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

Web Site: http://www.odu.edu/stemps

Petros Katsioloudis, Chair

The Department of STEM Education and Professional Studies offers five concentrations under the Bachelor of Science degree in occupational and technical studies. The five bachelor’s-level concentrations offered by the department are marketing education, technology education, training specialist, fashion merchandising, and industrial technology. At the graduate level, the department offers the Master of Science degree with concentrations in community college teaching (occupational and technical), business and industry training, and career and technical education teaching; the Master of Science in Education degree with majors in instructional design and technology, mathematics education and science education; a concentration within the Education Specialist in educational leadership; and the Ph.D. in Education with concentrations in instructional design and technology and occupational and technical studies. The department also offers minors in fashion merchandising, training and development, and marketing education, a certificate in industrial training, and licensure/endorsement programs in marketing teacher education, technology education, and industrial cooperative training. Several licensure/endorsement areas are available for graduate students. The department provides a simulation-based instruction concentration in the Master of Science in Engineering modeling and simulation degree program.

Bachelor of Science - Occupational and Technical Studies

Admission

Students applying for admission to the marketing education and technology education teacher licensure programs must satisfy the Virginia Board of Education Required Assessment for admission to an approved teacher education program. This requirement can be satisfied by meeting a passing score in one of the selected criteria below.

1. Passing Praxis I composite score of 532 by December 31, 2013; or
2. Passing Praxis Core Academic Skills Tests beginning January 1, 2014: Reading Score of 156, Writing Score of 162, and Mathematics Score of 150; or
3. Approved substitute test scores:
   a. SAT score of 1000 with at least 450 verbal and 510 mathematics taken prior to April 1, 1995; or
   b. SAT score of 1100 with at least 530 verbal and 530 mathematics taken after April 1, 1995 and before March 2016; or
   c. ACT composite score of 21 with ACT mathematics score of at least 21, and ACT English plus Reading score of at least 37, taken prior to April 1, 1995; or
   d. ACT composite score of 24 with ACT mathematics score of at least 22, and ACT English plus Reading score of at least 46, taken after April 1, 1995; or
   e. Praxis I Math test score of 178 by December 31, 2013 and a composite Virginia Communication and Literacy Assessment (VCLA) score of 470; or
   f. Praxis Core Academic Skills Mathematics test score of 150 beginning January 1, 2014 and a VCLA score of 470; or
   g. SAT Mathematics test score of at least 510 taken prior to April 1, 1995 and a VCLA score of 470; or
   h. SAT Mathematics test score of at least 530 taken after April 1, 1995 and a composite VCLA score of 470; or
   i. ACT Mathematics test score of at least 21 taken prior to April 1, 1995 and a composite VCLA score of 470; or
   j. ACT Mathematics test score of at least 22 taken after April 1, 1995 and a composite VCLA score of 470.

Note: ACT scores taken prior to 1989 are not valid.

* A new SAT test was released in March 2016. Praxis Core substitute scores for the new SAT have not been determined.

For the most current information on the prescribed Virginia Board of Education admission assessment, visit the Teacher Education Services website, http://www.odu.edu/tes and review the Teacher Education Handbook.

1. Present written recommendations from two faculty members from the STEM Education and Professional Studies Department.
2. Have an interview with the program leader. Although students may enroll in a limited number of education courses, students must be admitted into the approved marketing education or technology education teacher preparation program prior to enrolling in any instructional strategies practicum education course SEPS 408.

For admission to the fashion merchandising, training specialist, or industrial technology bachelor's degree programs, students must:
1. Complete one semester at Old Dominion University.
2. Achieve a minimum grade point average of 2.00 on undergraduate course work completed at the time of application to the major.
3. Have an interview with the program leader.

Continuance

Students in marketing education and technology education licensure programs must:
1. Satisfy University requirements.
2. Maintain a cumulative GPA of 2.75, a major/content GPA of 2.75 and a professional education GPA of 2.75 with no earned grade less than C- in all courses taken in the major and in the professional education core.
3. Successfully complete SEPS 297 and a student teaching interview.
4. Take and pass the Virginia Communication and Literacy Assessment (VCLA) and the appropriate Praxis Subject Assessment (Technology Education – Content Knowledge, 5051 or Marketing Education – Content Knowledge, 5561) prior to or while enrolled in the Instructional Strategies course SEPS 408. All assessments must be passed prior to the start of the Teacher Candidate Internship Orientation session.

Students in fashion merchandising, training specialist, or industrial technology majors must:
1. Satisfy University requirements.
2. Maintain a 2.00 overall grade point average.
3. Maintain a 2.00 grade point average in major courses.

Background Clearance Requirement

Old Dominion University requires a background clearance check of candidates interested in many of the professional education programs. Professional education programs have several field experiences that are required for continuance and graduation from the program. The background clearance must be successfully completed prior to a field experience placement. Candidates will be provided a field experience placement when the background check process is completed with resolution of any issues. The process to complete the ODU clearance background check is located at: http://www.odu.edu/success/academic/teacher-education/placement/background-checks. The ODU clearance process includes: an FBI fingerprint, a child protective service/social service review, and a Virginia State Police sex offender registry review. Candidates interested in...
the professional education programs are advised to complete this clearance process immediately upon entry into the program since the clearance process takes a minimum of eight weeks to complete.

Assessments required for teacher education programs and licensure

In order to obtain a Virginia teaching license, all teacher education students must attain passing scores on the appropriate teacher licensure exams. Students are required to take and pass the Virginia Communication and Literacy Assessment (VCLA) with a composite score of 470 or higher to be eligible for licensure. The VCLA should be taken during the semester prior to student teaching. It is recommended that the VCLA be taken after students have completed their English and reading course requirements. All students will take and attain a passing score on the appropriate Praxis Subject Assessment (Technology Education – Content Knowledge, 5051 with a score of 162 or Marketing Education – Content Knowledge, 5561 with a score of 147) in order to be eligible for student teaching and licensure. Score reports of all examinations must be on file in the Teacher Education Services Office in room 152 of the Education Building. To review more information on the Virginia Board of Education Prescribed Assessments, visit the Teacher Education Services website, http://education.odu.edu/tes/.

Exit

Students in marketing education and technology education licensure programs must have:

1. A 2.75 grade point average overall, in the major, and in the professional education core.
2. Earned a passing grade in student teaching.
3. Completed ENGL 110C, ENGL 211C or ENGL 221C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better.
4. Completed the senior assessment.

Students majoring in the fashion merchandising, training specialist, or industrial technology undergraduate programs must:

1. Meet all University requirements for graduation.
2. Have an overall grade point average of 2.00.
3. Complete ENGL 110C, ENGL 211C or ENGL 221C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better.
4. Have a grade point average of 2.00 in major and minor courses.

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 this Catalog. Students should obtain current program information from their advisors and the Darden College of Education website at http://www.education.odu.edu/.

Marketing Education Concentration

This program is designed to prepare students to teach marketing and related subjects in the secondary schools. It is an approved program for meeting licensure requirements to teach marketing education in Virginia. The requirements are as follows:

Lower Division General Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Communication Skills</td>
<td>6</td>
</tr>
<tr>
<td>Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>Mathematical Skills</td>
<td>3</td>
</tr>
<tr>
<td>Language and Culture</td>
<td>0-6</td>
</tr>
<tr>
<td>Information Literacy and Research</td>
<td>3</td>
</tr>
<tr>
<td>STEM 251G Computer Literacy: Communication and Information</td>
<td>3</td>
</tr>
<tr>
<td>Human Creativity</td>
<td>3</td>
</tr>
<tr>
<td>Interpreting the Past</td>
<td>3</td>
</tr>
</tbody>
</table>

Literature                                      3
Philosophy and Ethics                          3
The Nature of Science                          8
Human Behavior                                  3
ECON 2008 Basic Economics                     3

