

## **Technological Studies**

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We live in a technological age and the impacts of technology on the individual, society, and environment are great. Technology is the study of the human quest for solutions to problems involving the design and production of artifacts, systems, and environments. Society needs professionals who understand technological forces and are prepared to help people manage those forces. Students in either the Technology Education/Pre-Engineering or Mathematics/Science/Technology—M/S/T majors study a variety of themes including historical and contemporary influence of designed objects on end users and society, design style, product development, human factors engineering, product modeling, problem-solving techniques, communication, computers, and robotics. Emphasis is placed on understanding and applying core STEM principles to develop design and problem-solving skills. Courses are conducted in modern classroom/laboratories housed in the School of Engineering.

“Technology Education” is a broad term used in the United States to describe a curriculum that addresses the need to educate students about the many ways that technology affects their lives. At The College of New Jersey’s School of Engineering, this area of certification has been redesigned to include K-12 technological and pre-engineering principles. The goal of the program is to prepare teachers who can explain to students how objects that they interact with on a daily basis have been conceived of, designed, and fabricated by another person or group of people—an engineer, architect, graphic/fashion or industrial designer. These objects run the gamut from the design of the package that contains their cereal to the fabrication and fashion design of their clothing, to the water supply system that allows them to wash in the morning, to the myriad of engineering advances that allow them to play MP3s on their PC and instant message friends from their mobile phones while sitting comfortably in their climate-controlled houses.

New “Standards for Technological Literacy: Content for the Study of Technology” were published in 2000. The National Science Foundation (NSF), the American Association for the Advancement of Science (AAAS), and most recently the National Academy of Engineering (NAE) have recognized technology education/pre-engineering as a new field of study and as an important element of school reform. Continuing its commitment to providing New Jersey’s children with an education that enables them to succeed in the new economy, the New Jersey Department of Education established a new Core Content Standard #8 for “Technological Literacy.” Students in the Department of Technological Studies with a teacher-education specialty in either Technology Education or M/S/T receive provisional certification to teach in New Jersey schools. Most states recognize teacher candidates from these NCATE nationally accredited program. Students graduating from the program also take positions in business and industry such as manufacturing design and prototyping, industrial sales, training and development, or become entrepreneurs. Some students choose to pursue this program to prepare for positions in higher education, commerce, media, or government service. Graduates from both the Technology Education and M/S/T majors can become pre-certified to teach PLTW courses and are in high demand.

### **Entrance, Retention, and Graduation Standards**

Every major program at the College has set standards for allowing students to remain in that program, to transfer within the College from one program to another, and to graduate

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from a program. The following are the standards for programs in technological studies. Minimum grades are noted in parentheses:

- Retention in the technology education major is based on the following performance standards in these “critical content courses”: ETE 261/Multimedia Design (C+); and TED 280/Introduction to Teaching Technology Education (C+).
- Transfer to the technology education major from another program within the College is based upon the following performance standards in these “foundation courses”: ETE 261/Multimedia Design (C+); and TED 280/Introduction to Teaching Technology Education (C+).
- Retention in the M/S/T major is based on the following performance standards in these “critical content courses”: ETE 261/Multimedia Design (C+); and
  - ELST and DHST—ELE 201/RAL221 (C+) *or*
  - ECST—ECE 102/202 (C+) *or*
  - SEST—WRI 102/SPE 103/FSP (B)
- Transfer to the M/S/T major from another program within the College is based upon the following performance standards in these “foundation courses”: ETE 261/Multimedia Design (C+); *and*
  - ELST and DHST—ELE 201/RAL221 (C+) *or*
  - ECST—ECE 102/202 (C+) *or*
  - SEST—WRI 102/SPE 103/FSP (B)

### Technology Education (ETTC) or M/S/T (ELST/ECST/DHST/SEST) Majors

Candidates for a teacher-education certificate must have a 2.75 cumulative grade point average to successfully complete their teacher education program. They also must meet the state hygiene/physiology requirement and pass the appropriate PRAXIS examination before the New Jersey State Department of Education will issue the appropriate certificate. MST graduates will be able to qualify for a middle school endorsement. Teacher-education candidates will receive a “certificate of eligibility with advanced standing” which requires a candidate to be provisionally certified for his or her first year of teaching. After one year of successful teaching, the candidate is eligible for a permanent certificate. Students should consult with their departmental advisers in planning their academic program. These plans should take into account requirements for the major, general education, professional courses, and state certification.

