SYRACUSE UNIVERSITY

Department of Science Teaching

Doctoral Degree Programs

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Ph.D. Degrees

Students with an interest in research and/or university teaching usually pursue the Ph.D. degree. These programs emphasize intensive study in a major area of specialization and often a minor area as well, leading to the development or extension of theory and research in the major field.

To be considered for admission to a doctoral program in science education, students must submit a Graduate Application along with Graduate Record Examination General Test scores. Admission decisions are based on past academic records, GRE scores, letters of recommendation, and the personal statement that accompanies the application.

Applicants are strongly urged to meet with the Department of Science Teaching faculty members to discuss their needs, interests, and goals before deciding on which program to pursue.

Doctoral programs require several components:

1. filing the informal doctoral program plan
2. filing of a formal doctoral program plan
3. coursework requirements
4. preliminary 45-hour examination/review
5. practicum/research requirements (Science Ed PhD only)
6. qualifying examination
7. admission to candidacy
8. dissertation preparation and oral defense
The following are general requirements for the Ph.D. program:

1. Your program of study must include at least 90 credits beyond the baccalaureate degree.

2. You must have a minimum of 45 credit hours of Science and Science Education courses. Your major area (Science and Science Education) may include courses drawn from science content and science education courses. Neither dissertation hours nor core requirements can be included in your major area.

3. Your program of study must include EDU 781, *Institutions and Processes of Education* or an exemption approved by the Policy and Standards Committee.

4. Your program of study must include 12 credit hours of coursework on methods of research.

5. Your program of study must include a minimum of 9 (and up to 24) credit hours of dissertation credit.

6. A minor concentration is optional. If you elect to pursue a minor, you must select at least 15 hours in your minor area under the advisement of faculty in the minor area. You will be required to write a qualifying exam in this area.

7. Limits on transfer credit: One-half of the credit hours submitted for your Ph.D., exclusive of dissertation credits, must be taken at Syracuse University as part of your planned doctoral program. In other words, the number of course credit hours taken at Syracuse University as part of your doctoral program must be equal to or greater than those being transferred in. Grades earned must be a “B” or better to transfer.

**GUIDELINES FOR EXEMPTION FROM EDU 781**

Within each profession there are competing views of what constitutes good practice. There is controversy not only about the best way of solving specific problems, but also about how to define the problems, what will count as their solution, and what role the practitioner should play in solving them. The views of communities of practitioners about these questions are shaped by the cultural and historical contexts of their practice, as well as by competing paradigms within the profession.

The main goal of EDU 781 is to encourage students to further develop their own historical and professional paradigms that have influenced contemporary educational thought.

Therefore, students seeking exemption from EDU 781 should present evidence that they have already achieved this goal. More specifically, they should show that they have met the following objectives:
A. Students should demonstrate knowledge of different models of desirable professional practice in education. Relevant topics include:

1. Models of the professions and their place in society
   - the social meaning of the professions
   - the relationship between theory and practice
   - the nature of the client-professional relationship
   - the professional’s role in society
   - the institutional contexts conducive to professional practice

2. Political, social, and moral ideals that are used to guide and justify professional activity in education.

3. Competing paradigms in the student’s own area of expertise or in education more generally. This knowledge of alternative models might have been developed through historical case studies, comparative analysis, or close examination of disputes within the student’s area of expertise, or preferably, through a combination of these ways. Through these studies, a student should have developed a critical perspective about professional practice in education.

B. Students should have developed their own point of view in relationship to the alternatives described in the first objective and should be able to apply their views to the analysis of problems within their own areas of expertise or in education generally.

C. Students should demonstrate knowledge of the cultural, historical, and professional contexts that have influenced the models referred to in the first two objectives.

In terms of traditional subjects of study, the student might show that these objectives have been met by pointing to work in philosophy of education, comparative education, and political and social philosophy. It would, of course, not be necessary to have taken courses specifically focused on these areas. Students might have done relevant work as units in a variety of courses. Course syllabi and/or papers written by the student might be used to demonstrate mastery of the objectives.