Impact of Technology is satisfied by STEM 370T in the major

Technical Content Courses                      39

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS 100 Sales Techniques</td>
<td></td>
</tr>
<tr>
<td>SEPS 102 Advertising and Promotion</td>
<td></td>
</tr>
<tr>
<td>ACCT 201 Principles of Financial Accounting</td>
<td></td>
</tr>
<tr>
<td>SEPS 208 Retail Merchandising and Buying</td>
<td></td>
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<tr>
<td>SEPS 220 The Fashion Industry</td>
<td></td>
</tr>
<tr>
<td>SEPS 302 Workforce Supervision</td>
<td></td>
</tr>
<tr>
<td>MKTG 311 Marketing Principles and Problems</td>
<td></td>
</tr>
<tr>
<td>MGMT 325 Contemporary Organizations and Management</td>
<td>3</td>
</tr>
<tr>
<td>STEM 370T Technology and Society (Writing Intensive)</td>
<td>3</td>
</tr>
<tr>
<td>**</td>
<td></td>
</tr>
<tr>
<td>MKTG 402 Consumer Behavior</td>
<td></td>
</tr>
<tr>
<td>SEPS 415 Advanced Merchandising</td>
<td></td>
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<tr>
<td>STEM 351 Communication Technology</td>
<td></td>
</tr>
<tr>
<td>SEPS 480 Senior Project: Merchandise Retailing</td>
<td></td>
</tr>
</tbody>
</table>

Marketing Education Teaching Courses           38

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLED 408 Reading and Writing in Content Areas</td>
<td></td>
</tr>
<tr>
<td>SPED 313 Fundamentals of Human Growth and Development: Birth through Adolescence</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 297 Observation and Participation</td>
<td></td>
</tr>
<tr>
<td>SEPS 400 Instructional Systems Development</td>
<td></td>
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<tr>
<td>SEPS 401 Foundations of Career and Technical Education</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 402 Instructional Methods in Occupational Studies</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 405 Directed Work Experience</td>
<td></td>
</tr>
<tr>
<td>SEPS 408 Advanced Classroom Issues and Practices in Career and Technical Education</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 450 Assessment, Evaluation and Improvement</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 485 Student Teaching</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours 115-121

Elective credit may be needed to meet the minimum of 120 credits required for the degree.

* Grade of C or better required in both courses

** Grade of C or better required

Upper Division General Education

Satisfied through the professional education sequence.

Technology Education Concentration

This program is designed to prepare students to teach technology education subjects in the secondary and middle schools. It is an approved program for meeting licensure requirements to teach technology education in Virginia. Requirements are as follows:

Lower Division General Education

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Communication Skills</td>
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<td>Oral Communication</td>
<td>3</td>
</tr>
<tr>
<td>Mathematical Skills</td>
<td>3</td>
</tr>
<tr>
<td>Language and Culture</td>
<td>0-6</td>
</tr>
<tr>
<td>MATH 102M College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>or MATH 103M College Algebra with Supplemental Instruction</td>
<td>3</td>
</tr>
<tr>
<td>STAT 130M Elementary Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Language and Culture</td>
<td>0-6</td>
</tr>
</tbody>
</table>
Information Literacy and Research is met through STEM 251G in the major.

| Human Creativity | 3 |
| Interpreting the Past | 3 |
| Literature | 3 |
| Philosophy and Ethics | 3 |
| The Nature of Science | 8 |

**PHYS 111N** Introductory General Physics

**BIOL 121N** General Biology I

& **BIOL 122N** General Biology I Lab

| Human Behavior | 3 |
| PSYC 201S Introduction to Psychology |

Impact of Technology is met through STEM 370T in the major.

### Technical Content

| CHEM 103 | Introductory Chemistry |
| STEM 110T | Technology and Your World |
| MET 120 | Computer Aided Drafting |
| STEM 221 | Industrial Materials |
| STEM 231 | Materials and Processes Technology |
| STEM 241 | Energy Systems: Basic Electricity |
| STEM 242 | Technological Systems Control |
| STEM 251G | Computer Literacy: Communication and Information |
| STEM 320 | Manufacturing and Construction Technology |
| STEM 330 | Medical, Agricultural, and Biological Technologies |
| STEM 350 | Communication Technology Processes |
| STEM 351 | Communication Technology |
| STEM 360 | Energy, Power, and Transportation Technologies |
| STEM 370T | Technology and Society (Writing Intensive) ** |
| STEM 382 | Industrial Design |

| SEPS 401 | Foundations of Career and Technical Education |
| SEPS 450 | Assessment, Evaluation and Improvement |
| STEM 101 | Step 1 – Inquiry Approaches to Teaching STEM |
| STEM 102 | Step 2 - Inquiry Based STEM Lesson Design |
| STEM 201 | Knowing and Learning in STEM Education |
| STEM 202 | Classroom Interactions in STEM Education |
| STEM 401 | Project Based Instruction in STEM Education |
| STEM 402 | Perspectives on STEM |
| STEM 485 | Apprentice Teaching |

Elective credit may be needed to meet the minimum of 120 credits required for the degree.

* Grade of C or better required in both courses

** Grade of C or better required

### Upper Division General Education

Satisfied through the professional education sequence.

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**Fashion Merchandising Concentration**

This program is designed to prepare students to enter the fashion industry to become buyers, fashion coordinators, and merchandise managers. Requirements are as follows:

### Lower Division General Education

| Written Communication * | 6 |
| Oral Communication | 3 |
| Mathematical Skills | 3 |
| Language and Culture | 0-6 |
| Information Literacy and Research | 3 |

**STEM 251G** Computer Literacy: Communication and Information

| Human Creativity | 3 |
| Interpreting the Past | 3 |
| Literature | 3 |
| Philosophy and Ethics | 3 |
| The Nature of Science | 8 |

**Human Behavior (ECON 200S required)** | 3 |

Impact of Technology is satisfied by STEM 370T in the major.

### Technical Content Courses

| SEPS 100 | Sales Techniques |
| SEPS 102 | Advertising and Promotion |
| ACCT 201 | Principles of Financial Accounting |
| STEM 350 | Communication Technology Processes |
| SEPS 208 | Retail Merchandising and Buying |
| SEPS 220 | The Fashion Industry |
| SEPS 234 | Survey of Dress and Costume |
| SEPS 302 | Workforce Supervision |
| SEPS 303 | Social Aspects of Clothing |
| STEM 370T | Technology and Society (Writing Intensive) ** |
| MKTG 311 | Marketing Principles and Problems |
| MGMT 325 | Contemporary Organizations and Management |
| SEPS 400 | Instructional Systems Development |
| SEPS 402 | Instructional Methods in Occupational Studies |
| SEPS 405 | Directed Work Experience |
| SEPS 415 | Advanced Merchandising |
| SEPS 422 | Fashion Product Development |
| SEPS 480 | Senior Project: Merchandise Retailing |
| SEPS 481 | Occupational Career Transition |

Select four of the following or other advisor approved electives: 12

| SEPS 409 | Fashion Forecasting Market Trip |
| SEPS 410 | The Foreign Fashion Market Trip |
| SEPS 423 | Visual Merchandising and Display |
| SEPS 424 | Fashion, Textiles, and Construction Analysis |
| SEPS 431 | Web-Based Organization for Fashion |

### Elective Credit (consult the department advisor) | 6

Total Hours 114-120

Elective credit may be needed to meet the minimum of 120 credits required for the degree.

* Grade of C or better required in both courses

** Grade of C or better required

### Upper Division General Education

- Option A. Approved Disciplinary Minor (a minimum of 12 hour determined by the department) or second degree or second major
• Option B. Interdisciplinary Minor (specifically 12 hours, 3 of which may be in the major)
• Option C. International Business and Regional Courses or an approved Certification Program such as teaching licensure
• Option D. Two Upper-Division Courses from outside the College of Education and not required by the major (6 hours)

Requirements for Graduation
Requirements for graduation include a minimum cumulative grade point average of 2.00 overall and in the major, 120 credit hours, which must include both a minimum of 30 credit hours overall and 12 credit hours in upper-level courses in the major program from Old Dominion University, completion of ENGL 110C, ENGL 211C or ENGL 221C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better, and completion of Senior Assessment.