### Suggested Course Sequence

#### Technology Education—First Year (by advisement)

|     |                                       |               |
|-----|---------------------------------------|---------------|
| FSP | First Seminar                         | 1 course unit |
| MAT | 127/Calculus A                        | 1 course unit |
| TST | 161/Creative Design                   | 1 course unit |
| ETE | 261/Multimedia Design                 | 1 course unit |
| PHY | 201/General Physics I                 | 1 course unit |
| ETE | 111/Engineering Design                | 1 course unit |
| ETE | 131/Engineering Math                  | 1 course unit |
| WRI | 102/Academic Writing (if not exempt)* | 1 course unit |

**Total for year**

**8 course units**

*\*It is recommended that students exempted from this course take other liberal learning courses.*

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### **M/S/T with the Technology Specialization** **Elementary Education M/S/T (ELST) or** **Early Childhood Education M/S/T (ECST) or** **Deaf and Hard of Hearing M/S/T (DHST) or** **Special Education M/S/T (SEST)**

Students must complete the M/S/T Core and a Specialization:

TST 161/Creative Design  
MAT 127/Calculus A  
ETE 131/Engineering Math (counts toward NJDOE Middle School Math Endorsement)  
PHY 201/General Physics I *or* SCI 103/Physical, Earth, and Space Sciences  
Two additional approved science courses  
ETE 261/Multimedia Design  
ETE 271/Structures and Mechanics  
MAT 105/ Mathematical Structures and Algorithms for Educators I  
TED 460/Integrated M/S/T for the Child/Adolescent Learner  
One M/S/T approved electives.

The Technology Specialization also requires four additional units from among the following (*with at least three at the 300 level or higher*):

ETE 111/Engineering Design  
ETE 275/Mechanics and Materials  
ETE 281/Analog Circuits and Devices,  
ETE 341/Environmental & Biotechnical Systems  
ETE 361/Architectural and Civil Engineering Design  
ETE 371/Mechanical Systems Design  
ETE 381/Digital Electronics  
ETE 461/Manufacturing Systems,  
ETE 492/Facilities Design and Management.

Through the M/S/T with a Technology Specialization, students can qualify for endorsements in middle school mathematics and science by completing 15 credits (=3.75 course units) in each discipline and an endorsement in Technology Education by completing 30 credits (=7.5 course units) in required courses including 12 credits (=3 course units) at the 300 level or above and passing the technology education PRAXIS exam.

### **Suggested Course Sequence**

#### **M/S/T—Freshman Year (by advisement)**

|       |  |               |
|-------|--|---------------|
| FSP   | First Seminar  | 1 course unit |
| MAT   | 127/Calculus A   | 1 course unit |
| TST   | 161/Creative Design  | 1 course unit |
| ETE   | 261/Multimedia Design                                      | 1 course unit |
|       | Science Option #1 (by advisement)                          | 1 course unit |
| MAT   | 105/Mathematical Structures and Algorithms for Education I | 1 course unit |
| M/S/T | Major Option (by advisement)                               | 1 course unit |
| WRI   | 102/Academic Writing (if not exempt)*                      | 1 course unit |

*\*It is recommended that students exempted from this course take another liberal learning course.*

**Total for year 8 course units**

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### **Technology Minor**

The minor consists of five units:

TST 161/Creative Design

Select four of the following courses (at least one 300-level course):

ETE 111/Engineering Design

ETE 131/Engineering Math (counts toward NJDOE Middle School Math Endorsement)

ETE 261/Multimedia Design

ETE 271/Structures and Mechanics

ETE 275/Mechanics & Materials

ETE 281/Analog Circuits and Devices

ETE 341/Environmental & Biotechnical Systems

ETE 361/Architectural and Civil Engineering Design

ETE 381/Digital Electronics

ETE 461/Manufacturing Systems