Surveying is a crucial part of land development. Professional Surveyors must have a Bachelor of Science in Civil Engineering or Surveying and Mapping, and often work closely with architects and builders to produce precise surveys and maps of surface features of the earth. Surveyors can choose from many specialties and get involved at many stages of a project. Students who pursue a Surveying and Mapping minor will gain an understanding of global positioning; analyzing spatial data; digital map production and electronic data collection; survey software applications, boundary surveying and construction layout techniques. Students interested in pursuing a career in professional land surveying should consider completing the Surveying and Mapping minor. Completion of the minor, in combination with a BS-Civil Engineering degree, will enable students to sit for their Fundamentals of Surveying Exam in the State of Ohio and pursue licensure as a Professional Surveyor.

**Prerequisites for Surveying and Mapping Minor**

*Must be completed prior to beginning the minor program:*
- CIVILEN 2410 – Introduction to Surveying

**Requirements for Surveying and Mapping Minor**

*Credit hour requirement: 19 credit hours*

**Required Courses**
- All courses below must be completed
  - CIVILEN 2090 – Professional Aspects (1hr)
  - CIVILEN 5410 – Engineering Surveying (3hrs)
  - CIVILEN 5411 – Legal Aspects of Surveying (4 hrs)
  - CIVILEN 5412 – Land Boundary & Dev. Princ. (4hrs)
  - CIVILEN 5441 – Intro to GPS (3hrs)
  - CIVILEN 5461 – Geospatial Numerical Analysis (4hrs)

**Courses and Electives of Minor**

All courses listed below must be completed for the minor. Many of the courses are only offered once per year. Civil Engineering students may double-count 6 (six) credit hours from the minor with the technical elective portion of their engineering degree program.

POI = student may need Permission of Instructor for enrollment if prereq. is not part of major curriculum
(c) = concurrent requisite

### Course Offering Term

<table>
<thead>
<tr>
<th>Autumn Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVILEN 2410 and 2090</td>
<td>CIVILEN 2090</td>
</tr>
<tr>
<td>CIVILEN 5410</td>
<td>CIVILEN 5412</td>
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<tr>
<td>CIVILEN 5411</td>
<td>CIVILEN 5441</td>
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<tr>
<td>CIVILEN 5461</td>
<td></td>
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</tbody>
</table>

**Surveying and Mapping minor program guidelines**

*Required for graduation:* No

*Credit hours required:* A minimum of 19 credit hours is required to complete the Surveying and Mapping minor. 1000-level course shall not be counted in the minor.

*Transfer and EM credit hours allowed:* No more than 6 (six) of the credit hours required for the minor can come from transfer or EM credit.

*Overlap with the major:*  
- The minor must be in a different subject that the major  
- The minor must contain a minimum of 12 hours distinct from the major and/or additional minor(s).

*Double-counting:* Students in Civil Engineering are permitted to double-count up 6 (six) credit hours from the minor with the technical elective portion of their engineering degree program.

*Grades required:*  
- Minimum C- for a course to be listed in the minor program  
- Minimum 2.0 cumulative point-hour ratio (CPHR) required for the minor  
- Course work graded Pass/Non-Pass cannot count towards the minor

*Minor approval/changing the minor:* A student who completes the minor following the requirements need only file their college’s minor program form with their academic advisor or college office. Any changes must be approved by the Department of Civil, Environmental and Geodetic Engineering

*Filing the minor program form:* The minor program form must be filed at least by the time the graduation application is submitted to the students’ respective department.

### Course Offering Term

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Hours</th>
<th>Pre-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVILEN 2090</td>
<td>Professional Aspects of Civil and Environmental Engineering</td>
<td>1</td>
<td>Enrollment in Civil or EnvEng major.</td>
</tr>
<tr>
<td>CIVILEN 2410</td>
<td>Introduction to Surveying</td>
<td>3</td>
<td>Pre-req or concurrent CIVILEN 2050</td>
</tr>
<tr>
<td>CIVILEN 5410</td>
<td>Engineering Surveying</td>
<td>4</td>
<td>Pre-req CIVILEN 2410 and enrollment in CivilEn major or POI</td>
</tr>
<tr>
<td>CIVILEN 5411</td>
<td>Legal Aspects of Surveying</td>
<td>4</td>
<td>Pre-req CIVILEN 2410 and enrollment in CivilEn major or POI</td>
</tr>
<tr>
<td>CIVILEN 5412</td>
<td>Land Boundary and Development Principles</td>
<td>4</td>
<td>Pre-req 5411 and enrollment in CivilEn major or POI</td>
</tr>
<tr>
<td>CIVILEN 5441</td>
<td>Introduction to GPS: Theory and Application</td>
<td>3</td>
<td>Math 1172 or 1544 or 2153 and Jr. standing or above; or Grad standing; or POI</td>
</tr>
<tr>
<td>CIVILEN 5461</td>
<td>Geospatial Numerical Analysis</td>
<td>4</td>
<td>Pre-req CIVILEN 2410, or Grad standing or POI</td>
</tr>
</tbody>
</table>

Contact: The Department of Civil, Environmental and Geodetic Engineering (ceg.osu.edu)
470 Hitchcock Hall, 2070 Neil Ave. Columbus, OH 43210 (614) 292-2771