Industrial Technology Concentration
This program is designed to prepare students to enter industry as supervisors, technical managers, or trainers. This concentration is also available through the University's distance learning system. Additional industrial technology technical concentration tracks are available for transfer students. On approval of the program leader, select technical content areas from the community college can satisfy the 30 hours of technical content for this emphasis. Requirements are as follows:

Lower Division General Education
Written Communication * 6
Oral Communication 3
Mathematical Skills 6
- MATH 102M College Algebra
- or MATH 103M College Algebra with Supplemental Instruction
- STAT 130M Elementary Statistics
Language and Culture 0-6
Information Literacy and Research 3
- STEM 251G Computer Literacy: Communication and Information

Human Creativity 3
Interpreting the Past 3
Literature 3
Philosophy and Ethics 3
The Nature of Science 8
- PHYS 101N Conceptual Physics
- & PHYS 102N and Conceptual Physics
Human Behavior 3
PSYC 201S Introduction to Psychology
Impact of Technology is satisfied by STEM 370T in the major.

Technical Content-General Emphasis 24
- MET 120 Computer Aided Drafting
- STEM 221 Industrial Materials
- STEM 231 Materials and Processes Technology
- STEM 241 Energy Systems: Basic Electricity
- STEM 242 Technological Systems Control
- STEM 321 Manufacturing Technology
- STEM 351 Communication Technology
- STEM 382 Industrial Design

Supervision 18
- SEPS 302 Workforce Supervision
- STEM 370T Technology and Society (Writing Intensive) **
- SEPS 402 Instructional Methods in Occupational Studies
- SEPS 400 Instructional Systems Development
- PSYC 303 Industrial/Organizational Psychology

Approved Business Electives (Three Courses) 9
Elective credit 1
Total Hours 114-120
Elective credit may be needed to meet the minimum of 120 credits required for the degree.

* Grade of C or better required in both courses
** Grade of C or better required

Upper Division General Education
• Option A. Approved Disciplinary Minor (a minimum of 12 hours determined by the department) or second degree or second major
• Option B. Interdisciplinary Minor (specifically 12 hours, 3 of which may be in the major)
• Option C. International Business and Regional Courses or an approved Certification program such as teaching licensure
• Option D. Two Upper-Division Courses from outside the College of Education and not required by the major (6 hours)

Requirements for Graduation
Requirements for graduation include a minimum cumulative grade point average of 2.00 overall and in the major, 120 credit hours, which must include both a minimum of 30 credit hours overall and 12 credit hours in upper-level courses in the major program from Old Dominion University, completion of ENGL 110C, ENGL 211C or ENGL 221C or ENGL 231C, and the writing intensive (W) course in the major with a grade of C or better, and completion of Senior Assessment.

Training Specialist Concentration
This program is designed to prepare students as training specialists who design, develop, and present training in business and industry. This concentration is also available through the University's distance learning system. On approval of the program leader, select business-related technical content areas from the community college can satisfy 30 hours of technical content for this emphasis. Requirements are as follows:

Lower Division General Education
Written Communication * 6
Oral Communication 3
Mathematical Skills 3
Language and Culture 0-6
Information Literacy and Research 3
- STEM 251G Computer Literacy: Communication and Information

Human Creativity 3
Interpreting the Past 3
Literature 3
Philosophy and Ethics 3
The Nature of Science 8
- PHYS 101N Conceptual Physics
- & PHYS 102N and Conceptual Physics
Human Behavior 3
PSYC 201S Introduction to Psychology
Impact of Technology is satisfied by STEM 370T in the major.

Technical Content Courses 45
- ACCT 201 Principles of Financial Accounting
- HMSV 339 Interpersonal Relations

Science, Technology, Engineering, and Mathematics (STEM) Education and Professional Studies 4
MonarchTeach allows students to “Explore Teaching” through Step 1 and Step 2, both one-credit, field-based courses. Through these courses, students gain early teaching experience as they prepare and teach lessons in local elementary and middle school classrooms. These courses meet weekly on the ODU campus and experienced master teachers assist students in preparing inquiry-based lessons. Additional courses required in the MonarchTeach program, drawn from both the Darden College of Education and the College of Sciences, emphasize the relationships between mathematics and science, while integrating teaching content and skills throughout the field-intensive curriculum. Coursework in the MonarchTeach program prepares teacher candidates interested in teaching secondary mathematics or science to complete content and pedagogical competency requirements for teacher licensure in the Commonwealth of Virginia.

All students seeking Virginia Department of Education licensure to teach in secondary schools must complete all admission, continuation, and exit requirements for approved Teacher Education Programs (see the Darden College of Education Teacher Education Program section of this catalog). Students can officially apply to the MonarchTeach program after completion of the Step 2 course (STEM 102). When applying to the program, students must fill out the appropriate paperwork provided by the MonarchTeach program and go through the interview process in the Office of Teacher Education Services. To graduate and be recommended for licensure, students must complete the required coursework in an approved College of Sciences degree program and in the MonarchTeach program. Students must have a minimum major and overall GPA of at least 2.75, have earned a grade of at least C in all of the professional development and supporting courses listed below with the exception of Apprentice Teaching, which is a pass/fail course, have passing scores on Praxis Core Academic Skills Test or equivalent SAT or ACT scores as established by the Virginia Board of Education, as well as passing scores on the appropriate Praxis Content Test and the Virginia Communication and Literacy Assessment, and have passed the final teaching portfolio review.

Background Clearance Requirement
Old Dominion University requires a background clearance check of candidates interested in any field-based professional education course. The background clearance must be successfully completed prior to any field experience placement. Candidates will be provided a field experience placement when the background check process is completed with resolution of any issues. The process to complete the ODU clearance process includes: an FBI fingerprint, a child protective service/social service review, and a Virginia State Police sex offender registry review. Candidates must complete this clearance process immediately in the first field-based course since the clearance process takes a minimum of eight weeks to complete.

Course Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEM 101</td>
<td>Step 1 – Inquiry Approaches to Teaching</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>STEM (field based)</td>
<td></td>
</tr>
<tr>
<td>STEM 102</td>
<td>Step 2 - Inquiry Based STEM Lesson Design</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(field based)</td>
<td></td>
</tr>
<tr>
<td>STEM 201</td>
<td>Knowing and Learning in STEM Education</td>
<td>3</td>
</tr>
<tr>
<td>STEM 202</td>
<td>Classroom Interactions in STEM Education</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(field based)</td>
<td></td>
</tr>
<tr>
<td>STEM 401</td>
<td>Project Based Instruction in STEM Education</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(field based)</td>
<td></td>
</tr>
<tr>
<td>STEM 402</td>
<td>Perspectives on STEM</td>
<td>3</td>
</tr>
<tr>
<td>SCI 468</td>
<td>Research Methods in Math and Sciences</td>
<td>3</td>
</tr>
<tr>
<td>SCI 468</td>
<td>Research Methods in Math and Sciences</td>
<td>3</td>
</tr>
<tr>
<td>or BIOL 468W</td>
<td>Research Methods in Mathematics and</td>
<td></td>
</tr>
<tr>
<td>or CHEM 468W</td>
<td>Science</td>
<td></td>
</tr>
<tr>
<td>or OEAS 468W</td>
<td>Research Methods in Math and</td>
<td></td>
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<tr>
<td></td>
<td>Sciences</td>
<td></td>
</tr>
<tr>
<td>STEM 485</td>
<td>Apprentice Teaching (field based)</td>
<td>9</td>
</tr>
</tbody>
</table>

Total Hours: 26

Mathematics education students in the MonarchTeach program must also complete MATH 375 Advanced Concepts for Secondary Educators: Function and Modeling.
Program Requirements

Upon completion of Step 2 (STEM 102) students are encouraged to apply to the teacher preparation program MonarchTeach. Students who wish to teach science or mathematics at the secondary level must pursue courses of study leading to baccalaureate degrees in the College of Sciences. (See the College of Sciences section of this Catalog for full and specific requirements for science and mathematics secondary education.) In addition, to be eligible for state licensure to teach in secondary schools, students must complete requirements in the Darden College of Education listed below.

