Department of Science, Technology, Engineering, and Mathematics (STEM) Education and Professional Studies

228 Education Building
757-683-4305

Robert Spina, Interim Chair

The Department of Science, Technology, Engineering and Mathematics (STEM) Education and Professional Studies (STEMPS) is an academic leader in graduate studies related to education specialists, including career and technical education, instructional design and technology, marketing education, science education, mathematics education, technology education, STEM education, community college teaching, and business and industry training. It offers the M.S., M.S.Ed, and the Ph.D. in Education with programs in occupational and technical studies (OTS) and instructional design and technology (IDT). The Ed.S. is offered in conjunction with the educational leadership program. The department also offers licensure and teaching endorsement programs. Due to changing University requirements, national accreditation standards, and Commonwealth licensure regulations, the programs in the Darden College of Education are under constant revision. Any changes resulting from these factors supersede the program requirements described in the catalog. Students should obtain current program information from their advisors and the Darden College of Education website at http://education.odu.edu/.

Individual programs are described on the following pages.

Instructional Design and Technology Programs

- Master of Science in Education - Elementary – Instructional Design and Technology
- Master of Science in Education - Secondary – Instructional Design and Technology
- Doctor of Philosophy in Education- Instructional Design and Technology
- Certificate in Education and Training in Modeling and Simulation

Mathematics and Science Education Programs

- Master of Science in Education with Mathematics Education Specialist Endorsement (PK-8)
- Master of Science in Education with Initial License 6-12 - Mathematics
- Mathematics Education Specialist Endorsement (PK-8)
- Master of Science in Education with Initial License - Secondary - Science
- Master of Science in Education for Licensed Teachers - Elementary – Science
- Master of Science in Education for Licensed Teachers - Secondary – Science

Occupational and Technical Studies Programs

- Master of Science, Occupational and Technical Studies Program, with concentrations in:
  - Business and Industry Training
  - Career and Technical Education
  - Community College Teaching
  - STEM Education
- Master of Science, Occupational and Technical Studies, Technology Education concentration with Licensure
- Endorsement Program in Industrial Cooperative Training
- Marketing Teacher Education with Licensure
- Education Specialist
- Doctor of Philosophy in Education-Occupational and Technical Studies Concentration

Master of Science in Education - Elementary – Instructional Design and Technology Concentration

Ginger Watson, Program Coordinator

In the Master of Science in Education – Elementary-- instructional design and technology concentration, the core and support courses are combined, with students selecting 24 to 30 credits in instructional design and technology along with the problem paper or seminar research option. Working with an assigned advisor, students may take courses in the areas of distance education/telecommunications, instructional design and development, educational applications of instructional technology, and administration of instructional technology.

Admission

Students must:

1. hold a bachelor’s degree from a regionally accredited college/university;
2. have a cumulative undergraduate grade point average of 2.80;
3. take and receive satisfactory scores on either the Graduate Record Examination (score of 290 combined on verbal and quantitative with a minimum of 140 verbal for regular admission) or Miller Analogies Test (minimum score of 45 or 399 for regular admission); and
4. have an interview with the graduate program director or his/her designee.

Performance in classes taken as a non-degree graduate student will not be taken into consideration in the admission process. No courses in the undergraduate academic major or professional education in which the student has made below a C- will be accepted for licensure in the Darden College of Education.

Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate program director for elementary/middle education.

Continuance

Students must:

1. maintain a grade point average of 3.00;
2. maintain a grade point average of 3.00 in the major.

All ID&T students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed Internet connection.

Exit

Students must:

1. have a 3.00 grade point average;
2. pass a written comprehensive examination;
3. have an exit interview;
4. have completed all course requirements; and
5. submit an application for graduation.

Program Requirements

All courses in the core and elective blocks are offered via synchronous and asynchronous format.

Paper Option: Area I (24 credits); Area II (6 credits); 30 credits total.
Seminar Option: Area I (30 credits); Area II (6 credits); 36 credits total.

Old Dominion University 1
Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 715</td>
<td>Management of Technology Resources in the Classroom</td>
</tr>
<tr>
<td>FOUN 840</td>
<td>Educational Measurement and Assessment</td>
</tr>
<tr>
<td>IDT 746</td>
<td>Foundations of Distance Education</td>
</tr>
<tr>
<td>IDT 749</td>
<td>Instructional Systems Design</td>
</tr>
<tr>
<td>IDT 761</td>
<td>Applied Instructional Design</td>
</tr>
<tr>
<td>IDT 775</td>
<td>Designing Online Instruction</td>
</tr>
<tr>
<td>TLED 430/530</td>
<td>PK-12 Instructional Technology</td>
</tr>
<tr>
<td>TLED 665</td>
<td>Digital Video Materials Development</td>
</tr>
<tr>
<td>TLCI 731</td>
<td>Instructional Technology Trends in Curriculum and Instruction</td>
</tr>
</tbody>
</table>

Support Courses

Graduate electives approved by the Graduate Program Director may be substituted for technology courses when those courses complement personal and professional goals.

Research Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 612</td>
<td>Applied Research Methods in Education</td>
</tr>
<tr>
<td>SEPS 636</td>
<td>Problems in Occupational and Technical Studies</td>
</tr>
</tbody>
</table>

Electives

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 773</td>
<td>Advanced Instructional Design Techniques</td>
</tr>
</tbody>
</table>

Total Hours: 30-42

Master of Science in Education - Secondary – Instructional Design and Technology Concentration

Ginger Watson, Program Coordinator

The Master of Science in Education - Secondary - instructional design and technology concentration is designed to meet the needs of professionals interested or involved in the design, development, and delivery of instruction. The courses are appropriate for a variety of venues, including preK-12, higher education, military, and business. In this specialization, student’s select 24 to 30 credits in instructional design and technology plus the problems paper or seminar research option. Working with an advisor, students select courses that complement their backgrounds and professional goals.

