Materials Engineering

A minimum of 20 of the required 28 units should be Materials Science (MASC) or Materials Science cross-listed courses. Any course not on the list will require department approval to be applied toward the degree.

MASC elective list (20-28 units)

MASC 501 Solid State (3)
MASC 502 Advanced Solid State (3)
MASC 503 Thermodynamics of Materials (4)
MASC 504 Diffusion and Phase Equilibria (4)
MASC 505 Crystals and Anisotropy (4)
MASC 506 Semiconductor Physics (4)
MASC 512 Thin Film Science and Technology (4)
MASC 515 Basics of Machine Learning for materials (4)
MASC 520 Mathematical Methods for Deep Learning (4)
MASC 534 Materials Characterization (3)
MASC 535L Transmission Electron Microscopy (4)
MASC 551 Mechanical Behavior of Engineering Materials (4)
MASC 559 Creep (3)
MASC 560 Fatigue and Fracture (3)
MASC 561 Dislocation Theory and Applications (3)
MASC 562 Failure Analysis (3)
MASC 564 Composite Processing (4)
MASC 570 Introduction to Photovoltaic Solar Energy Conversion (3)
MASC 575 Basics of Atomistic Simulation of Materials (4)
MASC 576 Molecular Dynamics Simulations of Materials and Processes (4)
MASC 583 Materials Selection (4)
MASC 599 Special Topics (varies)
MASC 601 Advanced Semiconductor Device Physics (4)
MASC 610 Molecular Beam Epitaxy

ENG elective list (0-8 units)

AME 503 Advanced Mechanical Design
AME 508 Machine Learning and Computational Physics
AME 509 Applied Elasticity
AME 525 Engineering Analysis
AME 526 Engineering Analytical Methods
AME 546 Design for Manufacturing and Assembly
AME 577 Survey of Energy and Power for a Sustainable Future
AME 578 Modern Alternative Energy Conversion Devices
AME 588 Materials Selection
ASTE 557 Spacecraft Structural Strength and Materials
BME 510 Cellular Systems Engineering
CE 507 Mechanics of Solids I
CE 529a Finite Element Analysis
CE 546 Structural Mechanics of Composite Materials
CHE 501 Modeling and Analysis of Chemical Engineering Systems
CHEM 630 Fundamentals of Electrochemical Energy Systems
CHEM 632 Introduction to Surface Chemistry and Electrocatalysis
EE 471 (MASC 471) Applied Quantum Mechanics for Engineers (4)
EE 504L Solid State Processing and Integrated Circuits Laboratory
EE 507 (MASC 507) Micro- and Nano-Fabrication Technology
EE 508 (MASC 508) Nano-Fabrication Lithography
EE 512 Stochastic Processes
EE 529 Optics
EE 531 Non-linear Optics
EE 537 Modern Solid-State Devices
EE 601 Semiconductor Devices
EE 607 Microelectromechanical Systems
EE 612 Science and Practice of Nanotechnology
ENE 505 Energy and the Environment
ISE 510 Advanced Computational Design and Manufacturing
ISE 515 Engineering Project Management
PTE 586 Artificial Intelligence and Machine Learning in Oilfield Operations (3)