Admission

Students must:

1. Have an overall grade point average of 2.75 and a 2.75 in the academic major and the professional education core with no individual grade in content courses below C (except C+ for MATH 211 and MATH 212 for mathematics majors), C- (physics majors), C (earth science majors), C (chemistry majors with all other science courses a C- or better), and C (biology majors with other science courses a C- or better);

2. Achieve passing scores (as established by the Commonwealth of Virginia) on the Praxis Academic Skills Assessment or the SAT/ACT substitute scores as follows:
   a. Passing Praxis I composite score of 532 by December 31, 2013; or
   b. Passing Praxis Core Academic Skills Tests beginning January 1, 2014:
      - Reading Score of 156, Writing Score of 162, and Mathematics Score of 150; or
   c. Approved substitute test scores:
      1. SAT score of 1000 with at least 450 verbal and 510 mathematics taken prior to April 1, 1995; or
      2. SAT score of 1100 with at least 530 verbal and 530 mathematics taken after April 1, 1995 and before March 2016*; or
      3. ACT composite score of 21 with ACT mathematics score of at least 21, ACT English plus Reading score of at least 37, taken prior to April 1, 1995; or
      4. ACT composite score of 24 with ACT mathematics score of at least 22, and ACT English plus Reading score of at least 46, taken after April 1, 1995; or
      5. Praxis I Math test score of 178 by December 31, 2013 and a composite Virginia Communication and Literacy Assessment (hereafter referred to as the VCLA) score of 470; or
      6. Praxis Core Academic Skills Mathematics test score of 150 beginning January 1, 2014 and a VCLA score of 470; or
      7. SAT Mathematics test score of at least 510 taken prior to April 1, 1995 and a VCLA score of 470; or
      8. SAT Mathematics test score of at least 530 taken after April 1, 1995 and a composite VCLA score of 470; or
      9. ACT Mathematics test score of at least 21 taken prior to April 1, 1995 and a composite VCLA score of 470; or
      10. ACT Mathematics test score of at least 22 taken after April 1, 1995 and a composite VCLA score of 470.
      Note: ACT scores taken prior to 1989 are not valid.

3. Meet with the MonarchTeach program advisor to submit the program application to the director of Teacher Education Services. (The application forms may be obtained on the MonarchTeach web page under Resources for Students.)

4. Acceptance into the Darden College of Education teacher preparation program requires students to have no course grades in the academic major or professional education core below a C-, an overall GPA of 2.75 or higher, and passing scores on the Praxis Academic Skills Test or SAT/ACT equivalent scores. Students should be formally admitted to teacher education before completing STEM 202 Classroom Interactions.

Continuance

Students must:

1. Maintain minimum overall grade point averages of 2.75 and 2.75 in the academic major and the professional education core;
2. Successfully complete all professional education courses and field experiences;
3. Be approved for Apprentice Teaching by the faculty;
4. Pass the VCLA; and
5. Pass Praxis Content Test in order to participate in Apprentice Teaching. Passing scores must be attached to the Apprentice Teaching application.

Exit

Students must:

1. Have minimum overall grade point averages of 2.75 and 2.75 in the academic major and the professional education core;
2. Successfully complete prescribed Apprentice Teaching and Seminar;
3. Have an exit interview; and
4. Have completed all course requirements. No courses in the academic major in which the student has made below a C- will be accepted toward meeting requirements in the College of Education.

Minor in Fashion Merchandising

The department offers a minor in fashion merchandising for students majoring in disciplines other than occupational and technical studies emphasis areas. Requirements for the minor are completion of 12 credit hours from among the following courses:

Select four of the following: 12

- SEPS 302 Workforce Supervision
- SEPS 303 Social Aspects of Clothing
- SEPS 367 Cooperative Education
- SEPS 405 Directed Work Experience
- SEPS 409 Fashion Forecasting Market Trip
- SEPS 410 The Foreign Fashion Market Trip
- SEPS 415 Advanced Merchandising
- SEPS 422 Fashion Product Development
- SEPS 423 Visual Merchandising and Display
- SEPS 424 Fashion, Textiles, and Construction Analysis
- SEPS 431 Web-Based Organization for Fashion
- SEPS 435 International Retailing
or SEPS 440 Fashion Global Sourcing/Supply Chain Management
- SEPS 495 Topics in Occupational Education *
- SEPS 496 Topics in Career and Technical Education *

Total Hours 12

* Prior approval required

SEPS 208 or SEPS 220 are prerequisites for the minor and are not included in the calculation of the grade point average for the minor. Students must have a minimum overall cumulative grade point average of 2.00 in all courses required for the minor exclusive of 100- and 200-level courses and prerequisite courses and complete a minimum of six hours in upper-level courses in the minor through courses offered by Old Dominion University.

Minor in Marketing Education

The minor in marketing education is offered by the department to students majoring in disciplines other than occupational and technical studies emphasis areas. Requirements for the minor are:
Course options are as follows:

- More appropriate choices for their futures.
- Students with skills to make better personal decisions about technology and its impacts. The minor equips the social context and the historical and philosophical backgrounds needed by individuals, societies, and the environment. It provides the more appropriate choices for those futures.
- Environmental Health Administration and Law
- World Resources
- Hazards: Natural and Technological
- History of Medicine, Disease, and Health Technology
- Technology and Civilization
- The Evolution of Modern Science
- Principles of Information Technology
- Music Technology Survey
- Operations Management
- Computer Ethics
- Technology: Its Nature and Significance
- Technology and War
- War and Peace
- Technology and Society
- Industrial Design
- Exploring Technology and Modern Industry
- Women and Technology Worldwide

The interdisciplinary minor in the Impact of Technology requires 12 credit hours of 300/400-level courses selected from at least two different disciplines with a maximum of six credits from any one discipline. For completion of the interdisciplinary minor, students must have a minimum overall cumulative grade point average of 2.00 in all courses required for the minor exclusive of lower-level courses and prerequisite courses. At least six hours of upper-level courses must be taken through courses offered by Old Dominion University. Three credit hours may be in the major, if a major course is listed as an option for the interdisciplinary minor. As such, it will be credited toward both the major and the interdisciplinary minor.

Certificate Program in Industrial Training

This program is designed especially for military and civilian instructors and trainers. It is directed to those individuals who possess technical skills in the military, industry, career and technical centers, or community colleges. An overall grade point average of 2.0 or above in all courses specified as a requirement for the certificate is required for the award of the certificate. This certificate requires successful completion of the following 21 credit hours (seven courses).

- Workforce Supervision
- Instructional Systems Development
- Instructional Methods in Occupational Studies
- Communication Technology
- Technology and Society
- Industrial/Organizational Psychology
- Human Services Methods

Total Hours 21

Licensure/Endorsement Programs

Licensure Program in Marketing Teacher Education

The licensure program in marketing teacher education is designed to prepare a person who has a business-related 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

Prior to entering this program students must hold a business-oriented baccalaureate degree in which 30 hours of marketing-related courses have been completed including at least three semester hours each of courses covering the marketing process, economics, personnel, the sales.

Minor in Training and Development

The minor in training and development is offered by the department for students majoring in disciplines other than occupational and technical studies emphasis areas. The minor requires 15 hours of course work as follows:

- Education and Training of Adults
- Instructional Systems Development
- Instructional Methods in Occupational Studies
- Assessment, Evaluation and Improvement
- Communication Technology

Total Hours 15

Students must have a minimum overall cumulative grade point average of 2.00 in all courses required for the minor exclusive of upper-level courses and prerequisite courses. Six hours of upper-level courses must be taken through courses offered by Old Dominion University. Three credit hours may be in the major, if a major course is listed as an option for the interdisciplinary minor. As such, it will be credited toward both the major and the interdisciplinary minor.

Interdisciplinary Minor - The Impact of Technology

Philip A. Reed, Department of STEM Education and Professional Studies, Coordinator

This interdisciplinary minor develops a broader understanding of technology and its impact on individuals, societies, and the environment. It provides the social context and the historical and philosophical backgrounds needed by informed students to evaluate technology and its impacts. The minor equips students with skills to make better personal decisions about technology and more appropriate choices for their futures.

