

# B.S. in Engineering Technology, Surveying Engineering Technology

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(120 credit minimum)

Surveying involves activities such as mapping the earth above and below sea level; determining the position of the boundaries of public or private land including national and international boundaries; providing geospatial information necessary for the construction of private and public works; designing, establishing and administering of land and geographic information systems (LIS/GIS) and the integration of the data within those systems; positioning and monitoring of physical features, structures and engineering works; planning, development and re-development of property whether urban or rural; determining facts about the size, shape and gravity field of the earth; conducting hydrographic surveys for marine and coastal infrastructure development; and conducting high precision measurements for worldwide control networks and for industrial applications and scientific studies. The surveyor utilizes a wide variety of techniques and equipment on the job. Some of the equipment is terrestrial-based, other equipment is air- and space-borne.

The Surveying Engineering Technology (SET) curriculum stresses the technical, theoretical and legal aspects of surveying. Technical surveying courses include theory and application of Global Position Systems (GPS) and Geographic Information Systems (GIS). Law or Law-related courses are integrated into the program in order to impart to students the legal knowledge and legal responsibility of a land surveyor.

***This program is accredited by The Engineering Technology Accreditation Commission (ETAC of ABET), <http://www.abet.org>.*** Graduates of this program are eligible to sit for the Professional Engineer's examination in New Jersey with the appropriate experience, as determined by the New Jersey Board of Professional Engineers and Land Surveyors. (<http://www.njconsumeraffairs.gov/pels/>). Graduates of the program are also eligible to pursue graduate degrees in Geodesy, Remote Sensing, and Mapping and students may participate in the BS/MS Program (<http://www.njit.edu/graduatestudies/program-options/bs-ms/index.php> (<http://www.njit.edu/graduatestudies/program-options/bs-ms/>)).

The full four-year curriculum for the program is shown below. Students who wish to enter the program as a transfer student are typically students with an AAS. degree in Civil or Construction Engineering Technology or Computer Science and should have completed most or all of the courses, or their equivalents, in the first two years of the program as shown below. In the case of all students, both four-year and transfer, a minimum of **120 credits is required for graduation**.

## Program Educational Objectives

- Graduates will become licensed surveyors and/or GIS specialists.
- Graduates will be able to take on supervisory roles in their firms. Some graduates will start their own surveying practice.
- Graduates will be able to apply and expand upon their undergraduate-level surveying preparation. This will be accomplished through continuing education and becoming involved in regional and national professional societies such as NJSPLS and ACSM.

## Student Outcomes

- an ability to select and apply the knowledge, techniques, skills, and modern tools of their disciplines to broadly-defined engineering technology activities
- an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
- an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
- an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
- an ability to function effectively as a member or leader on a technical team
- an ability to identify, analyze, and solve broadly-defined engineering technology problems
- an ability to apply written, oral and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- an understanding of the need for and an ability to engage in self-directed continuing professional development
- an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
- a knowledge of the impact of engineering technology solutions in a societal and global context
- a commitment to quality, timeliness, and continuous improvement
- an ability to utilize modern measurement technologies to acquire spatial data,
- an ability to utilize industry-standard software to solve technical problems,
- an ability to apply technical concepts to the design and implementation of measurement systems to meet project requirements,

- an ability to design and implement procedures, and analyze data for conformance with precision and accuracy requirements, and
- an ability to carry out or supervise surveying activities and processes such as measurements, positioning, mapping, boundary determination, and geographic/land information systems.

**First Year**

<b>1st Semester</b>		<b>Credits</b>
CS 106	Roadmap to Computing for Engineers	3
HUM 101	English Composition: Writing, Speaking, Thinking I	3
MATH 111	Calculus I	4
PHYS 111	Physics I	3
PHYS 111A	Physics I Lab	1
ET 101	Introduction to Engineering Technology	0
FRSH SEM	First-Year Seminar	0
Term Credits		14

**2nd Semester**

Select one of the following:		3
EVSC 125	Fundamentals of Environmental Sciences	
CHEM 121	Fundamentals of Chemical Principles I	
BIOL 200	Concepts in Biology	
HUM 102	English Composition: Writing, Speaking, Thinking II	3
MATH 112	Calculus II	4
PHYS 121	Physics II	3
PHYS 121A	Physics II Lab	1
MET 103	Engineering Graphics and Intro. to CAD	2
Term Credits		16

**Second Year****1st Semester**

MGMT 290	Business Law I	3
Math Elective <sup>1</sup>		3
Computer Science/Technology/Engineering Elective <sup>2</sup>		3
SET 200	Introduction To Geomatics	3
SET 200A	Introduction to Geomatics Lab	1
SET 207	Evidence and Procedures for Property Surveys	3
Term Credits		16

**2nd Semester**

MATH 305	Statistics for Technology	3
ECON 201	Economics	3
or EPS 202	or Society, Technology, and the Environment	
History and Humanities GER 200 level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/</a> )		3
SET 280	Marine Surveying	4
Computer Science/Technology/Engineering Elective <sup>2</sup>		3
Term Credits		16

**Third Year****1st Semester**

SET 304	Adjustment Computations I	3
SET 307	Boundaries and Adjacent Properties	3
CE 321	Water Resources Engineering	3
ENG 352	Technical Writing	3
SET 301	Route Surveying	4
Term Credits		16

**2nd Semester**

SET 302	Geodetic Control Surveying	4
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SET 303	Photogrammetry and Aerial Photo Interpretation	4
SET 360	Digital Surveying Methods	3
History and Humanities GER 300+ level ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-300-level/</a> )		3
Term Credits		14
<b>Fourth Year</b>		
<b>1st Semester</b>		
SET 404	Adjustment Computations II	3
SET 420	Geographic/Land Information Systems	4
Computer Science/Technology/Engineering Elective <sup>2</sup>		3
Free Elective		3
Term Credits		13
<b>2nd Semester</b>		
SET 401	Fundamentals Of Geodesy	3
SET 407	Boundary Line Analysis	4
SET 490	Senior Project in Surveying	2
SET 440	Land Development	3
Humanities and Social Science Senior Seminar GER ( <a href="http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/">http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/hss-capstone/</a> )		3
Term Credits		15
Total Credits		120

<sup>1</sup> MATH 337 (<http://catalog.njit.edu/search/?P=MATH%20337>) Linear Algebra is recommended. Acceptable alternatives are MATH 211 Calculus III A, MATH 213 (<http://catalog.njit.edu/search/?P=MATH%20213>) Calculus III B, MATH 226 (<http://catalog.njit.edu/search/?P=MATH%20226>) Discrete Analysis, MATH 240 (<http://catalog.njit.edu/search/?P=MATH%20240>) Numerical Mathematics Laboratory.

<sup>2</sup> List of Approved Computer Literacy and/or Technology Elective  
 IS 265 - Introduction to Information Systems  
 IS 465 - Advanced Information Systems  
 CS 331 – Database Systems Design and Management  
 CS 435 - Advanced Data Structures and Algorithm Design  
 SET 403 - Remote Sensing Principles for Geomatics

Other Technical/Engineering Elective

Civil/Environmental/Engineering, Construction Engineering Technology, Computer courses

*This curriculum represents the maximum number of credits per semester for which a student is advised to register. A full-time credit load is 12 credits. First-year students are placed in a curriculum that positions them for success which may result in additional time needed to complete curriculum requirements. Continuing students should consult with their academic advisor to determine the appropriate credit load.*