

Springfield Technical Community College  
Academic Affairs

Course Number: CET- 160 Class/Lect. Hours: 3 Lab Hours: 0 Credits: 3 Dept.: Civil Engineering Technology

Course Number Title: **Engineering and Construction Documentation and Takeoff** Semester: Fall Year: 2020

**Course Description, Prerequisite, Corequisite:** An introduction to industry-standard documentation used in civil engineering and construction. Students will develop the ability to interpret and analyze professionally prepared documents for buildings, bridges, and road and highway projects. Students will take measurements from both digital and paper documents and develop quantities of needed materials needed for various projects.

**OBJECTIVES/COMPETENCIES**

Course Objectives	Competencies
<p>Upon completion of this class, the student will be able to:</p> <ul style="list-style-type: none"> <li>• Interpret engineering and construction drawings to determine material quantity take-offs for horizontal and vertical construction</li> <li>• Determine the quantities of sitework, concrete, masonry, steel, and rough carpentry</li> <li>• Understand how the quantities are used for construction project cost estimates</li> <li>• Create construction project cost estimates</li> <li>• Apply digital technology to manage the construction process</li> </ul>	<ul style="list-style-type: none"> <li>▪ Organize, analyze, and read engineering and construction drawings, plans, and prints</li> <li>▪ Understand the importance of an accurate quantity takeoff of materials required for construction materials like concrete, masonry, metals, and wood</li> <li>▪ Identify specifications on engineering and construction drawings, plans, and prints</li> <li>▪ Apply basic mathematics to engineering and construction drawings plans, and prints to calculate, convert, and report units of measure for materials</li>   <li>▪ Learn basic methods for estimating site clearing, excavation, and grading.</li> <li>▪ Estimate the cost of road and highway construction.</li> <li>▪ Estimate the cost of reinforced and non-reinforced concrete slabs, walls and foundations</li> <li>▪ Learn basic construction methods and materials used in masonry construction.</li> <li>▪ Learn basic methods of estimating quantities of materials for rough and finished frame construction</li>   <li>▪ Develop a quantity takeoff of materials through manuals and digital methods as required for the development of a complete construction cost estimate</li> <li>▪ Perform estimating and quantity takeoff for concrete, masonry, metals, and wood</li> <li>▪ Develop and present an engineering project estimate utilizing spreadsheet software</li> <li>▪ Develop an understanding of types of construction contracts and bidding methods</li> </ul>