Course options are as follows:

- Introduction to Global Health
- Media and Popular Culture
- Introduction to New Media Technologies
- Intercultural Communication
- Communication Theory
- Transnational Media Systems
- Computers in Society
- Internet Concepts
- Transportation Economics
- Economic Development
- Reporting and News Writing I
- Reporting News for Television and Digital Media
- Investigative Reporting Techniques
- Principles of Environmental Health Science

Total Hours 3

- Environmental Health Administration and Law
- World Resources
- Hazards: Natural and Technological
- History of Medicine, Disease, and Health Technology
- Technology and Civilization
- The Evolution of Modern Science
- Principles of Information Technology
- Music Technology Survey
- Operations Management
- Computer Ethics
- Technology: Its Nature and Significance
- Technology and War
- War and Peace
- Technology and Society
- Industrial Design
- Exploring Technology and Modern Industry
- Women and Technology Worldwide

The interdisciplinary minor in the Impact of Technology requires 12 credit hours of 300/400-level courses selected from at least two different disciplines with a maximum of six credits from any one discipline. For completion of the interdisciplinary minor, students must have a minimum overall cumulative grade point average of 2.00 in all courses required for the minor exclusive of lower-level courses and prerequisite courses. At least six hours of upper-level courses must be taken through courses offered by Old Dominion University. Three credit hours may be in the major, if a major course is listed as an option for the interdisciplinary minor. As such, it will be credited toward both the major and the interdisciplinary minor.

Certificate Program in Industrial Training

This program is designed especially for military and civilian instructors and trainers. It is directed to those individuals who possess technical skills in the military, industry, career and technical centers, or community colleges. An overall grade point average of 2.0 or above in all courses specified as a requirement for the certificate is required for the award of the certificate. This certificate requires successful completion of the following 21 credit hours (seven courses).

- Workforce Supervision
- Instructional Systems Development
- Instructional Methods in Occupational Studies
- Communication Technology
- Technology and Society
- Industrial/Organizational Psychology
- Human Services Methods

Total Hours 21

Licensure/Endorsement Programs

Licensure Program in Marketing Teacher Education

The licensure program in marketing teacher education is designed to prepare a person who has a business-related 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

Prior to entering this program students must hold a business-oriented baccalaureate degree in which 30 hours of marketing-related courses have been completed including at least three semester hours each of courses covering the marketing process, economics, personnel, the sales.

- Introduction to Global Health
- Media and Popular Culture
- Introduction to New Media Technologies
- Intercultural Communication
- Communication Theory
- Transnational Media Systems
- Computers in Society
- Internet Concepts
- Transportation Economics
- Economic Development
- Reporting and News Writing I
- Reporting News for Television and Digital Media
- Investigative Reporting Techniques
- Principles of Environmental Health Science

Total Hours 3

- Environmental Health Administration and Law
- World Resources
- Hazards: Natural and Technological
- History of Medicine, Disease, and Health Technology
- Technology and Civilization
- The Evolution of Modern Science
- Principles of Information Technology
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- Workforce Supervision
- Instructional Systems Development
- Instructional Methods in Occupational Studies
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- Human Services Methods

Total Hours 21

Licensure/Endorsement Programs

Licensure Program in Marketing Teacher Education

The licensure program in marketing teacher education is designed to prepare a person who has a business-related 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

Prior to entering this program students must hold a business-oriented baccalaureate degree in which 30 hours of marketing-related courses have been completed including at least three semester hours each of courses covering the marketing process, economics, personnel, the sales.
Students must:

Exit must be interviewed and accepted by the program coordinator. Prior to entering this program students must have or qualify for a Virginia training in the public schools.

The endorsement program in industrial cooperative training is designed to

Science in occupational and technical studies, career and technical education teaching concentration.

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 or complete SEPS 405.

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.

STEM 101. Step 1 – Inquiry Approaches to Teaching STEM. 1 Credit.

STEM 102. Step 2 - Inquiry Based STEM Lesson Design. 1 Credit.

STEM 110T. Technology and Your World. 3 Credits.

STEM 201. Knowing and Learning in STEM Education. 3 Credits.

STEM 202. Classroom Interactions in STEM Education. 3 Credits.

STEM 221. Industrial Materials. 3 Credits.

STEM 231. Materials and Processes Technology. 3 Credits.

A study of the production processes used with metallic and forest product materials. Industrial resources, their location, extraction, and processing into standard stocks are also covered. Students learn properties, uses and processing of metal and wood materials.

Endorsement Program in Industrial Cooperative Training

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

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.

Exit

Students must:

1. Complete the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS 297</td>
<td>Observation and Participation</td>
<td>1</td>
</tr>
<tr>
<td>SPED 313</td>
<td>Fundamentals of Human Growth and Development</td>
<td>3</td>
</tr>
<tr>
<td>TLED 408</td>
<td>Reading and Writing in Content Areas</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 400/500</td>
<td>Instructional Systems Development</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 401/501</td>
<td>Foundations of Career and Technical Education</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 408/508</td>
<td>Advanced Classroom Issues and Practices in Career</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>and Technical Education</td>
<td></td>
</tr>
<tr>
<td>SEPS 450/550</td>
<td>Assessment, Evaluation and Improvement</td>
<td>3</td>
</tr>
<tr>
<td>SEPS 485</td>
<td>Student Teaching</td>
<td>12</td>
</tr>
</tbody>
</table>

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; and

3. Document at least 4000 clock hours of marketing-related work experience completed within the past five years or complete SEPS 405.

Passing scores on the Praxis Subject Assessment, Marketing Education Content Knowledge are required before teacher internship. Passing scores must be attached to the teacher internship application.

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.

STEM 101. Step 1 – Inquiry Approaches to Teaching STEM. 1 Credit.

Step 1 provides mathematics and science students with the opportunity to explore teaching in a real classroom setting. Master teachers introduce students to examples of high-quality inquiry-based lessons and model the pedagogical concepts to which they are being introduced. In Step 1, with the guidance of the master teacher, students engage in two classroom observations and prepare and teach three inquiry-based lessons in an upper elementary school classroom. A criminal background check will be required as part of this course.

STEM 102. Step 2 - Inquiry Based STEM Lesson Design. 1 Credit.

This course continues the exploration of inquiry-based lesson design in STEM education. In this course, students build upon and practice lesson design skills developed in Step 1 while also becoming familiar with exemplary mathematics or science curricula at the middle school level. With the guidance of the master teacher, students engage in one observation and prepare and teach three inquiry-based lessons in a middle school classroom. Students incorporate and demonstrate their content knowledge in developing the inquiry-based lessons. At the end of Step 2, students are generally ready to make a decision about whether they want to pursue a pathway to teacher licensure through the MonarchTeach program. Prerequisites: a grade of C or higher in STEM 101.

STEM 110T. Technology and Your World. 3 Credits.

An overview of the resources and systems of technology. Emphasis is on impacts that technology has on individuals and their careers. Activities explore the evolution of technology, its major systems and their impact on individuals and their careers.

STEM 201. Knowing and Learning in STEM Education. 3 Credits.

This course is designed to expand the students’ understanding of current theories of learning and conceptual development in STEM. Students will investigate theories of knowing and learning in STEM and implications for teaching secondary mathematics and science. Students will examine their own assumptions about learning as well as critically examine the needs of a diverse student population in the classroom. Students are expected to independently register for and take the Praxis I examination while enrolled in this course. Pre- or corequisite: STEM 101.

STEM 202. Classroom Interactions in STEM Education. 3 Credits.

This course provides students with an overview of principles for teaching middle and secondary school mathematics or science through an exploration of the role of content, pedagogy, curriculum and technology as they promote learning and impact equity. Students are introduced to ways in which curriculum and technology are used in the classroom to build interrelationships among teachers and students. Frameworks for teaching students of diverse backgrounds equitably are emphasized in the course. A field component that consists of observations and teaching in the high school classroom is included. Pre- or corequisite: STEM 201.

STEM 221. Industrial Materials. 3 Credits.

A study of materials used by industry to produce products. Emphasis is on the study of ceramics, plastics, composites, and biotechnological materials. Students learn materials identification, use and processing.

