Biomaterials Focus Area

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Materials Science Requirements

Required Six Materials Science Core Classes*

MLGN500 Processing, Microstructure, and Properties of Materials
MLGN512/MTGN412 Ceramic Engineering
MLGN531/CHGN416 Polymer Engineering and Technology
MLGN501/CHGN580 Structure of Materials or CHGN505 Adv Organic Chemistry
MLGN504/MTGN555 Solid State Thermodynamics
or CHEN509 Advanced Chemical Engineering Thermodynamics
MLGN511 Kinetic Concerns in Materials Processing or MTGN548 Transformation in Metals
or MTGN556 Transport in Solids or CHEN518 Reaction Kinetics & Catalysis
or CHGN585 Chemical Kinetics

*Transfer credit can be approved by signature of the advisor and the Lead Scientist.

Focus Area Requirements

Math Requirement: Advanced Statistics or Biostatistics (MATH424 or MATH 530/MATH531)

Focus Area Prerequisites met?

Yes

No

BELS 301: Biology or equivalent (CU, CSU, UCD)
CHGN428: Biochemistry or equivalent

Choose a minimum of 5 courses from the list below with the help of your advisor

Courses Required for ALL Biomaterials Students
Anatomy/Physiology (BELS 404)
Introduction to Biocompatibility (MTGN/MLGN 570)

Ceramics:
MLGN544: Processing of Ceramics
MLGN516: Properties of Ceramics II
MLGN519: Non-Crystalline Materials
MTGN518: Phase Equilibria in Ceramic Systems
MTGN512: Ceramic Engineering
MTGN565 Mechanical Properties Ceramics and Composites

Metals:
MTGN530: Advanced Iron and Steel Making
MTGN531:Thermo. Of Metallurgical and Mat. Processing
MTGN542:Alloying Theory Structure and Phase Stability
MTGN548:Transformations in Metals
MTGN551:Advanced Corrosion Engineering

Polymers:
MTGN526:Gel Science and Technology
MLGN531:Introduction to Polymer Engineering
MLGN530: Introduction to Polymer Science
MLGN563:Polymer Eng Structure Prop & Processing

Material/Tissue Interface/Thin Films:
MLGN525: Surface Physics
MLGN510/CHGN410:Surface Chemistry
MTGN697:Microstructural Evolution Coatings & Thin Films
MTGN696:Vapor Deposition Processes
MTGN591:Physical Phenomena of Coating Processes

General:
MLGN583:Prin & Applications of Surface Analysis
MLGN517:Solid Mechanics of Materials
MLGN505: Mechanical Properties of Materials
MLGN509: Solid State Chemistry

PhD Qualifying Examination:
The qualifying exam is a 90 minute oral exam. This will follow completion of the student's core and required classes. The PhD candidate, in collaboration with their advisor and the mentor, will organize a qualifying examination committee of 3-5 professors and schedule the exam. A minimum of 10 days prior to the exam, the candidate must submit an extended abstract describing his/her PhD research plans and preliminary results (if applicable). This abstract should also discuss the major fundamental materials science themes of their research as they relate to their coursework. During the exam, the candidate will deliver a 30 min oral presentation on their research plans/preliminary results, followed by up to 90 minutes of oral examination from the committee on the fundamental materials science and engineering based on their coursework.

PhD Defense

A minimum of 18 course credits (6 courses) are required for students with course transfers/waivers. Total course credits: 30.