Admission

Students must:
1. hold a bachelor’s degree from a regionally accredited college/university;
2. have a cumulative undergraduate grade point average of 2.80;
3. take and receive satisfactory scores on either the Graduate Record Examination (score of 290 combined on verbal and quantitative with a minimum of 140 verbal for regular admission) or Miller Analogies Test (minimum score of 45 or 399 for regular admission); and
4. have an interview with the graduate program director or his/her designee.

Performance in classes taken as a non-degree graduate student will not be taken into consideration in the admission process.

Continuance

Students must:
1. maintain a grade point average of 3.00;
2. maintain a grade point average of 3.00 in the major.

All ID&T students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed Internet connection.

Exit

Students must:
1. have a 3.00 grade point average;
2. pass a written comprehensive examination;
3. have an exit interview;
4. have completed all course requirements; and
5. submit an application for graduation.

Program Requirements

All courses in the core and elective blocks are offered via synchronous and asynchronous format.

Area I: Emphasis Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 617</td>
<td>Foundations of Instructional Technology (*)</td>
</tr>
<tr>
<td>IDT 749</td>
<td>Instructional Systems Design</td>
</tr>
</tbody>
</table>

Elective Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 746</td>
<td>Foundations of Distance Education</td>
</tr>
<tr>
<td>IDT 760</td>
<td>Cognition and Instructional Design</td>
</tr>
<tr>
<td>IDT 763</td>
<td>Instructional Design Theory</td>
</tr>
<tr>
<td>IDT 764</td>
<td>Theories and Research</td>
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Design (Select at least three courses)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>IDT 725</td>
<td>Human Performance Assessment</td>
</tr>
<tr>
<td>IDT 742</td>
<td>Task Analysis Methods</td>
</tr>
<tr>
<td>IDT 748</td>
<td>Instructional Technology Product Evaluation</td>
</tr>
<tr>
<td>IDT 761</td>
<td>Applied Instructional Design</td>
</tr>
<tr>
<td>IDT 773</td>
<td>Advanced Instructional Design Techniques</td>
</tr>
</tbody>
</table>

Human Performance Technology (Select at least one course)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 730</td>
<td>Principals and Practice of Human Performance Technology</td>
</tr>
<tr>
<td>IDT 737</td>
<td>Consulting Skills for Instructional Designers</td>
</tr>
<tr>
<td>IDT 739</td>
<td>Needs Analysis and Assessment</td>
</tr>
</tbody>
</table>

Electives: From above, or from related areas (e.g., Modeling & Simulation, Psychology, Engineering, Speech-communications, Business, I/O Psychology) with approval of advisor and GPD

Area II: Research Core Courses Required

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 612</td>
<td>Applied Research Methods in Education</td>
</tr>
<tr>
<td>SEPS 636</td>
<td>Problems in Occupational and Technical Studies</td>
</tr>
</tbody>
</table>

* = Required Course

Total Hours: 30-36
Doctor of Philosophy in Education –
Instructional Design and Technology
Concentration
Gary Morrison, Program Coordinator

The Doctor of Philosophy in Education Instructional Design and Technology (ID&T) concentration prepares individuals to conduct research and assume leadership roles in the field of instructional technology. Students will master a number of instructional design skills, ranging from instructional problem identification, task and audience analysis, strategy design, assessment, evaluation, and implementation that they can use in a variety of settings including traditional classrooms, distance education, business, health care, military, K-12 and higher education, and government. Courses explore theories and research that provide a foundation for the field. Students are also expected to participate in and conduct research studies as part of their program. Completing the Ph.D. in ID&T will prepare students to take jobs as instructional design and human performance practitioners in business, military, government, health care, and educational settings. They are also prepared to take positions as faculty members in higher education and as researchers for private organizations.

Admission

For admission to this program, individuals should have completed master’s degree in an appropriate discipline from a regionally accredited university. Degrees that are equivalent to a master’s degree such as L.L.B., J.D., and D.D.S. are also acceptable. Prospective students should also have prior course work in statistics and instructional technology. If this requirement is not met, then additional course work may be added to the candidate’s graduate program of study at the discretion of the advisor and graduate program director. Please see prerequisites on the curriculum description for specifics.

Admission to the instructional design and technology Ph.D. program is competitive. A number of criteria are considered including graduate and undergraduate GPAs, GRE scores, writing ability, a personal interview, and the match between student interests and faculty expertise. Meeting the minimum requirements established by the department does not ensure admission to the program. A minimum undergraduate GPA of 2.8 and a minimum graduate GPA of 3.25 are recommended.