Students who believe that they qualify for exemption under these guidelines should submit their petitions and supporting materials to the Policy and Standards Committee which will evaluate each case.
REQUIREMENTS FOR METHODS OF RESEARCH AND/OR
SCHOLARLY INQUIRY

As a graduate of a university that emphasizes research and other forms of scholarly inquiry, you should be able to demonstrate your competence in research methods appropriate to your career path and exhibit functional familiarity with other commonly used research methodologies. Faculty in the School of Education expects all doctoral students to understand the different conceptions of social sciences, be able to conduct and report research and/or other forms of scholarly inquiry, and understand the process by which the results of research and/or scholarly inquiry contribute to a particular body of knowledge.

Ph.D. students are required to take at least 12 credit hours of research methodology courses. The assumption is made that those studying for the Ph.D. will seek positions in research universities where they will be expected both to engage in their own research and/or other forms of scholarly inquiry as well as serve on the committees of students writing dissertations. Such individuals should, therefore:

1. Have a depth of competence in at least one research methodology relevant to the area for which they are preparing, sufficient that they can both critique and carry out such work with facility and excellence. Their own dissertation should use that methodology. If it does not, then preparation in the dissertation’s method is also necessary.

2. Acquire receptive literacy in both qualitative and quantitative research methods in their area of expertise so that they are able to appropriately critique various types of research.

The minimal requirement of 12 research credit hours is usually best met by completing EDU 603 and EDU 647 plus six additional credit hours selected to develop further expertise appropriate to your dissertation and postdoctoral work. The EDU 603 and EDU 647 core prepares students to understand the different conceptions of the social sciences, be able to conduct and report research and/or other forms of scholarly inquiry, understand the criteria used to judge the findings of research and/or other forms of scholarly inquiry, and understand the process by which the results contribute to a particular body of knowledge or practice. The core will introduce you to qualitative, survey, and experimental methodologies, as well as beginning statistics. However, as it does not provide sufficient depth for real competence in any of these areas, you must select six additional credits, with the guidance of your advisor, in order to build competence in a selected methodology.

You may select other research methods sequences with the approval of your advisor. A qualitative or quantitative emphasis may be selected with further study in the areas of research design, survey methods, and methods to conduct an evaluation. Additional alternative sequences may also be approved by the Policy and Standards Committee if a rationale is provided which demonstrates the appropriateness and coherence of the proposed course sequence.

On the following page is a checklist of the specific requirements you will need to fulfill, followed by a more detailed explanation of each step.
**Ph.D. CHECKLIST**

<table>
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<tr>
<th>Task</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Advisor___________________________________________________________</td>
<td>Advisor’s Phone # ________________________________________________________</td>
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<tr>
<td>Dissertation Advisor______________________________________________</td>
<td>Phone # __________________________________________________________________</td>
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<tr>
<td>Date completed and checked with Office of Academic Services (OAS)</td>
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<tr>
<td>________ Official degree-bearing undergraduate and graduate transcripts submitted</td>
<td></td>
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<tr>
<td>________ Informal Doctoral Program Plan: submitted signed by advisor in first semester</td>
<td></td>
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<tr>
<td>________ Preliminary Memo: from advisor (after 45 hour review/exam)</td>
<td></td>
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<tr>
<td>________ Formal Doctoral Program Plan: submitted after 45 hour review for final approval</td>
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<tr>
<td>________ Research Apprenticeship Registration: form filed with OASS</td>
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<tr>
<td>________ 12 hour Research Apprenticeship requirement completed</td>
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<tr>
<td>________ IRB proposal: if needed for Research Apprenticeship, approval letter to OASS</td>
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<tr>
<td>________ Research Apprenticeship Advisor Approval form: filed with OASS (approval form/apprenticeship paper filed by advisor)</td>
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<td>________ Application for Doctoral Qualifying Exam: no less than 2 weeks before the exam</td>
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<tr>
<td>________ Qualifying Exam: results (per memo from advisor) to OASS</td>
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<tr>
<td>________ All But Dissertation (ABD) Status Form: certification that student has officially attained the status of ABD</td>
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<tr>
<td>________ Establish Dissertation Committee</td>
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<td>________ Dissertation Proposal: file one signed cover sheet with OASS</td>
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<tr>
<td>________ IRB Proposal: if required filed with Institutional Review Board, copy of approval sent to OASS</td>
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<tr>
<td>________ Diploma Request: filed electronically on MySlice one semester before defense</td>
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<td>________ Intent to Defend: to be filed electronically the semester before defense</td>
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<td>________ Request for Examination form: to be filed electronically 4 weeks before defense</td>
<td></td>
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<tr>
<td>________ Three copies of dissertation to Associate Dean 3 weeks prior to defense</td>
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<tr>
<td>________ Submit cover page of dissertation signed by your advisor to OASS</td>
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<tr>
<td>________ Submit final revised and signed version of dissertation to 107 Steele Hall</td>
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<tr>
<td>________ Submit final, approved copy of the dissertation to Syracuse University UMI ETD website</td>
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<td>________ Complete Survey of Earned Doctorates: online</td>
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FILING YOUR INFORMAL PROGRAM

