallurgical and Materials Engineering Program or three (3) credit hours of Individual Studies in place of one three-credit hour elective course. All courses require a grade of C or better and a minimum GPA of 3.0 is required for graduation. Please refer to the graduate catalog for time limitations and other degree requirements.

Thesis work should clearly demonstrate the student's ability to execute independent, innovative research. The research should be original and make a contribution to the state of the art. Thesis work is the substance of the MS degree. It must be written, in whole or in part, as a technical paper and submitted to a peer-reviewed journal prior to scheduling the thesis defense. The student should be the first author along with the research advisor (if applicable to include research advisor).

Code	Title	Hours
MME 5398 & MME 5399	Thesis and Thesis	6
Fifteen (15) credit hours of core courses and nine (9) credit hours of graduate elective MME courses.		30
Total Hours		30

Specific Requirements for Non-Thesis Project Program

Students in the Non-Thesis Project Option must take 36 hours, which include MME 5396 Graduate Projects and MME 5397 Graduate Projects. The student is allowed to enroll in three (3) credit hours of approved coursework in areas outside the Metallurgical and Materials Engineering Program or three (3) credit hours of Individual Studies in place of one three-credit hour elective course. A report must be submitted to the supervising project instructor. The project courses MME 5396 Graduate Projects and MME 5397 Graduate Projects can not be counted toward requirements in the Thesis Option. All courses require a grade of C or better and a minimum GPA of 3.0 is required for graduation.

Code	Title	Hours
MME 5396 & MME 5397	Graduate Projects and Graduate Projects	6
Fifteen (15) credit hours of core courses and fifteen (15) credit hours of graduate elective MME courses.		36
Total Hours		36

Specific Requirements for Non-Thesis Course Only Program

Students in the Course Only Option must take 36 credit hours, which include 15 credits of core courses and 21 credits of elective courses. The student is allowed to enroll in three (3) credit hours of approved coursework in areas outside the Metallurgical and Materials Engineering Program or three (3) credit hours of Individual Studies in place of one three-credit hour elective course. All courses require a grade of C or better and a minimum GPA of 3.0 is required for graduation.

Code	Title	Hours
Fifteen (15) credit hours of core courses		15
Twenty-one (21) credit hours of graduate elective MME courses.		21
Total Hours		36

Advisory Committees

The department faculty, as well as the Graduate School, will approve all program curricular proposals. The Graduate Program Director will monitor the academic progress of all graduate students until a thesis or research advisor is chosen. This can be done at any time after the student matriculates into the MS program. The student will form a Research Advisory Committee that will consist of the research advisor (who serves as chair) and at least one additional member of the department faculty and one faculty member from another academic department. An additional member of the committee is often desirable if a concentration is involved, bringing the committee size to four members. All members of the committee must be members of the Graduate Faculty. Students are required to meet with their Research Advisory Committee at least once per year.

Degree Plan

Thesis Option

Code	Title	Hours
Core Courses (A minimum grade of B is required)		
Required		
MME 5302	Matls Extrac, Synth, & Process	3
MME 5401	Microstruc & Microchem Charac	4
MME 5403	Adv Concepts in Matls Sci Engr	4
MME 5304	Phase Transformations & Micros	3
MME 5195	Graduate Seminar	1
Electives		
Select 9 credit hours of graduate MME courses		9
Required		
MME 5398	Thesis	3
MME 5399	Thesis	3
Total Hours		30

Non-Thesis Option

Code	Title	Hours
Core Courses (A minimum grade of B is required)		
Required		
MME 5302	Matls Extrac, Synth, & Process	3
MME 5401	Microstruc & Microchem Charac	4
MME 5403	Adv Concepts in Matls Sci Engr	4
MME 5304	Phase Transformations & Micros	3
MME 5195	Graduate Seminar	1
Electives		
Select 15 credit hours of graduate MME courses		15
Graduate Project Courses		
Required:		
MME 5396 & MME 5397	Graduate Projects and Graduate Projects	6
Total Hours		36

Non-Thesis (Course Only) Option

Code	Title	Hours
Core Courses (A minimum grade of B is required)		
Required:		
MME 5302	Matls Extrac, Synth, & Process	3
MME 5401	Microstruc & Microchem Charac	4
MME 5403	Adv Concepts in Matls Sci Engr	4
MME 5304	Phase Transformations & Micros	3
MME 5195	Graduate Seminar	1
Electives		
Select 21 credit hours of graduate MME courses		21
Total Hours		36

Graduate MME Courses

A maximum of 3 individual studies credits is allowed.