Application requirements for the Ph.D. in instructional design and technology are as follows:

1. A completed application which is available online or from the Office of Graduate Admissions.
2. Official transcripts of all undergraduate and graduate courses and degrees completed.
3. Official report scores from the Graduate Record Examination (verbal, quantitative, and analytical) taken within the last five years. GRE scores expire after five years; however, candidates who have completed the exam prior to five years before the application deadline may submit those scores for consideration if they are provided from an official source such as a transcript or form provided by the Educational Testing Service. Old Dominion University reserves the right to determine what is an “official source.”
4. Applicants whose native language is not English (or who do not have a B.S. or M.S. degree from an accredited institution in a country where English is the native language) must submit a current score for the Test of English as a Foreign Language (TOEFL) of at least 600 (written) or 250 (computer based).
5. Applicants must submit a 500 word statement of their academic and professional goals with an emphasis on how the Ph.D. degree in instructional design and technology will contribute to the achievement of the stated goals.
6. Three letters of reference from sources capable of commenting on the applicant’s readiness for advanced graduate study. It is recommended that at least two of the letters come from university faculty members. Other letters may come from work supervisors or managers.
7. An interview with the instructional design and technology program faculty. This committee will also review applications for admission.

Program Requirements

The Ph.D. program in Education with a concentration in instructional design and technology is comprised of courses totaling a minimum of 60 academic credit hours beyond the master’s degree. The curriculum includes an program core of 21 credit hours, 9 credit hours in the instructional design concentration, and a research core of 15 credit hours, the three credit dissertation seminar and the dissertation, which will include a minimum of 12 credit hours. The dissertation will often include more than 12 credit hours depending on the length of time necessary for completion. Students entering the program may also need to complete introductory statistics courses and an instructional technology foundations course if they have not had equivalent courses or cannot demonstrate competency at a satisfactory level. Students who enter the Ph.D. program with a master’s degree in an academic field that is unrelated to instructional design and technology and/or who have not completed courses to develop competency in specified areas may need to complete these courses in addition to the required courses. All courses are offered through distance learning. All students must complete the research residency project (IDT 879 and IDT 898) that results in a submission for publication or presentation to a nationally refereed journal or conference prior to taking comprehensive exams. The residency project must be completed within two years of the start of IDT 879. If not, the student must repeat IDT 879 without credit.

All IDT students are expected to have regular and reliable access to a multimedia computer (headphones, microphone, and web cam) and a high speed Internet connection.

Under normal circumstances, admissions will be offered at least three times a year for the fall, spring, and summer semesters. Acceptance is competitive to assure that there is an adequate number of full-time faculty to serve the students through advising, mentoring, and other duties, particularly when individuals reach the dissertation stage of the program.

Students interested in attending full-time and applying for financial aid should submit their applications by February 1 prior to the fall semester they wish to start.

Applicants must submit completed applications and all related material no later than the following dates:

- May 1st for the Fall Semester*
- November 1st for the Spring Semester
- March 1st for the Summer Semester

Program Continuance

After completing 12 hours in ID&T course work, students must maintain a 3.25 GPA in ID&T courses. Failure to do so will result in one year probation. If the student’s GPA in ID&T courses is less than 3.25 at the end of the probation period, the student will be suspended. Students who earn a grade of C+ or lower (including U) in a graduate course in their program of study are considered to be making unsatisfactory progress. Students earning one or more grades of C+ or lower must meet with the program director prior to enrolling in courses in future semesters. Students must provide a plan for making satisfactory progress or they will be suspended. If a student earns three or more grades of C+ or lower, they will be suspended from the program. Students wishing to be considered for reinstatement must follow the procedures set forth in the ODU Graduate Catalog.

In addition, the ODU Graduate Catalog states students who have less than a 3.0 GPA on courses at ODU will be placed on probation and may be suspended if conditions prescribed in the catalog are not met.

Continuous Enrollment and Exams

Doctoral students who do not meet the conditions for continuous enrollment and who do not have an approved leave of absence will be suspended from the degree program. Doctoral students who fail the comprehensive exam (either oral or written) or the doctoral final examination (e.g., dissertation defense) twice will be suspended from the degree program.
Satisfactory Progress

Doctoral students who do not complete at least 12 hours of course credits towards their degree each year with a grade of B- or higher prior to candidacy will be evaluated for continuation in the program. If the program faculty do not feel the student is making adequate progress, the student will be placed on program probation for one year. If the student has not completed 12 hours of course credits toward the degree with a grade of B- or higher, they will be suspended.

Research Residency and Dissertation

Doctoral students will be evaluated annually for their progress in completing their research residency or dissertation. Students who have not made progress towards the completion as demonstrated evidence of a finished proposal, data collection, data analysis, or drafts of the manuscript/dissertation will be evaluated by faculty for continuance in the program. If faculty feel the student has not made adequate progress, the student will be placed on probation for one year. If the student has not made adequate progress after one year of probation, faculty may recommend suspension from the program for failing to make adequate progress towards completion of the degree.

Plagiarism

Any student found guilty of plagiarism will be suspended immediately from the program.

Program Completion and Exit

To complete the program students must fully comply with the curriculum below and all requirements noted elsewhere in the University catalog for graduate students and within the Ph.D. in Education Handbook. It is the responsibility of the student to obtain these materials and complete required portions.

Curriculum

Prerequisites: All students admitted into the Ph.D. in instructional design and technology must complete the following prerequisite courses unless they have previously completed equivalent graduate level coursework or have appropriate educational experience.