STEM 231. Materials and Processes Technology. 3 Credits.

A study of the production processes used with metallic and forest product materials. Industrial resources, their location, extraction, and processing into standard stocks are also covered. Students learn properties, uses and processing of metal and wood materials.
STEM 241. Energy Systems: Basic Electricity. 3 Credits.
A study of direct and alternating current and its use in contemporary technology. Activities include experiments and projects to supplement the theory of electricity.

STEM 242. Technological Systems Control. 3 Credits.
Students will develop an understanding of systems control technology for application to energy and power, manufacturing, processing and transportation systems. Emphasis will be placed on research and development, creativity and experimentation, and trouble shooting in designing control systems.

STEM 251G. Computer Literacy: Communication and Information. 3 Credits.
A guided review of communication technology and information sources to help students discern between reliable and unreliable sources and techniques. Students develop skills in computer applications, information retrieval, filtering and analyzing data, and formatting and presenting information.

STEM 301. STEMPS Writing. 1 Credit.
This course covers the elements of effective writing along with identifying editing strategies to correct errors. Prerequisite: 58 total credit hours, completion of General Education Written Communication requirement, and declared major in STEM Education and Professional Studies.

STEM 305. Curriculum for Technology Education. 3 Credits.
National and state trends in instructional content are analyzed. Course content, activities, and facilities are planned. Competency-based and standards-based educational methods are stressed. Prerequisites: STEM 251G and junior standing.

STEM 306. Methods for Technology Education. 3 Credits.
A practical study and application of recommended methods for teaching technology education. Students plan and present micro-lessons; videotaped micro-teaching demonstrations are included. They also learn to organize student organizations and plan for laboratory management. Prerequisites: STEM 251G and junior standing.

STEM 320. Manufacturing and Construction Technology. 3 Credits.
A study of production processes used in manufacturing and construction systems. Students will research and design manufactured products for mass production and constructed products for building. The social, cultural, environmental and economic impacts of manufacturing and constructed products on society are discussed. Prerequisites: STEM 221, STEM 231 or permission of instructor.

STEM 321. Manufacturing Technology. 3 Credits.
A study of the production processes used in manufacturing systems. Emphasis is placed upon planning, organizing and principles of manufacturing. Students research and design enterprise systems for mass production. Emphasis is on manufacturing design requirements and the social, cultural, and economic impacts of manufactured products on society and the environment. Prerequisites: STEM 221, STEM 231 or permission of instructor.

STEM 322. Construction Technology. 3 Credits.
A study of the production processes used in construction systems. Emphasis is placed upon planning, organizing and constructing correlated projects and activities in the study of construction. Prerequisites: junior standing or permission of instructor.

STEM 330. Medical, Agricultural, and Biological Technologies. 3 Credits.
A course for technology education majors that studies technological systems related to medical and food processing technologies. Students learn the basis of these technologies and complete activities that integrate the content with processes and products found in our technological world. Prerequisite: junior standing or permission of department.

STEM 350. Communication Technology Processes. 3 Credits.
The study of communication design principles and techniques for technology education. Emphasis is placed on the skills and equipment used in design, production, and distribution of communications. Print and electronic media are explored through technical illustration, video, audio, and other specialty processes of communications. Prerequisite: STEM 251G.

STEM 351. Communication Technology. 3 Credits.
A study of the development and impact of communication technology. Emphasis is placed on the integration of technical skills to produce information-based products such as print and telecommunications media. Prerequisite: junior standing or permission of the instructor.

STEM 355. STEM Education Grades 6 Through 8. 3 Credits.
This course prepares educators to use research-based methods for integrating science, technology, engineering, and mathematics (STEM) in the 6-8 classroom. Emphasis is placed on standards for the STEM disciplines, the development of contextual learning units, and classroom/labatory instructional strategies. This course contains a 45-hour practicum experience at the middle school level. Prerequisite: junior standing.

STEM 360. Energy, Power, and Transportation Technologies. 3 Credits.
Study of the development of energy, power, and transportation systems and the movement of energy, power, people, and cargo. Areas of concern include vehicle systems design and support systems. Prerequisite: junior standing or permission of the instructor.

STEM 367. Cooperative Education. 1-3 Credits.
Available for pass/fail grading only. Student participation for credit based on the academic relevancy of the work experience, criteria, and evaluative procedures as formally determined by the department and the Cooperative Education program prior to the semester in which the work experience is to take place. (Qualifies as a CAP experience) Prerequisites: approval by the department and Career Development Services, in accordance with the policy for granting credit for Cooperative Education programs.

STEM 370T. Technology and Society. 3 Credits.
A multidisciplinary course designed to provide insight into the fundamental, historical, and contemporary nature of technology as an area of human knowledge. Attention is given to the positive and negative aspects of technology and how they affect society. (This is a writing intensive course.) Prerequisites: grade of C or better in ENGL 211C or ENGL 221C or ENGL 231C; junior standing or permission of the instructor.

STEM 382. Industrial Design. 3 Credits.
Students will analyze and design products representative of today's industrial technological society. Emphasis will be placed upon design methodology, aesthetic value, and design thinking. Prerequisites: junior standing.

STEM 386. Architecture. 3 Credits.
A course designed to apply principles of space planning, architectural construction techniques, and energy-efficient building methods as they apply to residential and commercial structures. Prerequisite: junior standing.

STEM 401. Project Based Instruction in STEM Education. 3 Credits.
Through a dynamic process of investigation and collaboration, students aim to master techniques for project-based investigations in STEM classrooms, and teach project-based lessons in the secondary classroom. Students work in teams to formulate questions, make predictions, design investigations, collect and analyze data, make products and share ideas. The use of assessments to improve student learning is emphasized in the course. This course includes a field component that consists of two observation days and three teaching days in a secondary classroom. Prerequisite: STEM 201.

STEM 402. Perspectives on STEM. 3 Credits.
This course explores the historical, social, and philosophical implications of mathematics and science through investigations of significant episodes in their history. Students are brought to understand that science and mathematics are not merely body of facts, theories, and techniques but involve diverse processes by which they are continually generated and reformulated. Corequisite: STEM 485.

STEM 417. Exploring Technology and Modern Industry. 3 Credits.
A course designed to explore technological systems and new developments in technology education. Emphasis is on middle schools. Prerequisites: STEM 251G and junior standing or permission of the instructor.
Science, Technology, Engineering, and Mathematics (STEM) Education and Professional Studies

STEM 433/533. Developing Instructional Strategies PreK-6: Mathematics. 3 Credits.
Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in mathematics in grades PreK-6 in support of NCTM national instructional standards and the Virginia Standards of Learning. Prerequisites: TLED 301 or TLED 290 and TLED 430 with a C- or higher.

STEM 434/534. Developing Instructional Strategies PreK-6: Science. 3 Credits.
Following a theory into practice philosophy, students explore, develop, and use instructional strategies, materials, technologies, and activities to promote children's development of attitudes, behaviors, and concepts in science in grades PreK-6 in support of AAAS national instructional standards and the Virginia Standards of Learning. Prerequisites: TLED 301 or TLED 290 and TLED 430 with a C- or higher.

STEM 453/553. Developing Instructional Strategies for Teaching in the Middle/High School: Mathematics. 3 Credits.
A course designed to provide career and technical education teachers, industrial technologists, counselors, and administrators an opportunity to observe and enhance their knowledge of representative service industries from the local region. (Qualifies as a CAP experience) Prerequisite: junior standing and industrial technology major.

STEM 474/574. Service Industries. 3 Credits.
A course designed to provide career and technical education teachers, industrial technologists, counselors, and administrators an opportunity to observe and enhance their knowledge of representative service industries from the local region. (Qualifies as a CAP experience) Prerequisite: junior standing and industrial technology major.

STEM 475/575. Transportation Industries. 3 Credits.
A course designed to provide career and technical education teachers, industrial technologists, counselors, and administrators an opportunity to observe and enhance their knowledge of representative transportation industries from the local region. (Qualifies as a CAP experience) Prerequisite: junior standing and industrial technology major.

