SCHOLARS PROGRAM ROADMAP (BS-MTE / MS-MTE(2))

Metallurgical & Materials Engineering Curriculum – BS MTE Degree – Revised 2016-- Effective Spring 2017

146 hrs total

FRESHMAN YEAR — 30

Fall — 16 hrs

- **CH 101 (4) * N** General Chemistry 1 — Pre-reqs. = See catalog
- **MA 125 (4) *** Calculus 1 — Pre-reqs. = See catalog
- **ENGR 103 (3)** Engineering Foundations — Pre-reqs. = MATH 125 or higher w/concurrency
- **ENGR 161 (1)** Small-Scale Engineering Graphics — Co-reqs. = ENGR 103
- **EN 101 (3) * FC** English Composition 1
- **MTE 121 (1) ‡** Introduction to Metallurgical Engineering

Spring — 14 hrs

- **CH 102 (4) * N** General Chemistry 2 — Pre-reqs. = CH 101
- **MA 126 (4) *** Calculus 2 — Pre-reqs. = MA 125
- **EN 102 (3) * FC** English Composition 2 — Pre-reqs. = EN 101
- **EC 110 (3) * SB** Principles of Microeconomics — Pre-reqs. = MA 100 or higher

SOPHOMORE YEAR — 34

Fall — 17 hrs

- **PH 105 (4) * N** General Physics with Calculus 1 — Pre-reqs. = MA 113 or 115 or 125 or 145
- **MA 227 (4)** Calculus 3 — Pre-reqs. = MA 126
- **MTE 271 (3)** Engineering Materials 1 — Pre-reqs. = CH 101, MA 125
- **MTE 252 (3) *** Metallurgical Process Calculations — Pre-reqs. = CH 102, ENGR 103, MA 125
- **HU/L/FA (3) ***

Spring — 17 hrs

- **PH 106 (4) * N** General Physics with Calculus 2 — Pre-reqs. = PH 101 or 105 or 125
- **MA 238 (3)** Differential Equations 1 — Pre-reqs. = MA 126
- **AEM 201 (3)** Statics — Pre-reqs. = MA 125, PH 105, ENGR 103
- **MTE 362 (4) C** Thermodynamics of Materials — Pre-reqs. = MTE 252
- **MTE 275 (3)** Engineering Materials Laboratory — Pre-reqs. = EN 101; Co-reqs. = MTE 271

JUNIOR YEAR — 33

Fall — 16 hrs

- **ECE 320 (3)** Fundamentals of Electrical Engineering — Pre-reqs. = PH 106, MA 238
- **AEM 250 (3)** Mechanics of Materials — Pre-reqs. = MA 126, AEM 201
- **MTE 373 (4) W** Physical Metallurgy — Pre-reqs. = MTE 271, 362
- **MTE 380 (3) ##** Synthesis, Processing and Manufacturing of Materials — Pre-reqs. = MTE 271
- **HU/L/FA (3) ***

Spring — 17 hrs

- **MTE 455 (4)** Mechanical Behavior of Materials — [Pre-req. = AEM 250]
- **MTE 416 (4) C** Fundamentals of Foundry Processing — [Pre-reqs. = MTE 362, MTE 380]
- **MTE 353 (3) *** Transport Phenomena — Pre-req. = Math 238, MTE 252
- **ADV. SCI. (3) [1]**
- **HI/SB (3) ***

SENIOR YEAR — 29

Fall — 14 hrs

- **MTE 481 (4) W *** Analytical Methods for Materials — Pre-req. = MA 238; Co-req. = MTE 441
- **MTE 443 (3) #** Materials Engineering Design 1 — Pre-reqs. = MTE 362, 373, 380; Co-Reqs. = MTE 441, 481
- **MTE 441 (4)** Chemical Metallurgy — Pre-reqs. = MTE 353, MTE 362; Co-Reqs. = MTE 443
- **MTE EL. (3) [2].**

Spring — 15 hrs

- **MTE 445 (3) #** Materials Engineering Design 2 — Pre-reqs. = MTE 416, 441, 443, 455, 481
- **ADV. MATH (3) [1]**
- **MTE EL. (3) [2].**
- **HI/SB (3) ***
- **HU/L/FA (3) ***