Prerequisites *

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 722</td>
<td>Introduction to Applied Statistics and Data Analysis</td>
</tr>
<tr>
<td>IDT 617</td>
<td>Foundations of Instructional Technology</td>
</tr>
</tbody>
</table>

ID&T Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 730/830</td>
<td>Principals and Practice of Human Performance Technology</td>
</tr>
<tr>
<td>IDT 751/851</td>
<td>Computer-Based Multi-Media Design</td>
</tr>
<tr>
<td>IDT 760/860</td>
<td>Cognition and Instructional Design</td>
</tr>
<tr>
<td>IDT 773/873</td>
<td>Advanced Instructional Design Techniques</td>
</tr>
<tr>
<td>IDT 801</td>
<td>Instructional Design and Technology Seminar</td>
</tr>
<tr>
<td>IDT 810</td>
<td>Trends and Issues in Instructional Design and Technology</td>
</tr>
<tr>
<td>IDT 849</td>
<td>Instructional Systems Design</td>
</tr>
</tbody>
</table>

Research Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 812</td>
<td>Research Design and Analysis</td>
</tr>
<tr>
<td>FOUN 814</td>
<td>Qualitative Research Design in Education</td>
</tr>
<tr>
<td>FOUN 823</td>
<td>Analysis of Variance Applied to Educational Research</td>
</tr>
<tr>
<td>IDT 725/825</td>
<td>Human Performance Assessment</td>
</tr>
<tr>
<td>IDT 879</td>
<td>Research Residency in Instructional Design and Technology</td>
</tr>
</tbody>
</table>

Instructional Design Concentration

Choose courses from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 742/842</td>
<td>Task Analysis Methods</td>
</tr>
</tbody>
</table>

Education and Training Emphasis in Modeling & Simulation Certificate

Ginger Watson, Program Coordinator

The College of Education offers a certificate in Modeling & Simulation through the Instructional Design and Technology program, a graduate-level program that is part of the STEM Education and Professional Studies Department.

Simulation and gaming are used extensively as teaching tools and training environments in a variety of education and training applications. The certificate provides the student with a fundamental understanding of modeling and simulation techniques coupled with targeted coursework in the design and use of simulation and gaming technologies for instructional settings. This certificate was the first of its kind in the U.S. and is a natural concentration area in instructional design and technology given the widespread use of simulation and gaming as instructional tools in Pre-K-12 education, colleges, universities, and corporate and military training programs. This certificate is one of several such certificate programs offered as part of the M&S strategic plan of Virginia Modeling, Analysis and Simulation Center (VMASC) and ODU.

The Modeling and Simulation Certificate Program consists of a minimum of four, three credit graduate courses. Courses include:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 746/846</td>
<td>Foundations of Distance Education</td>
</tr>
<tr>
<td>IDT 748/848</td>
<td>Instructional Technology Product Evaluation</td>
</tr>
<tr>
<td>IDT 761/861</td>
<td>Applied Instructional Design</td>
</tr>
<tr>
<td>IDT 763</td>
<td>Instructional Design Theory (IDT 863)</td>
</tr>
<tr>
<td>IDT 764/864</td>
<td>Theories and Research</td>
</tr>
<tr>
<td>IDT 898</td>
<td>Research Residency II</td>
</tr>
<tr>
<td>IDT 715/815</td>
<td>Management of Technology Resources in the Classroom</td>
</tr>
<tr>
<td>IDT 752/852</td>
<td>Diffusion and Adoption of Instructional Technology Innovations</td>
</tr>
<tr>
<td>IDT 755/855</td>
<td>Theory and Design of Instructional Simulation</td>
</tr>
<tr>
<td>IDT 756/856</td>
<td>Instructional Gaming: Theories and Practice</td>
</tr>
<tr>
<td>IDT 775/875</td>
<td>Designing Online Instruction</td>
</tr>
<tr>
<td>TLCI 735/835</td>
<td>Connecting Research In Early Developmental Practice In Early Childhood Education</td>
</tr>
<tr>
<td>IDT 735/835</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>IDT 737/837</td>
<td>Consulting Skills for Instructional Designers</td>
</tr>
<tr>
<td>IDT 739/839</td>
<td>Needs Analysis and Assessment</td>
</tr>
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</table>

Electives **

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 881</td>
<td>Dissertation Seminar ***</td>
</tr>
<tr>
<td>SEPS 899</td>
<td>Dissertation in Occupational Education</td>
</tr>
</tbody>
</table>

Total Hours: 45

* All students admitted into the Ph.D. program in instructional design and technology must complete the prerequisite courses unless they have previously completed equivalent graduate level coursework or have appropriate educational experience.

** Electives are chosen from the list above, or from related areas, e.g., modeling & simulation, psychology, engineering, speech-communications, business, IO psychology.

*** If seminar is waived by the doctoral committee, the credits are added to the content.

Additional courses or substitutions may be used as approved by student’s advisory committee.
of the degree program are listed below:

A minimum of 33 semester credits are required. The courses for completion of the degree program are listed below:

### Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSIM 601</td>
<td>3</td>
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### Related Elective Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDT 755/855</td>
<td>3</td>
</tr>
<tr>
<td>IDT 756/856</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 750/850</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Hours: 12

For more information about the Master of Science in Engineering modeling and simulation concentration, refer to the Catalog section for the Batten College of Engineering and Technology.

### Master of Science in Education - Elementary - with Mathematics Education Specialist Endorsement (PK-8)

Mary Enderson, Program Coordinator

This graduate program leads to a Master’s of Science in Education degree. Elementary major, with the Mathematics Specialist (PK-8) endorsement. This program is offered in partnership with the Department of Mathematics and Statistics in the College of Sciences.

#### Admission

Candidates must:

- Have 3 years of successful classroom experience in teaching mathematics;
- Hold a bachelor’s degree from a regionally accredited college/university;
- Hold the Virginia Collegiate Professional License or an equivalent license from another state;
- Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major;
- Achieve a satisfactory score (as established by the Department of Educational Curriculum and Instruction) on the Graduate Record Examination or the Miller Analogies Test; and
- Submit an application for graduate studies.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate director for the program.