During the first semester after you’ve been admitted to the program, you, with the help of your advisor, should complete an Informal Program of Study form and submit it to Academic and Student Services, 111 Waverly Avenue, Suite 230. The purpose of filing an informal plan so early in your doctoral career is to make sure that you’ve done some long-term thinking about your doctoral program before you’ve accumulated many course credits. Of course, this plan can and should be revised as you proceed with your studies.

In order to complete the form, you will need to meet with your faculty advisor to determine such details as the number of courses you will be able to transfer into your program, when you will complete your core courses, what you will do for a practicum experience, and when you will do it, etc. Don’t wait for your advisor to initiate a meeting about your informal plan. You should initiate this meeting.

PRELIMINARY REVIEW

At the end of your first semester of full time study, or upon completion of your 45th hour of course work beyond the bachelor’s degree (at least 15 of which must be earned at Syracuse University), a preliminary review will be conducted and a memo sent to Academic Services stating that you have made satisfactory progress in your program.

FILING YOUR FORMAL PROGRAM

In the semester following your preliminary review, you must file your Formal Program of Study plan with the Policy and Standards Committee. Once the program is approved, it, unlike the informal program you submitted in your first semester, must be amended by petition if changes need to be made. It is your responsibility to develop this plan in conjunction with your advisor and to submit it for approval.
RESEARCH APPRENTICESHIP REQUIREMENT

Ph.D. students must complete a research apprenticeship prior to work on the doctoral dissertation. The purpose of the research apprenticeship is to provide doctoral students experience in conducting a significant piece of work prior to your dissertation. The project should engage students in all aspects of a research study, such as experimental design, data collection, data analysis and interpretation, and reporting. Usually this project helps students learn the research methodology necessary for their dissertation. You must submit a completed research document in publishable format before you apply to take your Qualifying Examination.

The research apprenticeship is usually supervised by a sole faculty member who is either your program advisor or another member of the faculty. It is your responsibility, in consultation with your advisor, to arrange the apprenticeship experience. Some students complete the research apprenticeship experience within the context of a regular course (in which case the course instructor sponsors the apprenticeship). Other students contract with their sponsor for an independent study course carrying 3 to 6 credit hours. Still others conduct the apprenticeship without any formal hours attached to it.

A registration form for obtaining advance agreement with your faculty program advisor and faculty research apprenticeship sponsor regarding the research apprenticeship authorship is available on the School of Education student forms website. Obtaining advance agreement regarding who will sponsor your research apprenticeship and detailing authorship with that sponsor, should the research apprenticeship report be published, are important steps in the planning process. A copy of this document should remain in your department. Upon completion of the apprenticeship, the Faculty Advisor’s Approval Form must be submitted to the Office of Academic and Student Services.
THE QUALIFYING EXAMINATION

Graduate School regulations require you to take the qualifying examination no later than the semester before you expect to complete all degree requirements. However, students may take the examination when they have completed all coursework and their research apprenticeship, but before beginning their dissertation study.

