

1. *Course number and name*
ENGR 235: Surveying
2. *Credits and contact hours*
3 credit hours; two 50-minute lecture sessions and one 150-minute laboratory session/week
3. *Instructor's or course coordinator's name*
Instructor: Ghassan Tarakji, Professor of Civil Engineering

Course coordinator: Ghassan Tarakji, Professor of Civil Engineering
4. *Text book, title, author, and year*
McCormac, Jack. *Surveying*. 6th ed. John Wiley and Sons, 2012.

d. other supplemental materials
Tarakji, G. *Surveying Laboratory Manual*. San Francisco State University, 2016.
5. *Specific course information*
 - a) *brief description of the content of the course (catalog description)*
Surveying: distance, elevation, and direction measurements; traverse analysis; contours; topography; areas calculations. Introduction to GPS and GIS. The US public lands system.
 - b) *prerequisites or co-requisites*
ENGR 100: Introduction to Engineering
MATH 226: Calculus I (Graphs. Differentiation: theory, techniques, and applications. Integration: Fundamental Theorem of Calculus and applications. Transcendental functions)
 - c) *indicate whether a required, elective, or selected elective course in the program*
Required for Civil Engineering
6. *Specific goals for the course*
 - e. *specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.*
 - Students will demonstrate an understanding of the tools and applications of surveying in civil engineering and construction.
 - Students will demonstrate an understanding of gross, systematic, and random errors.
 - Students will demonstrate that they are able to perform distance measurements and to perform the necessary corrections to these measurements.
 - Students will demonstrate that they are able to perform elevation measurements and to perform the necessary corrections to these measurements.
 - Students will demonstrate that they are able to perform direction measurements and to perform the necessary corrections to these measurements.
 - Students will demonstrate the ability to calculate the area of a traverse.
 - Students will demonstrate that they can perform traverse analysis and corrections.
 - Students will demonstrate an understanding of the concepts of GPS and GIS, and the applications of these two systems in the practice of surveying.
 - Students will demonstrate an understanding of the US Public Lands System.

- Students will demonstrate their ability to complete a project that includes both surveying data collection and computations.

f. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

Course addresses ABET Student Outcome(s): [list outcomes by letter].

N/A

7. *Brief list of topics to be covered (Tentative)*

- Introduction and background
- Distance measurement and correction
- Differential and profile leveling
- Angles and directions
- Traverse analysis
- Contours and topography
- Area calculations
- Introduction to GPS
- Introduction to GIS
- U.S. public lands system
- Project

Brief list of laboratory experiments to be covered (Tentative)

- Swift Measurements (pacing and rolling wheel) and referencing points
- Stadia distance measurement
- Precise taping
- Leveling along a loop
- Profile leveling
- Closing the horizon using the theodolite
- Measurement of interior angles using the theodolite
- Traverse measurements using total station
- Staking out points using total station
- Traverse analysis