



University of California, Santa Barbara
Program Learning Outcomes

PhD in Materials

Upon graduation with a PhD in Materials:

Core Knowledge

- Students shall be able to demonstrate knowledge of the fundamental concepts of Materials Science, notably the principles governing the structure of materials at different length scales (Matrl 200A,B,C), and the relationships between structure, properties and synthesis/processing in the context of their major field within the discipline.
- Students shall be able to demonstrate a deep understanding and expertise in at least one of the major fields of the Materials Ph.D. program at UCSB.

Research Methods and Analysis

- Students shall be able to plan and execute an original research project in their field, rigorously analyze relevant findings and draw sound conclusions.
- Students shall be able to demonstrate knowledge and understanding of the methods and techniques for synthesis and processing, structural characterization, property measurement and/or computational simulation relevant to their major field of study.
- Students shall be able to review, critically assess and cogently synthesize relevant literature in their field, guided by an understanding of theory and engineering practice.
- Students shall be able to properly use literature citations and references to make their technical arguments and justify critical assumptions.

Pedagogy

- Students shall develop the ability to communicate the fundamentals of their discipline and major field of study to general or specialized audiences.
- Students shall develop basic lecturing, mentoring and managing skills as a foundation for an academic career or a group leadership position in a research organization. This may include, as appropriate, the mentoring of undergraduates in an academic research environment.

Scholarly Communication

- Students shall be able to communicate their research findings and conclusions effectively through oral presentations and through the development of requisite audiovisual materials.

Continued on Page 2

University of California, Santa Barbara Program Learning Outcomes, continued

- Students shall demonstrate their ability to communicate their research findings in writings that contribute to expand knowledge in their field, can be understood by their peers and meet the standards of publication of leading journals in the discipline.

Professionalism

- Students shall be familiar with, and understand the benefits and responsibilities of participating in the relevant professional societies in the Materials field.
- Students shall demonstrate an understanding of the benefits of interdisciplinary interactions, both in research teams as well as in the context of professional societies, as well as the skills to interact productively with colleagues at all levels of experience, including more senior researchers, peers, undergraduates, and technical staff.
- Students shall understand and be able to articulate their career options after graduation, including industrial, government and academic environments.
- Students shall demonstrate a commitment to the principles of ethical professional conduct.

Independent Research

- Students shall demonstrate their ability to identify an important research problem in their field, propose an original and rigorous research program to elucidate the problem, elaborate the necessary theories, models and experimental capabilities to implement their research plan, write a doctoral dissertation that meets high standards of scholarship in their field, and defend it in a public forum.
- Students shall produce scholarly manuscripts suitable for publication in leading peer reviewed journals in Materials, as appropriate to the research topic.