Summer — 3 hrs

- **Approved MATH elective[3] (3)**

GRADUATE — 9 / 9

Fall — 9 hrs

- **MTE 562 (3)** Metallurgical Thermodynamics — Pre-reqs. = MTE 362
- **MTE 579 (3)** Advanced Physical Metallurgy — Pre-reqs. =
- **Approved Graduate Elective (3)**

Spring — 9 hrs

- **MTE 556 (3)** Advanced Mechanical Behavior — Pre-req. = AEM 250
- **Approved Graduate Elective (3)**
- **Approved Graduate Elective (3)**

* Core Curriculum courses
\# Senior standing
\## or ME 383/283

1. A list of acceptable science and math electives is available in the metallurgical and materials engineering department office. These courses must be taken at 400-level or higher. Prior approval must be obtained from the Instructor, Graduate Director and the Graduate School before the semester begins. All other coursework to count toward the Graduate degree must be taken at the 500-level or higher.
2. MTE Students may take up to six (6) hours of MTE 400-level coursework with prior approval from the Instructor, Graduate Director and the Graduate School before the semester begins. All other coursework to count toward the Graduate degree must be taken at the 500-level or higher.
3. A course in engineering-related mathematics (e.g., statistics, linear algebra, advanced calculus, or other math-based course that has been approved by the Department)

This is an unofficial flowchart prepared to assist students in planning their coursework. The UNIVERSITY CATALOG contains the official listing of academic information. The MTE Department may change prerequisites and corequisites from time to time as course content changes to keep pace with changing technology. These changes are posted on the academic bulletin board outside the Department office. Students should consult the CATALOG and Department bulletin board prior to registration. Revised Spring Semester 2016.

Policy on MTE Electives

Each student may select any two MTE electives to satisfy the requirements of MTE elective courses. The technical elective requirement may be satisfied with an additional MTE elective or a 300 level or higher "materials-related" engineering, math, or science course by prior petition.

Policy on Humanities and Social Science Electives

Students must satisfy College of Engineering Core curriculum requirements. These include 9 semester hours of humanities (HU), literature (L), and arts (FA) courses. Nine semester hours are also required in history (HI) and social and behavioral sciences (SB). Six of these 18 semester hours must be from a single discipline (Depth Study). There is no mandatory requirement of literature or fine arts in metallurgical engineering.

Engineering Registration as a Professional Engineer

Engineering is a profession requiring state registration to become a "Professional Engineer." The first step towards becoming registered is passing the Fundamentals of Engineering Exam. Students are strongly encouraged (but not required) to take and pass the Fundamentals of Engineering Exam before they graduate.

Approved Math Elective Courses*

MA 237 – Applied Matrix Theory

MA 257 – Linear Algebra

MA 300 – Introduction to Numerical Analysis

MA 343 – Applied Differential Equations II

MA 411 – Introduction to Numerical analysis

GES 255 – Engineering Statistics I

GES 400 – Engineering Statistics

GES 451 – Matrix and Vector Analysis

ME 411 – Finite Element Analysis and Heat Transfer

* Other courses in "engineering-related" mathematics (e.g., statistics, linear algebra, advanced calculus, etc.) can be taken provided that it has been approved by the Department by prior petition.

Approved Science Elective Courses**

BSC 114 – Principles of Biology

CH 223 – Chemical Equilibria and Analyses

CH 231 – Elementary Organic Chemistry I

PH 253 – Modern Physics

PH 331 – Electricity and Magnetism I

PH 333 – Optics

GEO 210 – Minerology

GY 339 – Natural Resources & Environmental Planning

CE 425 – Air Pollution (see prerequisites in catalog)

CHE 438 – Electronic Materials

CHE 412 – Polymer Materials Engineering

ME 441 – Introduction to Biomedical Engineering

MTE 476 – Physical Ceramics

MTE 487 – Corrosion Science & Engineering

** Other courses in "engineering-related" sciences can be taken provided that it has been approved by the Department by prior petition.

Approved MTE Elective Courses***

MTE 412 (CHE 412) – Polymer Materials Engineering

MTE 439 – Metallurgy of Welding

MTE 449 – Powder Metallurgy

MTE 450 – Plasma Processing of Thin Films

MTE 467 – Strengthening Mechanisms in Materials

MTE 476 – Physical Ceramics

*** Other "materials-related" engineering, math or science courses can be taken provided that it has been approved by the Department by prior petition.

THE UNIVERSITY OF ALABAMA® | College of Engineering
Metallurgical and Materials Engineering