## DOCTORAL PROGRAM MATHEMATICS & SCIENCE EDUCATION

<table>
<thead>
<tr>
<th>Year</th>
<th>1st Year Project</th>
<th>Poster</th>
<th>2nd Year Project</th>
<th>Present Paper</th>
<th>Major Area Paper</th>
<th>Dissertation Proposal</th>
<th>Dissertation</th>
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<tbody>
<tr>
<td>FALL</td>
<td>EDUC 8040</td>
<td>EDU 8010</td>
<td>EDUC 8020</td>
<td>EDUC 8000</td>
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<td>SPRING</td>
<td>PSY-GS 8858 or PSY-GS 8861</td>
<td>EDU 8030</td>
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<td>FALL</td>
<td>MSE SEMINAR</td>
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<td>RESEARCH METHODS 1</td>
<td>RESEARCH METHODS 2</td>
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<td>SPRING</td>
<td>RESEARCH GROUP</td>
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<td>YEAR 1</td>
<td>ELECTIVES</td>
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<td>YEAR 2</td>
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<td>YEAR 3</td>
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<td>YEAR 5</td>
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- **ELECTIVES**: 9 HOURS
- Must be completed in designated semester
- Suggested schedule
- Any Spring
- Any Fall
- No credit

**MSE: NICOLE JOSEPH**

Oct 2019
**Mathematics and Science Education Ph.D. REQUIREMENTS**

Vanderbilt University requires students to take 72 hours of work to earn a PhD. These hours can be fulfilled through transfer of graduate credits, coursework, independent studies, and dissertation work. The number of hours transferred and the number of hours counted toward dissertation work vary according to each student’s particular circumstances. Typically, students who enter with a master’s degree with coursework relevant to their area of study will be able to complete coursework in three years. Students with less prior coursework typically will require additional time.

<table>
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<tr>
<th>Year</th>
<th>Fall Courses</th>
<th>Spring Courses</th>
<th>Expected Products</th>
<th>Cum. Hours (72 max)</th>
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</table>
| Year 1 | Advanced Learning and Instruction*  
Research Group* (0 hours)  
Equity and Diversity in Education*  
Statistical Inference^ (PSY-GS 8858 or PSY-GS 8861) | Inquiry into Education*  
Research Group* (3 hours)  
Foundational Readings in STEM Education Research~ | First Year Project  
(presented as poster Fall of second year) | 18 |
| Year 2 | Research Methods 1*  
Research Group* (0 hours)  
Elective  
Elective | Teaching as Social Practice*  
Research Group* (3 hours),  
Research Methods* 2 | Second Year Project  
(presented in short talk Fall of third year) | 36 |
| Year 3 | Electives (may take research groups) | Electives (may take research groups) | Major Area Paper  
(candidacy exam) | 54 |
| Year 4 | Electives (may take research groups)  
Dissertation hours (0 to 9 hours) | Electives (may take research groups)  
Dissertation hours (0 to 9 hours) | Dissertation Proposal Defense | 72 (max) |
| Year 5 | Dissertation hours (0 to 9 hours) | Dissertation hours (0 to 9 hours) | Dissertation Defense  
(depending on progress) | 72 (max) |

* Required by Teaching & Learning Department (taught every year, semester may vary)  
~ Required by MSE doctoral concentration  
^ Vanderbilt Graduate Program Requirement
Core Courses (required, 27 hours)

- Advanced Learning and Instruction (EDUC 8030)
- Inquiry into Education (EDUC 8010)
- Equity and Diversity in Education (EDUC 8040)
- Teaching as Social Practice (EDUC 8020)
- Statistical Inference (Peabody College requires PSY-GS 8858 or PSY-GS 8861; the latter is a pre-requisite for advanced quantitative methods coursework)
- Research methods (2 courses other than required statistics; Introduction to Qualitative Research Methods (EDUC 8820) is recommended for MSE doctoral concentration)
- Research Groups (EDUC 9700 is a year-long course (3 hours), required in both Years 1 and 2; may be taken again in later years for variable credit)

MSE Seminars (at least 3 required, can also be taken as electives, 9 hours or more)

- Foundational Readings in STEM Education (TBA)
- Discourse in STEM Classrooms (EDUC 7140)
- Power and Identity in STEM (EDUC 7300)
- Epistemological Foundations of Mathematics and Sciences (EDUC 8100)

Electives (21 hours, may include Research Groups in Years 3 and 4)

- Observational and Design Research on Informal Learning (TBA)
- Design-based Research (TBA)
- Design Thinking, Values, and Practices (TBA)
- Institutional Settings for STEM Education (TBA)
- Connected Learning and STEM Teaching (TBA)
- Advanced Qualitative Methods: Learning and the Interaction Order (EDUC 8830)
- Discourse Analysis in Education (EDUC 8810)
- Humanizing Pedagogies (EDUC 7700)
- Computational Thinking and Modeling (TBA)
- Learning Analytics and Data Science (TBA, offerings across Vanderbilt departments)
- Foundations in Learning and Development (EDUC 8200)
- Foundational Readings in Learning Sciences (TBA)
- Electives in Mathematics, Science, and Engineering (various A&S department offerings)
- Electives in other Peabody College Departments (Psychology, Leadership and Organizations, Community Research and Action, and Special Education)
**Doctoral Program Benchmarks**

- Research Presentation (with faculty feedback): Year 1 poster presentation to the department and other PhD students; Year 2 (same audience)
- Major Area Paper (MAP) completed and defended by Candidacy Exam in Year 3
- Dissertation Proposal completed and defended by Year 4

**Specialized Area of Expertise**

Each student will develop a program of studies designed to enable him or her to acquire expertise in a given area that is consistent with his or her career objectives and prior education and research-related experiences. Students select courses and develop a description of their area of expertise through discussion with and approval of their advisors. Each year the program reviews each students’ plans along with materials required as part of the students’ annual review materials.

**Research Presentation Competence**

Students will develop competence presenting research results by engaging in varied activities related to presenting research findings. First year projects (developed with advisor) will be shared with the department in the form of a poster presentation. Second year papers will be presented to the department in the form of a conference presentation. In addition, students will develop and submit abstracts seeking the opportunity to present research at national conferences. Students are encouraged to submit papers to national conferences as early as possible. Students are also encouraged to submit manuscripts to peer-reviewed journals and to apply for relevant fellowship opportunities in their area of study.