MATERIALS SCIENCE & ENGINEERING
APPROVED LIST OF "ELECTIVES" FOR GRADUATE STUDENTS

MECHANICAL ENGINEERING

530.601	Continuum mechanics
530.604	Mechanical Properties
530.605/606	Mechanics of solids & materials I & II
530.612	Computational solid mechanics
530.631	Conduction and Radiation of Heat
530.632	Convection of heat and mass
530.640	Statistical mechanics and molecular dynamics
530.642	Plasticity
530.646	Robot Devices, Kinematics, Dynamics, and Control
530.644	Mechanics of composite materials
530.652	Bridge length scales in materials behavior
530.655	Additive Manufacturing (Graduate)
530.656	Deformation Mechanisms
530.671	Statistical mechanics in biological systems
530.684	Orientation Mapping of Crystalline Materials
530.730	Finite element methods
530.732	Fracture of materials
530.733	Microelectromechanical systems
530.748	Stress waves in solids
530.751	Finite elasticity
530.753	Fatigue
530.754	Viscoelasticity
530.756	Advanced analytical electron microscopy
530.757	Nanomechanics
530.766	Numerical Methods

BIOMEDICAL ENGINEERING

580.642	Tissue Engineering
580.774	Molecular & Cellular Imaging

CIVIL ENGINEERING

560.728	Stochastic Micromechanics
560.730	Finite element methods
560.731	Theoretical methods in computational mechanics
560.733	Computational plasticity
560.735	Finite element methods in solid mechanics
560.737	Wave Propagation

CHEMICAL & BIOMOLECULAR ENGINEERING

540.622	Introduction to Polymeric Materials
540.623	Phase equilibria
540.624	Applied statistical thermodynamics
540.626	Introduction to biomacromolecules
540.630	Thermodynamics, Statistical Mechanics & Kinetics
540.633	Engineering aspects of controlled drug delivery
540.637	Application of molecular evolution in biotechnology
540.652	Fundamentals of Biotransport Phenomena (formerly 540.651 - Advanced transport phenomena
540.440/540.640	Micro & Nanotechnology
540.603	Colloids and Nanoparticles
540.660	Polymer Physics
540.662	Polymer Design and Bioconjugation

COMPUTER SCIENCE

601.615	Databases

ELECTRICAL & COMPUTER ENGINEERING

520.603	Electromagnetic Waves and Radiating Systems
520.604	Computational Electromagnetics
520.605/606	Introduction to Solid State Physics
520.610	Computational Functional Genomics
520.619	Optical Communications
520.607	Intro to the Physics of Electronic Devices
520.621	Introduction to Nonlinear Systems
520.623	Optical Propagation, Backgrounds and Sensing
520.627	Photovoltaics and Energy Devices
520.653	Fundamental Non-linear Optics
520.691	Optoelectronic VLSI
520.725	Medical Microsystems
520.727/728	Quantum electronic
520.745	Solid state electronics
520.765	Nonlinear Waves and Interactions in Optics and Electrodynamics
520.773	Advanced topics in fabrication and microengineering
520.776	Learning on Silicon

GEOGRAPHY & ENVIRONMENTAL ENGINEERING

570.661	Applied Mathematics for Engineering/Cross Listed with 531.661
570.686	Multiscale Flow and Transport in Porous Media

INBT (Institute for NanoBioTechnology)

670.621	NanoBioLaboratory
670.619	Fundamental Physics & Chemistry of NanoMaterials

PHYSICS

171.605.606	Quantum mechanics
171.621-622	Condensed matter physics (including advanced, experimental, topics in…)
171.634	Magnetism
171.703-704	Advanced statistical mechanics
173.712	Laboratory of advanced instrumentation

EARTH & PLANETARY SCIENCES

270.621-622	Transmission electron microscopy
270.635	Crystal chemistry and behavior of rocking-forming minerals
270.641	Inorganic solids
270.647	Mechanics of Earth's interior

CHEMISTRY

030.451	Spectroscopy (graduate version is taught but is not listed separately)
030.601	Statistical mechanics
030.607	Surface and interface chemistry
030.603	Organic Photochemistry
030.610	Chemical Kinetics
030.611	Electron Transfer Processes
030.615	Topics in biological inorganic chemistry
030.620	Chemical Biology II
030.631	Bioorganic chemistry
030.635	Methods in Nuclear Magnetic Resonance
030.681	Organometallic Chemistry

BIOPHYSICS

250.685	Proteins and nucleic acids
250.689	Physical chemistry of biological macromolecules
250.690	Methods in molecular biophysics

BIOLOGY

020.637	Advanced Genetics and Development
020.639	Macromolecular assemblies in biology
020.642	Proteins: structure, folding and interaction with partners
020.646	Biological Spectroscopy
020.667	Bioconjugate Techniques
020.679	Advanced Biological Electron Microscopy
020.735	Membrane Trafficking

APPLIED MATHEMATICS & STATISTICS

553.740	Machine Learning
553.636	Introduction to Data Science

AS.410.603 Advanced Cell Biology – **AAP Biotechnology**

661.610 Research Writing

All other courses need to be approved by either the Master's Program Committee (MSE) or the Doctoral Program Committee (Ph.D.)in order to be counted as Materials Science & Engineering electives.