STEM 485. Apprentice Teaching. 9 Credits.
Internship in school. Available for pass/fail grading only. Offers prospective teacher candidates a culminating experience that provides them with the tools needed for their first teaching jobs. Students are immersed in a local secondary school for 10 consecutive weeks and experience the expectations, processes, and rewards of teaching. As part of their Apprentice Teaching experience, candidates will be required to attend a one hour weekly seminar that will bring them together with master teachers to share experiences and to explore issues, problems, concerns, and processes related to their teaching experiences and to entering the profession of teaching. Corequisite: STEM 402. Prerequisites: Completion of all course work in the MonarchTeach professional development sequence program and BIOL 468W or CHEM 468 or OMAS 468W or PHYS 468W or SCI 468, passing scores on PRAXIS I or equivalent SAT or ACT scores as established by VA Board of Education, passing scores on the appropriate PRAXIS II content examination and the Virginia Communication and Literacy Assessment, departmental approval, minimum major and overall GPA of at least 2.75 and a criminal background check.

STEM 486/586. Middle School Student Teaching for Technology Education. 6 Credits.
Classroom placement for student teaching in a middle school technology laboratory. Students apply content and methodology under the supervision of a cooperating teacher and university faculty member. Available for pass/fail grading only. (Qualifies as a CAP experience.) Prerequisites: Passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores, passing scores on the appropriate PRAXIS II content examination and STEM 305, STEM 306, SEPS 408, SEPS 450, SPED 313, and TLED 408.

STEM 488. High School Student Teaching for Technology Education. 6 Credits.
Classroom placement for student teaching in a high school technology laboratory. Students apply content and methodology under the supervision of a cooperating teacher and university faculty member. Available for pass/fail grading only. (Qualifies as a CAP experience) Prerequisites: STEM 305, 306; SEPS 408, SEPS 450; SPED 313; TLED 408 and passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores, and passing scores on the appropriate PRAXIS II content examination.

STEM 495/595. Topics. 1-3 Credits.
The advanced study of selected topics designed to permit small groups of qualified students to work on subjects of mutual interest which, due to their specialized nature, may not be offered regularly. These courses will appear in the course schedule. Prerequisite: permission of the instructor.

STEM EDUCATION AND PROFESSIONAL STUDIES Courses

SEPS 100. Sales Techniques. 3 Credits.
This is an introductory course that emphasizes the concept of determining customer needs, wants, and desires and matching them to products and services for a long-term sales relationship. The course is not intended for students pursuing majors in the College of Business and Public Administration.

SEPS 102. Advertising and Promotion. 3 Credits.
This is an introductory course designed to teach the fundamental product and service promotion processes of planning and producing advertising and promotion campaigns. The course is not intended for students pursuing majors in the College of Business and Public Administration.
SEPS 195. Topics. 1 Credit.
Topics of current interest in the area of STEM Education and Professional Studies.

SEPS 208. Retail Merchandising and Buying. 3 Credits.
This course introduces students to the fundamentals of retail merchandising and explores retail buyers' skills and responsibilities including identifying customers and vendors, retail mathematics, buying plans, and merchandise control.

SEPS 220. The Fashion Industry. 3 Credits.
Course is designed for marketing education and fashion students. It covers fashion as a force which alters patterns of change and growth in the fashion industry to include designers, manufacturers, buyers, retailers, and customers. Students explore the latest trends in style and materials.

SEPS 234. Survey of Dress and Costume. 3 Credits.
Whether high fashion or low, glitz or grunge, from revolutionary politics to the new machine age, war and depression to growth and prosperity, fashion dress and costume goes hand-in-hand with history. This course examines the evolution of dress and costume and finds innovation at every turn.

SEPS 295. Topics. 1 Credit.
Topics of current interest in the area of STEM Education and Professional Studies.

SEPS 297. Observation and Participation. 1 Credit.
Students observe middle and/or high school classes for 30 clock hours. Assist teachers and students in practical settings. Relate principles and theories of education and specialty content to actual practice in the classrooms and schools. Attend seminars related to contemporary school practices. Prerequisite: sophomore standing. (qualifies as a CAP experience).

SEPS 302. Workforce Supervision. 3 Credits.
Explores the skills and knowledge required of successful supervisors: leading, motivating, setting goals, delegating, budgeting, interviewing, negotiating, counseling, coaching, conducting meetings, and handling grievances. Prerequisite: junior standing or permission of the instructor.

SEPS 303. Social Aspects of Clothing. 3 Credits.
A study of the social meaning of appearance, how it is established, how it is interpreted, and the importance of the social and cultural contexts in which these processes occur. Prerequisite: junior standing or permission of instructor.

SEPS 355. Fashion Consumer Behavior. 3 Credits.
This course is designed to enhance a student's understanding of what drives customers' wants and needs for fashion merchandise. Students examine the forces that affect consumer buying behavior and how they relate to the marketing of fashion. Prerequisites: SEPS 208 and SEPS 220.

SEPS 367. Cooperative Education. 1-3 Credits.
Available for pass/fail grading only. Student participation for credit based on the academic relevance of the work experience, criteria, and evaluative procedures as formally determined by the department and the Cooperative Education program prior to the semester in which the work experience is to take place. Prerequisite: approval by the department and Career Development Services, in accordance with the policy for granting credit for Cooperative Education programs. (qualifies as a CAP experience).

SEPS 389. Education and Training of Adults. 3 Credits.
An in-depth overview of education and training of adults. Attention is given to adult learning theory and strategies for facilitating the learning process. Aspects of the course will focus on helping students understand and visualize jobs and careers in adult education and training. Prerequisite: junior standing or permission of the instructor.

SEPS 395. Topics in Occupational Education. 1-3 Credits.
The department offers selected topics designed to permit small groups of qualified students to work on subjects of mutual interest. Prerequisite: permission of the instructor.

SEPS 400/500. Instructional Systems Development. 3 Credits.
Students learn how to design and develop classroom instructional materials including career and technical education and training curricula and programs for youths and adults. Skills in this area include the selection and use of materials, including media and computers and evaluation of pupil performance. Training specialist students learn to develop instructional materials using the instructional systems design process. Career and technical education students learn to plan instruction, to implement competency-based and standards-based education, and to modify and use the Virginia career and technical education curriculum guides. Prerequisite: junior standing.

SEPS 401/501. Foundations of Career and Technical Education. 3 Credits.
This course is designed to teach career and technical education majors to plan, develop, and administer a comprehensive program of career and technical education for high school students and adults. Students also develop an understanding of the historical and sociological foundations underlying the role, development and organization of public education in the United States. Prerequisite: junior standing.

SEPS 402/502. Instructional Methods in Occupational Studies. 3 Credits.
Designed to develop a student's ability to use basic instructional techniques and methods applicable to career and technical education, and adults in business, government, and industrial organizations. It involves videotaped micro-teaching demonstrations and presentations. Prerequisite: SEPS 400.

SEPS 403/503. Methods in Career and Technical Education. 3 Credits.
A practical study and application of recommended methods of teaching career and technical education to high school students. Video-taped micro-teaching demonstrations are included. The course should be taken the semester prior to student teaching. Prerequisite: junior standing.

SEPS 405. Directed Work Experience. 4 Credits.
Student must be employed the summer prior to his/her senior year in an emphasis-related job approved by the instructor. The student work is supervised by a job supervisor and the course instructor in a cooperative effort. Must complete a job package that describes all aspects of the organization. (qualifies as a CAP experience).

SEPS 408/508. Advanced Classroom Issues and Practices in Career and Technical Education. 3 Credits.
An overview of classroom issues and practices for prospective career and technical teachers. The course covers classroom management and safety, communication processes, reading in the content area and child abuse and neglect recognition and intervention. Students learn the legal requirements and alternative teaching strategies for serving students with special needs. Students visit schools for a 30-hour student observation. PRAXIS II and VCLA are course completion requirements. Prerequisite: admission to an approved teacher education program.