The exam is administered by the academic area faculty. You must file an application to take the exam at least two weeks prior to the administration of the exam with an Assistant Director of Academic Advising in 111 Waverly Avenue, Suite 230. Applications will be accepted only from candidates who have filed a registered program of study in the semester prior to the administration of the examination and have submitted their research apprenticeship report.

The examination covers the major field of study (including research methodology, if relevant) and, if applicable, the minor field. The examination consists of six half days of written examinations or the equivalent. If you have a minor field of study, two half days are in the minor field and four half days are in the major field.

The structure of the examination, however, is variable by doctoral program, so please check with your faculty program advisor or department chair. The examination is prepared and evaluated by a faculty committee consisting of at least two faculty members, including one from the minor field of study if applicable. The Policy and Standards Committee considers examinations in the major and minor areas separately. It is possible for a candidate to pass one, but not the other. All examinations must be passed within a two-year period. If any area is failed twice, the faculty program advisor may recommend additional courses before the third trial. A candidate who fails the major or the minor area three times will be removed from the doctoral program. Your faculty program advisor must report the results of your examination to an Assistant Director of Academic advising in the Office of Academic and Student Services.

The examination in the major area may be written and/or oral. The exam is prepared and evaluated by a committee consisting of your advisor and at least one other person of professional rank (your division may have other requirements as well).

The examination in the minor area is prepared and evaluated by faculty in the area specified. The process of preparing the minor area exam and reporting the results are the same as for the major area.

Students who pass the qualifying examination are admitted to Doctoral Candidacy status and may represent themselves as such. Typically, the letters A.B.D. after one’s name represents this status to others. Doctoral candidates have five calendar years to complete and defend their dissertation research and to complete their degree programs.
THE DISSERTATION

The doctoral dissertation must be developed following these guidelines:

1. The Dissertation Committee

A dissertation committee composed of at least three Syracuse University tenure-track faculty members must be approved by the chair of your department. Your dissertation advisor does not need to be your program advisor, but at least one member of the committee must have faculty status in your program area.

2. The Dissertation Proposal

After passing the Dissertation Proposal Defense, you must file the signed cover sheet of your dissertation proposal to the Office of Academic and Student Services, 111 Waverly Avenue, Suite 230. Your committee must meet about the proposal, approve, and sign off on the proposal before it is sent.

The dissertation proposal should include:

1. A clear statement as to the nature of the problem and why it is worthy of study as a doctoral investigation.
2. The kinds of data needed.
3. How you are going to obtain these data.
4. How you are going to deal with the data you’ve obtained.
5. The nature and significance of the contribution which the dissertation may make to the field of education.

After filing your approved proposal, you may begin to collect data or otherwise execute the proposed research. During the period of collecting and analyzing data and writing your dissertation, you should meet with your dissertation committee as frequently as possible, but you must do so at least once between the time your proposal has been accepted and your final oral examination.

3. Institutional Review Board (IRB)

Public Law 93-348 (1974) requires that all research projects involving human subjects be reviewed by a properly constituted institutional review board. Review and approval by the IRB must occur before research can begin. IRB forms may be acquired from and submitted to the IRB Office, 121 Bowne Hall, 443-3013. Required forms, deadlines, updated policies, and additional resources can be found at: http://orip.syr.edu.
4. Dissertation Styles

The conventional format of dissertations submitted to the faculty in the School of Education at Syracuse University follows the *Publication Manual* of the American Psychology Association. Manuscript form detailed in the *Chicago Manual of Style* is also approved for use. A summary of frequent style problems has been published by Turabian in *A Manual for Writers of Dissertations* (available at the SU Bookstore). Formats not specified in the references above should be approved by the Graduate School. Whatever the format, all dissertations are expected to observe the conventions of standard (edited) English.