#### Continuance

Candidates must maintain a grade point average of 3.00.

#### Exit

Candidates must:

- Have a 3.00 grade point average;
- Have completed all course requirements;
- Have completed a professional learning portfolio; and
- Submit an application for graduation.

#### Curriculum

A minimum of 33 semester credits are required. The courses for completion of the degree program are listed below:

### Education Content

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>STEM 651</td>
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<tr>
<td>STEM 660</td>
<td>3</td>
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<tr>
<td>STEM 661</td>
<td>3</td>
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</tbody>
</table>

### Mathematics Content

<table>
<thead>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
</tr>
<tr>
<td>MADP 605</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives: 3

Other courses may be taken with permission from the Graduate Program Director.

Total Hours: 33

### Master of Science in Education with Initial Licensure 6-12 - Mathematics

There are a number of individuals who have earned B.S. or B.A. degrees who now want to obtain a master’s degree leading to licensure as a secondary school teacher. In the program, students complete (or have completed) a minimum of 32 credits of undergraduate courses in one endorsement area (mathematics) and an additional 31-34 credits of education courses at the graduate level.

#### Students seeking this degree need to apply through the Department of Teaching and Learning.

### Master of Science in Education with Initial Licensure 6-12 - Science

There are a number of individuals who have earned B.S. or B.A. degrees who now want to obtain a master’s degree leading to licensure as a secondary school teacher. In the program, students complete (or have completed) a minimum of 32 credits of undergraduate courses in one endorsement area (earth science, chemistry, biology, or physics) and an additional 31-34 credits of education courses at the graduate level.

Students seeking this degree need to apply through the Department of Teaching and Learning.

### Mathematics Education Specialist Endorsement (PK-8)

Mary Enderson, Program Coordinator

This endorsement program leads to a Mathematics Specialist (PK-8) endorsement for individuals with a current Virginia license and a master’s degree related to teaching elementary or middle school mathematics. This program is offered in partnership with the Department of Mathematics and Statistics in the College of Sciences.

#### Admission

Candidates must:

- Have 3 years of successful classroom experience in teaching mathematics;
- Hold a bachelor’s degree from a regionally accredited college/university;
• Hold the Virginia Collegiate Professional License or an equivalent license from another state.
• Have an undergraduate grade point average of 2.80 and an average of 3.00 in the major;
• Achieve a satisfactory score (as established by the Department of Teaching and Learning) on the Graduate Record Examination or the Miller Analogies Test; and
• Submit an application for graduate studies.

Performance in classes taken as a non-degree student will not be taken into consideration in the admission process. Under certain circumstances, applicants who do not fully meet the requirements for regular admission to the program may be admitted on a provisional basis subject to conditions specified by the graduate director for the program.

### Continuance
Candidates must maintain a grade point average of 3.00.

### Exit
Candidates must:

- Have a 3.00 grade point average;
- Have completed all course requirements;
- Have completed a professional learning portfolio; and
- Submit an application for graduation.

### Curriculum
A minimum of 21 semester credits are required. The courses for completion of the endorsement program are:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAPD 601</td>
<td>Number and Operations for PK-8 Mathematics Specialists</td>
<td>3</td>
</tr>
<tr>
<td>MAPD 602</td>
<td>Geometry and Measurement for PK-8 Mathematics Specialists</td>
<td>3</td>
</tr>
<tr>
<td>MAPD 603</td>
<td>Rational Numbers and Proportional Reasoning for PK-8 Mathematics Specialists</td>
<td>3</td>
</tr>
<tr>
<td>MAPD 604</td>
<td>Probability and Statistics for PK-8 Mathematics Specialists</td>
<td>3</td>
</tr>
<tr>
<td>MAPD 605</td>
<td>Algebra and Functions for PK-8 Mathematics Specialists</td>
<td>3</td>
</tr>
<tr>
<td>STEM 661</td>
<td>Mathematics Specialists as Teacher Leaders</td>
<td>3</td>
</tr>
<tr>
<td>STEM 668</td>
<td>Internship for Mathematics Specialist</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Hours:** 21

### Master of Science-Occupational and Technical Studies
Cynthia Tomovic, Graduate Program Director

This is an advanced master’s degree and requires prior academic work associated with this area of study. The M.S. occupational and technical studies program has four concentrations - career and technical education, business and industry training, community college teaching, and STEM education. These studies are designed to help teachers and trainers upgrade their knowledge and skills and prepare for leadership roles in education and training. These programs are all delivered at the Norfolk campus and through the University’s distance learning system.

### Admission
Students are admitted to the program on a continuing basis. Applications can be obtained from the Admissions Office, distance learning sites, the department and online. Students are admitted for fall, spring, and summer on a rolling basis. Graduate students can complete up to 12 graduate hours with a non-degree application. All applicants to the Master of Science degree in occupational and technical studies must meet University, college, and department requirements. In addition, all applicants must:

- hold an undergraduate degree in a related field or have work experience in an occupational/technical area,
- have an overall grade point average of 2.80 with a 3.00 in major courses,
- complete the Graduate Record Examination (GRE) with a score in the 45th percentile (verbal and quantitative sections combined) or the Miller Analogy Test with a 45th percentile in the intended major, and
- submit two letters of recommendation.

### Continuance
Students must:

1. complete the Graduate Writing Proficiency Examination administered by the department prior to completing nine credit hours, and
2. maintain a minimum grade point average of 3.00.

