Required Courses 2023

Component	Courses	Description
Research Apprenticeship	Faculty Interviews (MSE 801)	During their first year, students interview 8 faculty members from both campuses and write a 1-page summary of each interview. The summaries are submitted to the SDSU MSED Co-Director.
	Three Research Rotations: MSE 802 (SDSU) ***and*** MSED 295 (UCSD)	Students have practical experience with 3 different research projects (at least one on each campus). Each rotation should involve approximately 30 hours of work. [Note: One is a rotation on the grant writing process. Then students arrange one at each campus for the other two rotations.]
	Research Project: MSE 820 (SDSU) ***or*** MSED 298(UCSD)	Students design and conduct an empirical study under the supervision of a faculty member. Students typically collect data in the summer following their first year and analyze and report their findings during the fall of their second year.
Cognitive Science	Two Courses at UCSD selected from the following; at least 1 must be at the graduate (200 level): Distributed Cognition (102A); Cognitive Ethnography (102B), Cognitive Foundations of Mathematics (152 or 252), Gesture and Cognition (155), Cognitive Science Seminar (200), Cognitive Science Foundations (203), Information Visualization (220), Seminar on Special Topics (COGS 260); Cognitive Theory (**one** of COGS101 A, B, **or** C)	UCSD is recognized internationally as a leading center of cognitive science. In courses and seminars, students will explore questions such as the following: What is the nature of intelligent activity? What are possible computational and biological mechanisms underlying such activity? What is the role of the environment (cultural and social as well as physical) in supporting and enabling cognition?
	Seminar in Mathematics and Science Education (MSED 296 A, B, & C at UCSD)	International, as well as US, theories and research about how students learn mathematics and science from elementary school through college, what mathematics and science they are expected to learn, and ways of helping them learn (i.e., teaching them) are studied

Theoretical Perspectives in Mathematics & Science Education	Learning Theories (MTHED 603 at SDSU)	The application of several major learning theories (e.g., behaviorism, Piagetian constructivism, information processing, sociocultural perspectives, and embodied cognition) to research on the learning and teaching of mathematics and science.
	Science Education Seminar (TE610C at SDSU) *required for science educators*	Research on the learning and teaching of science at the K-14 level is explored. Issues include students' conceptions (of topics in biology, physics, and chemistry), the nature of science, and experimental curricular approaches.
	Two Seminars taught at SDSU, selected from the following, *required for mathematics educators*: Mathematics in the Early Grades (MTHED 600) Mathematics in the Middle Grades (MTHED 601) Teaching Mathematics (MTHED 604) Algebra in the 7-14 Curriculum (MTHED 605) Geometry, Probability, Statistics in the 7-14 Curriculum (MTHED 606) Research on Undergraduate Mathematics Education (MTHED 607) Equity in STEM Education (MTHED 608)	In MTHED 600 and 601, students explore research in the teaching and learning of mathematics in Grades K-4 and Grades 5-8, respectively. MTHED 604 addresses the research on teaching practices in mathematics, teacher knowledge, and teacher learning. MTHED 605 and 606 students investigate the research on students' conceptions of a variety of topics in important content areas (such as geometry and algebra) at the secondary and lower-division undergraduate levels. Innovative pedagogical approaches are also investigated. MTHED 607 explores the research on teaching and learning mathematics at the undergraduate level. MTHED 608 Equity in STEM
Research Methods	Quantitative Methods: PSYC 201 A & B (UCSD) ***or*** EDS 254 & 255 (UCSD) ***or*** MA 282 A & B (UCSD) ***or*** [Note: EDS 288A & 288C are also possible with a course substitution]	Statistical methods and the mathematical treatment of data are explored.
	Qualitative Methods (MSE 810 at SDSU)	Qualitative methods are explored, such as clinical interviewing, verbal protocol analysis, grounded theory, design experiments, and interactional analysis.

Teaching Experience	One Teaching Practicum selected from: Assisting or teaching prospective teachers (MSE 805 at SDSU) Supervised K-12 teaching (MSE 806 at SDSU or MSED 294 at UCSD) Specially designed practicum (MSE 807 at SDSU) TA for undergraduate mathematics or science ("Content" 500 at UCSD)	Students work with a supervising faculty member to create an experience in which they will assist or teach prospective teachers, undergraduates, or K-12 students.
Experiences	Two courses from any categories are selected with advisors according to the student's needs and background:	
	Philosophy & History. UCSD: Philosophy of Science (PHIL 145); Philosophy of Physics (PHIL 146); Philosophy of Biology (PHIL 147); Seminar on Science Studies (PHIL 209A); History of Science (HISC 106, 107, 108, 109, 110, 160/260, 163/263, 165).	
	Sociology. UCSD: Language, Culture, & Education (SOCI 117/EDS 117); Social Organization of Education (SOCI 126/EDS 126); Intro to Academic Tutoring of Secondary School Students and Practicum (EDS 136 & 139); Sociology of Education (SOCG 270)	
	• **Equity & Diversity.** UCSD: Chicanas/os and Latinos in Education (EDS 113), History, Politics, and Theory of Bilingual Education (125), Equitable Educational Research and Practice (250), Transforming Learning Environments (EDS 251), Transforming Inequities in Student Outcomes (252), or Talking Culture, Culture Talking: Voices of Diversity (EDS/COGR 278)	
	• **Mathematics & Science.** Graduate level courses in mathematics, chemistry, biology, or physics.	
	• **Teaching Experience**. An option for students who have not yet had teaching experiences at both the K-12 and collegiate levels is to take a second teaching practicum.	
	Other. Other types of courses (at the graduate or upper division undergraduate level) can be approved by the advisors if they contribute to a coherent program.	
Independent Research	Research Seminar (MSE 830)	Students and faculty present ongoing research for discussion and critique.
	Dissertation Research: MSE 897-899 (SDSU) *or* MSED 299 (UCSD)	Independent study and research for the doctoral dissertation.