Code	Title	Hours
MME 5191	Individual Studies	1
MME 5194	Graduate Research	1
MME 5195	Graduate Seminar	1
MME 5245	Electron Microscopy Appl	2
MME 5294	Graduate Research	2
MME 5302	Matls Extrac, Synth, & Process	3
MME 5304	Phase Transformations & Micros	3
MME 5308	Mechanical Behavior of Matls	3
MME 5311	Ceramics	3
MME 5313	Advanced Matrls & Composites	3
MME 5314	Polymer Engineering	3
MME 5315	Metallography and Micro Inter.	3
MME 5321	Engineering Alloys	3
MME 5331	Biomaterials	3
MME 5333	Biofabrication	3
MME 5342	Hydrometallurgy	3
MME 5350	Material Joining Technologies	3
MME 5351	Non-Destructive Examination	3
MME 5352	Root Cause Analysis	3

MME 5353	Fracture Mechanics	3
MME 5390	Special Topics	3
MME 5391	Individual Studies	3
MME 5394	Graduate Research	3
MME 5396	Graduate Projects	3
MME 5397	Graduate Projects	3
MME 5401	Microstruc & Microchem Charac	4
MME 5403	Adv Concepts in Matls Sci Engr	4
MME 5494	Graduate Research	4
MME 5594	Graduate Research	5
MME 5694	Graduate Research	6

Undesignated Degrees

A student holding a Bachelor of Science with a major in Metallurgical and Materials Engineering or a related materials area can work toward a 33-semester-hour undesignated MS in Engineering degree without a thesis, leading to a concentration in an area outside of the major. The coursework includes 18 hours in the major field and at least 12 hours in the particular area of concentration. The work in the major field includes credit for MME 5396 Graduate Projects. Possible areas of concentration are indicated below.

Interdisciplinary Concentrations

Possible concentrations for an undesignated degree or to complement a research area or to achieve a broader materials background can involve Business Management, Operations Research, Structural Mechanics, Electronic Device Design and Development, Experimental Design, Manufacturing Engineering emphasizing advanced manufacturing and Materials Processes, Waste Materials Management, and the like. Some examples of other engineering courses which might contribute to developing these areas include the following:

Civil Engineering

Code	Title	Hours
CE 5305	Advanced Structural Analysis	3
CE 5312	Environmental Processes	3
CE 5317	Stats Methods for Civil Eng	3

Electrical Engineering and Computer Science

Code	Title	Hours
EE 5311	Semiconductor Device Physics	3
EE 5312	Advanced Optoelectronic Device	3

Mechanical/Industrial/Manufacturing Engineering

Code	Title	Hours
IE 5351 or MECH 5351	Linear and Combin Optimiz Meth Intro to 3D Eng & Additive Mfg	3
IE 5352	Design/Analysis Indust Exprmnt	3
IE 5390 or MECH 5390	Special Topics Industrial Engr Special Topics Mechanical Engr	3

Metallurgical and Materials Engineering or Materials Engineering Concentration

Students from other Science or Engineering disciplines might wish to develop a concentration in Metallurgical and Materials Engineering or Materials Engineering. In general, a concentration could be developed by considering the core program:

Code	Title	Hours
MME 5302	Matls Extrac, Synth, & Process	3
MME 5304	Phase Transformations & Micros	3
MME 5401	Microstruc & Microchem Charac	4
MME 5403	Adv Concepts in Matls Sci Engr	4

Other Concentrations

Other concentrations could be developed by other groupings of courses or areas represented by course groupings. The first three core courses shown above from the MS program are also articulated with the PhD program core in materials science and engineering. Students completing the MS degree in Metallurgical and Materials Engineering and pursuing the PhD degree in Materials Science and Engineering can waive MASE 6400, and MASE 6402 , substituting work as recommended by the Graduate Program Director.