### Exit
Students in the career and technical education, business and industry training, and STEM education concentrations must complete of 33 semester hours and students in the community college teaching concentration must complete 39 semester hours, as distributed in the M.S. curriculum. In addition, all students must:

1. achieve an overall grade point average of 3.00;
2. complete all competencies listed on course syllabi;
3. pass the written comprehensive examination; and
4. successfully complete a problems paper or thesis.

### Curriculum (33-42)

#### Common Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS 785</td>
<td>Curriculum Development in Occupational Education and Training</td>
</tr>
<tr>
<td>SEPS 788</td>
<td>Instructional Strategies for Innovation in Training and Occupational Education</td>
</tr>
<tr>
<td>SEPS 789</td>
<td>Instructional Technology in Education and Training</td>
</tr>
</tbody>
</table>

**Total Hours:** 9

#### Concentration Specific Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS 760</td>
<td>Trends and Issues in Occupational Education</td>
</tr>
<tr>
<td>SEPS 762</td>
<td>Administration and Management of Education and Training Programs</td>
</tr>
<tr>
<td>SEPS 761</td>
<td>Foundations of Adult Education and Training</td>
</tr>
<tr>
<td>SEPS 762</td>
<td>Administration and Management of Education and Training Programs</td>
</tr>
<tr>
<td>SEPS 760</td>
<td>Trends and Issues in Occupational Education</td>
</tr>
<tr>
<td>SEPS 761</td>
<td>Foundations of Adult Education and Training</td>
</tr>
<tr>
<td>STEM 720</td>
<td>STEM Educational Foundations</td>
</tr>
<tr>
<td>STEM 721</td>
<td>Science, Technology, Engineering, and Mathematics Connection and Integration</td>
</tr>
</tbody>
</table>

**Total Hours:** 6

#### Research Core

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS 635</td>
<td>Research Methods in Occupational and Technical Studies</td>
</tr>
<tr>
<td>SEPS 636</td>
<td>Problems in Occupational and Technical Studies or SEPS 698 Thesis in Occupational Education</td>
</tr>
</tbody>
</table>

**Total Hours:** 6-9

#### Professional Technical Specialty

<table>
<thead>
<tr>
<th>Specialty Type</th>
<th>Course Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career and Technical Education (12 credits)</td>
<td>*</td>
</tr>
<tr>
<td>Business and Industry Training (12 credits)</td>
<td>*</td>
</tr>
<tr>
<td>Community College Teaching (18 credits)</td>
<td>**</td>
</tr>
</tbody>
</table>

**Total Hours:** 12-18
In addition, all applicants must:

- submit three letters of reference from sources capable of commenting on readiness for advanced graduate study;
- submit a resume that shows your educational and professional background;
- submit academic transcripts from all undergraduate and graduate institutions previously attended or currently being attended with a minimum 3.00 graduate grade point average;
- submit scores from the Graduate Record Examination that have been earned within the past five years with a score at or above the 50th percentile on the verbal and quantitative components; and
- if the applicant’s primary language is not English, submit a current score for the Test of English as a Foreign Language (TOEFL) that meets the University’s current standard.

Applications for admission are on a rolling basis. Graduate assistantships are awarded in February annually.

**Continuance**

Students must:

1. have their Ph.D. program approved;
2. successfully complete annual progress reviews;
3. meet faculty and University program expectations;
4. complete the departmental Graduate Writing Proficiency Examination; and
5. meet professional development and career preparation expectations.

**Exit**

Students must:

1. complete a minimum of 60 credit hours beyond the master’s degree;
2. complete all competencies listed on course syllabi;
3. achieve an overall grade point average of 3.00;
4. pass the written comprehensive examination;
5. select a dissertation committee;
6. prepare and defend a dissertation prospectus;
7. successfully complete a dissertation with an oral defense; and
8. complete the graduate student University assessment.

**Prerequisites**

A master’s degree in an appropriate field related to this concentration is required for admission to the Ph.D. program. Students who do not have equivalent coursework or appropriate educational experiences must complete the following prerequisite courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUN 612</td>
<td>Applied Research Methods in Education</td>
<td>3</td>
</tr>
<tr>
<td>FOUN 722</td>
<td>Introduction to Applied Statistics and Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 785</td>
<td>Curriculum Development in Occupational Education and Training</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 788</td>
<td>Instructional Strategies for Innovation in Training and Occupational Education</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 789</td>
<td>Instructional Technology in Education and Training</td>
<td>3</td>
</tr>
</tbody>
</table>

**Curriculum (60 credits minimum)**

Students in the occupational and technical studies concentration complete core courses in research, the occupational and technical studies concentration, and an emphasis in either career and technical education, human resources development, or technology education along with 6 credit hours of electives.
Endorsement Program in Industrial Cooperative Training

Philip Reed, Program Coordinator

The endorsement program in industrial cooperative training is designed to prepare a licensed teacher to be endorsed to teach industrial cooperative training in the public schools.

Admission

Students may enroll in this teaching endorsement program as a non-degree student. If an M.S. degree is sought, some graduate level courses may be applied toward professional technical studies in this component of the degree. Admission should be sought into the M.S. program in occupational and technical studies with a concentration in career and technical education teaching. Graduate students can complete up to 12 graduate hours with a non-degree application. Students should contact the program coordinator to discuss admissions options. Prior to entering this program, students must have or qualify for a Virginia Collegiate Professional or Postgraduate Professional License. Secondly, they must be interviewed and accepted by the program coordinator.