SEPS 409/509. Fashion Forecasting Market Trip. 3 Credits.
This is the study of planning and conducting a fashion buying trip to one of the major fashion markets in the United States like the Las Vegas Magic Trade Show. The students envision themselves as buyers in action and learn how trend forecasting and creative presentations help market fashion products and services to trade customers and consumers. Prerequisite: SEPS 208.

SEPS 410/510. The Foreign Fashion Market Trip. 3 Credits.
Students plan and conduct a fashion buying trip to a foreign market in Europe or Asia, and learn how to buy merchandise in the global marketplace. The course requires students to go on the trip as well as attend the pre- and post-trip classes. Prerequisite: SEPS 208.

SEPS 415. Advanced Merchandising. 3 Credits.
This course is designed for marketing education and fashion students. It includes advanced merchandising math concepts used in the merchandising industry. Topics include pricing and re-pricing merchandise, creating and analyzing six-month plans, maintaining inventory control, and solving problems that are typically experienced in the merchandising field. Prerequisites: SEPS 208 and ACCT 201.
SEPS 420. Fashion Research. 3 Credits.
This course is designed to apply diverse research methods to explore the complex dynamics in fashion. Utilizing an interdisciplinary approach, students will engage in diverse topics in fashion bridging the gap between theory and practice. Prerequisites: SEPS 208 and SEPS 220.

SEPS 422. Fashion Product Development. 3 Credits.
Students work step-by-step through the preproduction processes of apparel product development: planning, forecasting, fabricating, developing silhouettes and specifications, pricing, and sourcing. The course demonstrates how these processes must be coordinated to get the right product to retail when consumers want it and at a price they are willing to pay. Prerequisites: SEPS 208 and SEPS 220.

SEPS 423/523. Visual Merchandising and Display. 3 Credits.
This course is designed to introduce students to the best practices and effective strategies in visual merchandising. It will provide the basic framework with which prospective merchandisers plan and construct visual displays that enhance the selling of merchandise and ideas. Prerequisite: junior standing or permission of the instructor.

SEPS 424/524. Fashion, Textiles, and Construction Analysis. 3 Credits.
This course explores information related to new technological advances in the textile/apparel industry and determines consumer preferences and concepts of fashion product quality. It includes the development of standards for judging qualities of merchandise. Fabrics are examined to determine the value they provide to the apparel and accessories customer. Prerequisite: junior standing or permission of the instructor.

SEPS 427. Fashion Marketing. 3 Credits.
This course explains key concepts of fashion marketing and illustrates how they are applied within the fashion industry. Using examples and case studies, students will examine how marketers develop and apply strategies that meet consumer needs for fashion products. Prerequisites: SEPS 208 and SEPS 220.

SEPS 430/530. Technology Applications in Training. 3 Credits.
This course is designed to prepare training professionals to plan and conduct training using technological applications. The course covers instructional technology skills, computer systems, and software that trainers need so that they can teach basic computer and information skills in business, industry and government. Prerequisite: junior standing.

SEPS 431/531. Web-Based Organization for Fashion. 3 Credits.
This course provides the basic communications foundations needed to conceive, plan, develop, implement, and maintain a Web-based organization for fashion. Upon completion, students will understand what is required to plan, launch and maintain a successful online venture, limited only by the willingness of the student to explore these technological advances. Prerequisite: STEM 251G or equivalent or permission of instructor.

SEPS 435/535. International Retailing. 3 Credits.
This course examines globalization and the development of an integrated global economy. Primary emphasis is placed on the strategies for successful global business expansion for retailers in international markets. Prerequisites: SEPS 220 or SEPS 208.

SEPS 440/540. Fashion Global Sourcing/Supply Chain Management. 3 Credits.
This course examines the role of global sourcing in the strategic positioning of retailers in the global economy. Emphasis is placed on economic, political, logistical, and ethical factors affecting world trade and global sourcing decisions. Prerequisite: SEPS 220 or SEPS 208.

SEPS 450/550. Assessment, Evaluation and Improvement. 3 Credits.
This course prepares training and educational professionals to plan for and conduct assessments to use in planning instructional programs, evaluate individual learning, monitor student progress, measure program effectiveness and efficiency, and evaluate the return on investments of training courses and programs. Prerequisite: junior standing.

SEPS 456. E-Commerce and Social Media in Fashion. 3 Credits.
This course is designed to understand the expanding fields of e-commerce and social media. It will focus on examining features available in social media and the web/mobile technologies and their ability to improve fashion marketing strategies. Prerequisites: SEPS 208 and SEPS 220.

SEPS 471/571. Communication Industries. 3 Credits.
A course designed to provide career and technical education teachers, industrial technologists, counselors, and administrators an opportunity to observe and enhance their knowledge of representative communication industries from the local region. Prerequisite: junior standing and industrial technology major for 471. (qualifies as a CAP experience).

SEPS 472/572. Construction Industries. 3 Credits.
A course designed to provide career and technical education teachers, industrial technologists, counselors, and administrators an opportunity to observe and enhance their knowledge of representative construction industries from the local region. Prerequisite: junior standing and industrial technology major for 472. (qualifies as a CAP experience).

SEPS 480. Senior Project: Merchandise Retailing. 3 Credits.
A senior capstone course in which fashion and business knowledge and skills are applied to plan and implement a merchandise retailing business. Students must submit a professional quality written report and present results to a panel of consultants. Course to be taken final semester before graduation.

SEPS 481. Occupational Career Transition. 3 Credits.
To provide the senior-level student majoring in occupational and technical studies with the skills and techniques necessary to bridge the gap from college to career. Focus is on the generation of a professional portfolio and experiential learning that will transfer into today's job market. Prerequisites: Senior standing.

SEPS 484/584. Student Teaching Mentored. 6-12 Credits.
Classroom placement in school systems for students to apply content and methodologies. The student is mentored by a school mentor and university faculty. This course is for newly hired teachers on provisional contracts. Prerequisites: completion of the approved teacher education program in the major area, departmental approval, and permission of the director of teacher education services; passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores and passing scores on the appropriate PRAXIS II content examination required.

SEPS 485. Student Teaching. 12 Credits.
Five days per week, full semester. Available for pass/fail grading only. (qualifies as a CAP experience) Prerequisites: completion of the approved teacher education program in the major area, departmental approval, passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores, passing scores on the appropriate PRAXIS II content examination, and permission of the director of teacher education services.

SEPS 486/586. Middle School Student Teaching for Technical Education. 6 Credits.
Classroom placement for student teaching in a middle school technology laboratory. Students apply content and methodology under the supervision of a cooperating teacher and university faculty member. Available for pass/fail grading only. (qualifies as a CAP experience) Prerequisites: STEM 305, STEM 306, SEPS 408, SPED 313, TLED 408 and SEPS 450; or SEPS 508, SEPS 590, STEM 730, SEPS 788, TLED 608, TLED 616, READ 680 for graduate students; passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores and passing scores on the appropriate PRAXIS II content examination are required.

SEPS 488. High School Student Teaching for Technical Education. 6 Credits.
Classroom placement for student teaching in a high school technology laboratory. Students apply content and methodology under the supervision of a cooperating teacher and university faculty member. Available for pass/fail grading only. (qualifies as a CAP experience) Prerequisites: STEM 305, STEM 306, SEPS 408, SPED 313, TLED 408, SEPS 450, passing scores on PRAXIS I or State Board of Education-approved SAT or ACT scores, and passing scores on the appropriate PRAXIS II content examination.

SEPS 495/595. Topics in Occupational Education. 1-3 Credits.
The department offers selected topics designed to permit small groups of qualified students to work in subjects of mutual interest which, due to their specialized nature, may not be offered regularly. Prerequisite: permission of the instructor.
SEPS 496/596. Topics in Career and Technical Education. 1-3 Credits.
The department offers selected topics designed to permit small groups of qualified students to work in subjects of mutual interest which, due to their specialized nature, may not be offered regularly. Prerequisites: permission of the instructor.

SEPS 497/597. Independent Study in Occupational Education. 1-6 Credits.
Independent study. Prerequisite: permission of the instructor.

SEPS 498. Independent Study in Occupational Education. 1-6 Credits.
Independent study. Prerequisite: permission of the instructor.