

## STANDARDIZED COURSE OUTLINE

### SECTION I

**SUBJECT AREA AND COURSE NUMBER:** CTC 140

**COURSE TITLE:** Construction Graphics/Quantity Takeoff

**COURSE CATALOG DESCRIPTION:**

Understand and interpret construction documents for building and heavy construction. Focus of course will be on the analysis of architectural and structural drawings and specifications. Understand quantity take-off processes and conduct take-offs of site work, concrete, rough carpentry, light -gage steel construction, masonry, steel, sheathing and interior finishes.

**LECTURE HOURS PER WEEK:** 2

**CREDIT HOURS:** 3

**LAB HOURS PER WEEK :** 2

**PREREQUISITE(S):** CSA 105

### SECTION II

**A. SCOPE:**

This course covers an introduction to print reading, interpretation, technical terms, graphic symbols, reading measuring tools (English and metric units and conversion), sketching/drawing, scales/dimensions, specifications and materials. Additional topics include reading, interpreting, and doing material quantity takeoffs of site drawings, foundations, structural concrete, masonry construction, structural steel, wood framing, roofing/moisture protection, and interior/exterior finishes. A brief introduction to reading/interpreting mechanical/electrical/plumbing drawings is included. The students learn the manual methodologies for computing material quantities and then learn to use application software for electronic takeoff.

**This course fulfills a Designated Core Competency in the area of Quantitative Reasoning (QR) and an Embedded Core Competency in the area of Critical Analysis (CA )**

**B. REQUIRED WORK:**

Work varies by instructor. Students will be expected to do all required readings, assignments, tests, quizzes, and homework as outlined by their instructor.

**C. ATTENDANCE AND PARTICIPATION:**

Regular attendance, assignment submission timeliness, promptness and class/lab participation will be expected. Instructors will include specific attendance and participation policies requirements in their class syllabi.

**D. METHODS OF INSTRUCTION:**

Methods may include any of the following: lecture, lecture/discussion, demonstrations, use of classroom audiovisual and computer presentation materials, "On Screen Takeoff" and/or other takeoff software.

## E. OBJECTIVES, OUTCOMES, and ASSESSMENT

Students' grades will be based on achievement of learning the objectives and outcomes listed below as measured by the instructor's methods of assessment:

<b>LEARNING OBJECTIVES</b>	<b>LEARNING OUTCOMES</b>	<b>ASSESSMENT METHODS</b>
<b>To demonstrate an understanding of:</b>	<b>Student will:</b>	<b>As measured by:</b>
Orthographic, perspective, and isometric drawings	Interpret, draw/sketch orthographic, perspective, and isometric drawings	Homework/Lab assignments; Written and Oral Exercises; Quizzes and Exams
Building materials and systems	Identify and construct drawings of building materials commonly used, their characteristics and applications ( QR 1)	Homework/Lab assignments; Written and Oral Exercises; Quizzes and Exams
Various construction systems	Produce detailed drawings of footings, foundations, columns, beams, joists, wall construction, etc., built in various materials and interpret and evaluate the drawings for accuracy and reasonableness	Homework/Lab assignments; Written and Oral Exercises; Quizzes and Exams
Architectural (A), Structural(S), Mechanical (M)and Electrical (E) drawings	Interpret A, S, M, and E drawings and apply the information to the construction process (QR 3,CA 1)	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams
Site work and Excavation Calculations	Calculate linear excavations using the Average End Area method Calculate mass area excavations using the Average Depth Method (and scaled up using grid method) Convert quantities between banked, compacted, and loose earth conditions and evaluate the results obtained from calculations for accuracy and reasonableness ( QR 4)	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams;
Concrete Quantity Calculation	Compute volume for various geometric shapes in CF or CY	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams;
Masonry Quantity Calculation	Compute SF of wall construction and veneer Compute LF of joint reinforcing Compute LF of Lintels	Homework/Lab assignments; Written and Oral Exercises; Quizzes and Exams;

Steel Quantity Calculation	Compute ton of structural steel columns, beams, edge form angles Compute quantities of Open Web Joists, bridging steel, end welds Compute SF of metal decking	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams;
Rough carpentry Quantity Calculation	Compute quantities of lumber in cubic inches and board feet Compute quantities of sheathing in SF and by sheets	Homework/Lab exercises; Written and Oral exercises; Quizzes and Exams;
Gypsum Board Quantity Calculation	Compute quantities of sheet rock in SF and by sheets. Compute quantities of tape, joint compound, and screws (QR 2)	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams;
Construction Estimating Software	Use software to compute material quantities and produce an estimate. Explain how the data was obtained and evaluate the results for accuracy (CA3)	Homework/Lab assignments; Written and Oral exercises; Quizzes and Exams, Final project

**F. TEXT(S) AND MATERIALS:**

**Text Books:** Brown, W.C., *“Print Reading for Construction—Residential and Commercial”*. (2005) ISBN: 13-978-1-59070347-2. Goodhart-Wilcox, IL, USA. Note: Comes with a set of plans (116 plans).

Cook, Paul J., *“Quantity Takeoff for Contractors”*. (1989) ISBN: 0876292686, R. S. Means, MA, USA. Note: Only photocopies are available.

**Required Materials:** Architect’s and Engineer’s scales, calculator.

**Recommended Materials:** Color pencils or markers.

**G. INFORMATION TECHNOLOGY:**

Microsoft Word and Excel “On Screen Takeoff” software .