Continuance and Exit

Students must:

1. complete the following courses:
   - STEM 305 Curriculum for Technology Education 3
   - STEM 306 Methods for Technology Education 3
   - SEPS 401/501 Foundations of Career and Technical Education 3
   - SEPS 408/508 Advanced Classroom Issues and Practices in Career and Technical Education 3
   - SEPS 450/550 Assessment, Evaluation and Improvement 3
   - Total Hours 18
2. earn a 2.75 cumulative grade point average if licensure is at the undergraduate level and a 3.00 cumulative grade point average if licensure is at the graduate level; and
3. document at least 4000 clock hours of acceptable employment in a trade, technical, or industrial education subject area completed within the past five years.

Twelve hours of 500/600 level courses may be applied toward the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Marketing Teacher Education with Licensure

Michael F. Kosloski, Program Coordinator

The licensure program in marketing teacher education is designed to prepare a person who has a baccalaureate degree to be a marketing education teacher-coordinator. Participants who successfully complete this program will qualify to apply for a Virginia teaching license to teach marketing education.

Admission

Students can complete this licensure program through an undergraduate degree program, second undergraduate degree, graduate non-degree seeking level, or through the M.S. program. Students should meet with the program coordinator to discuss these options. Graduate students can complete up to 12 graduate hours with a non-degree application. Prior to entering this program students must hold a baccalaureate degree. Students must also have completed a rigorous general education program as outlined by the Commonwealth in its Licensure Regulations for Teachers. They must be interviewed and accepted by the program coordinator. Finally, students must successfully complete the required tests for seeking a Virginia teaching license (see advisor or Teacher Education Services). Students must be admitted into the approved marketing education teacher preparation program prior to enrolling in practicum education courses.

Endorsement Program in Industrial Cooperative Training

Philip Reed, Program Coordinator

The endorsement program in industrial cooperative training is designed to prepare a licensed teacher to be endorsed to teach industrial cooperative training in the public schools.

Admission

Students may enroll in this teaching endorsement program as a non-degree student. If an M.S. degree is sought, some graduate level courses may be applied toward professional technical studies in this component of the degree. Admission should be sought into the M.S. program in occupational and technical studies with a concentration in career and technical education teaching. Graduate students can complete up to 12 graduate hours with a non-degree application. Students should contact the program coordinator to discuss admissions options. Prior to entering this program, students must have or qualify for a Virginia Collegiate Professional or Postgraduate Professional License. Secondly, they must be interviewed and accepted by the program coordinator.

Continuance and Exit

Students must:

1. complete the following courses:
   - STEM 305 Curriculum for Technology Education 3
   - STEM 306 Methods for Technology Education 3
   - SEPS 401/501 Foundations of Career and Technical Education 3
   - SEPS 408/508 Advanced Classroom Issues and Practices in Career and Technical Education 3
   - SEPS 450/550 Assessment, Evaluation and Improvement 3
   - Total Hours 18
2. earn a 2.75 cumulative grade point average if licensure is at the undergraduate level and a 3.00 cumulative grade point average if licensure is at the graduate level; and
3. document at least 4000 clock hours of acceptable employment in a trade, technical, or industrial education subject area completed within the past five years.

Twelve hours of 500/600 level courses may be applied toward the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Marketing Teacher Education with Licensure

Michael F. Kosloski, Program Coordinator

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Admission

Students can complete this licensure program through an undergraduate degree program, second undergraduate degree, graduate non-degree seeking level, or through the M.S. program. Students should meet with the program coordinator to discuss these options. Graduate students can complete up to 12 graduate hours with a non-degree application. Prior to entering this program students must hold a baccalaureate degree. Students must also have completed a rigorous general education program as outlined by the Commonwealth in its Licensure Regulations for Teachers. They must be interviewed and accepted by the program coordinator. Finally, students must successfully complete the required tests for seeking a Virginia teaching license (see advisor or Teacher Education Services). Students must be admitted into the approved marketing education teacher preparation program prior to enrolling in practicum education courses.

Endorsement Program in Industrial Cooperative Training

Philip Reed, Program Coordinator

The endorsement program in industrial cooperative training is designed to prepare a licensed teacher to be endorsed to teach industrial cooperative training in the public schools.
Continuance and Exit

Students must:

1. complete the following courses:
   - SEPS 297 Observation and Participation 1
   - SEPS 400/500 Instructional Systems Development 3
   - SEPS 401/501 Foundations of Career and Technical Education 3
   - SEPS 408/508 Advanced Classroom Issues and Practices in Career and Technical Education 3
   - SEPS 450/550 Assessment, Evaluation and Improvement 3
   - SEPS 485 Student Teaching 12
   - SPED 313 Fundamentals of Human Growth and Development: Birth through Adolescence 3
   - TLED 408 Reading and Writing in Content Areas 3
   - SEPS 788 Instructional Strategies for Innovation in Training and Occupational Education 3
   - TLED 608 Foundations of Education and Instructional Assessment 3
   - TLED 516 Design for Effective Instruction 3

   Total Hours 31

2. earn a 2.75 cumulative grade point average if licensure is at the undergraduate level and a 3.00 cumulative grade point average if licensure is at the graduate level;
3. document at least 4000 clock hours of marketing-related work experience completed within the past five years or complete a directed field experience (SEPS 405);
4. earn credit in marketing related courses to include the marketing process, economics, merchandising, advertising, personal selling, marketing math, communication, ethics, training, international marketing, and marketing technology;
5. complete a university graduate student assessment if enrolled in the M.S. degree program.

Twelve hours of 500/600 level courses may be applied toward the Master of Science in occupational and technical studies, career and technical education teaching concentration.