5. The Intent to Defend Notice

One or two semesters before you expect to defend your dissertation research, you must file an *Intent to Defend* form. This will alert all faculty of your intent and give them an opportunity to sign up to serve as readers of your dissertation. Filing the form is done electronically at this link:

http://mysoe.syr.edu/intenttodefend

Through the same link, your dissertation advisor will then have to approve of your intent, indicating that he/she and your committee expect that you will soon be ready for the defense of your research. Refer to these filing deadlines:

<table>
<thead>
<tr>
<th>Semester of Defense</th>
<th>Intent to Defend must be filed by</th>
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<tbody>
<tr>
<td>Fall</td>
<td>August 15&lt;sup&gt;th&lt;/sup&gt;</td>
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<tr>
<td>Spring</td>
<td>December 15&lt;sup&gt;th&lt;/sup&gt;</td>
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While dissertation defenses are sometimes held during the summer months, you should not plan on such a schedule. Faculty members are often away from campus and it may not be possible to find readers to serve at the defense.

6. The Request for Examination

When your dissertation is approved by your dissertation advisor and every member of your committee, your advisor will return to the electronic link to indicate that the defense should be arranged. This should occur no less than five weeks before the time when the defense might be held. Your advisor’s action will alert the Associate Dean, who will then identify two readers and a Graduate School representative for the dissertation defense. The Graduate School representative will serve as the Chair of the defense.

You are evaluated on your dissertation and on your field of specialization by the six members of the committee. Your defense of your dissertation is successful if the majority of the committee approves your research and examination. One of the affirmative votes must come from a reader.
7. Final Submission of Your Dissertation

You must submit the final copy of the dissertation to the Graduate School by the deadline set there in order to complete the degree and graduate in the semester of the defense. The final copy, approved by the examining committee and your dissertation advisor is submitted along with the abstract and the cover page signed by your advisor. These materials are submitted to the Graduate School, 303 Bowne Hall. The abstract must not exceed 350 words. Consult with the Office of Academic and Student Services or the Graduate School for semester deadlines.

Contact the Graduate School (315/443-4492) to obtain a microfilming contract and fee information. Complete the contract and graduating student survey, and return these materials to the Graduate School. You must pay a fee to the Bursar's Office to cover the cost of publishing the abstract in Dissertation Abstracts, and microfilming the entire dissertation. One positive microfilm copy is sent to the Library of Congress and a second positive copy is sent to Syracuse University's Bird Library. The microfilm negative is kept in the archives of University Microfilms, Ann Arbor, Michigan. The original copy of the dissertation is bound and kept in Bird Library. You will not be cleared for graduation until these requirements are met!
Ph.D. in COLLEGE SCIENCE TEACHING

This program is for those who plan to teach undergraduate courses in the sciences or mathematics in a junior college, small liberal arts college, or university. The program leads to a Ph.D. in college science teaching and offers:

1. broad training concentrated in the natural sciences or engineering;
2. a combination of breadth, specialization, and integration in the sciences or engineering;
3. supervised college teaching experience in the candidate’s science specialty, either at Syracuse University or at another college in the Syracuse vicinity;
4. seminars in curriculum development and methods of teaching science in higher education; and
5. research focused on the teaching and learning of science in the undergraduate environment.

Representatives from the Department of Science Teaching and the natural sciences comprise the doctoral committee which guides the student’s graduate program. An advisor is selected during the first year of study in consultation with the program faculty.

ADMISSION

Applicants must meet the requirements for admission to the Graduate School and must hold a bachelor’s degree in a science field or in science education. Typically, students have earned a master’s degree in a science or engineering field prior to admission to the doctoral program.

PROGRAM REQUIREMENTS

The degree requires a total of 90 credits, of which a minimum of 9 must be dissertation credits. At least 54 credits of graduate courses in science and science education beyond the bachelor’s degree are also required. Programs are planned individually so that each student specializes and develops teaching and research competence in one or more fields.

The following courses, which constitute a foundation area, are also required:

- The Nature of Science in Science Education
- College Science Teaching
- Higher Education
A research tools requirement must be satisfied by successfully completing a prescribed core of courses in research methods (12-15 credits). Students are admitted to doctoral candidacy only after successfully completing the following:

1. the research tools requirement;
2. the foundation area of 9 credits;
3. written and oral qualifying examinations.

The dissertation must focus on research addressing teaching and/or learning science in the undergraduate or graduate environment.