M.S. Degree in Technology Education with Licensure

Philip Reed, Program Coordinator

The M.S. degree in technology education with licensure is designed to prepare a person who has a baccalaureate degree and industrial/military related technical experience to be a technology education teacher. Participants who successfully complete this program will receive a Master of Science degree and qualify to apply for a Virginia teaching license to teach technology education.

Admission Information

To earn the M.S. with licensure to teach technology education, candidates have to be accepted into the M.S. concentration in career and technical education teaching. Graduate students can complete up to 12 graduate hours with a non-degree application. Student must meet with the program coordinator to have military and other technical content courses reviewed to determine their applicability toward licensure requirements. Prior to entering this program students must hold a baccalaureate degree with a major related to technology/engineering or have completed military schools equating to a minimum of 18 credits in industrial technology areas as evaluated by the American Council on Education (ACE Guide). Students must also have completed a rigorous general education program as outlined by the Commonwealth in its Licensure Regulations for Teachers. They must be interviewed and accepted by the program coordinator. Finally students must successfully complete the required tests for seeking a Virginia teaching license (see advisor or Teacher Education Services). Students must be admitted into the approved technology education teacher preparation program prior to enrolling in any practicum education courses.

Continuance and Exit

Students must:

1. complete the following courses:
   - FOUN 612 Applied Research Methods in Education 3
   - READ 680 Reading to Learn Across the Curriculum 3
   - SEPS 508 Advanced Classroom Issues and Practices in Career and Technical Education 3
   - SEPS 586 Middle School Student Teaching for Technical Education 6
   - SEPS 596 Topics in Career and Technical Education 1-3
   - SEPS 636 Problems in Occupational and Technical Studies 3
   - SEPS 788 Instructional Strategies for Innovation in Training and Occupational Education 3
   - SEPS 789 Instructional Technology in Education and Training 3
   - SPED 313 Fundamentals of Human Growth and Development: Birth through Adolescence 3
   - STEM 231 Materials and Processes Technology 3
   - STEM 320 Manufacturing and Construction Technology 3
   - STEM 350 Communication Technology Processes 3
   - STEM 351 Communication Technology 3
   - STEM 730 Introduction to Technology 3
   - TLED 608 Foundations of Education and Instructional Assessment 3
   - TLED 516 Design for Effective Instruction 3

   Total Hours 49-51

2. earn a 2.75 cumulative grade point average on undergraduate level courses and a 3.00 cumulative grade point average at the graduate level,
3. earn passing scores on Virginia Licensure Test before the teacher internship (see advisor or Teacher Education Services); and
4. complete the graduate student University assessment.

Completing this licensure program and other departmental requirements will allow the candidate to earn the Master of Science in occupational and technical studies, career and technical education teaching concentration.

Education Specialist-Occupational and Technical Studies

Cynthia Tomovic, Graduate Program Director

The Department of STEM Education and Professional Studies jointly offers the education specialist (Ed.S.) with the Department of Educational Foundations and Leadership. The program offers a cohesive sequence of academic studies designed to help graduates deal effectively with administrative problems encountered in urban schools and agencies. Principalship can be planned into the educational specialist degree.

Admission

To be admitted to the Ed.S. program, an applicant must:

1. Hold a master’s degree in career and technical education or related field;
2. Have a successful experience as an administrator or teacher;
3. Hold a teaching license or equivalent; and
4. Have taken ELS 600 or its equivalent as a prerequisite.

Students seeking this degree need to apply through the Ed.S. program in the Department of Educational Leadership and Counseling.

Entrance

Students must:

1. meet all University requirements,
2. provide two letters of recommendation;
3. hold a master’s degree from an accredited institution (minimum 3.25 graduate grade point average),
4. provide a one-page essay explaining why he/she should be admitted to the program; and
5. have an acceptable score on the GRE or Miller Analogies Test.

**Continuance**

Students must meet all University requirements and maintain a 3.00 or higher grade point average.

**Exit**

Students must successfully complete:

1. a written comprehensive examination,
2. the required course of study,
3. have a 3.00 grade point average or above, and
4. complete a university graduate student assessment.

**Curriculum (33 credits)**

Requirements for the Ed.S. with a specialty in occupational and technical studies include 30-33 semester hours (18 hours must be completed in 800-level courses in ELS), as follows:

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th>3-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELS 610</td>
<td>School Community Relations and Politics</td>
</tr>
<tr>
<td>ELS 621</td>
<td>Curriculum Development and Assessment</td>
</tr>
<tr>
<td>ELS 657</td>
<td>Public School Law</td>
</tr>
</tbody>
</table>

**Educational Leadership**

18

| ELS 853 | Educational Finance and Budgeting |
| ELS 854 | Human Resource Development and Evaluation |
| ELS 871 | Educational Systems Planning and Futures |
| ELS 876 | Leadership for Social Justice |
| ELS 878 | Leadership for Teaching and Learning |
| ELS 879 | Field Research in School Administration and Supervision |

**Occupational and Technical Studies**

15

| SEPS 860 | Trends and Issues in Occupational Education |
| SEPS 862 | Administration and Management of Education and Training Programs |
| SEPS 885 | Curriculum Development in Occupational Education and Training |
| SEPS 888 | Instructional Strategies for Innovation in Training and Occupational Education |
| SEPS 889 | Instructional Technology in Education and Training ** |

**Total Hours**

36-45

* ELS 610, ELS 621, and ELS 657 are prerequisites for the principalship endorsement.

** and/or other courses approved by the candidate’s advisor.