



AMERICAN SOCIETY OF CIVIL ENGINEERS

Survey

April 6-8, 2017

hosted at University of California Irvine

## Event Description

There will be three main surveying tasks to be performed within 45 minutes. In the first two tasks students must use their skills in land surveying and knowledge of basic trigonometry. In the first task, teams must determine the distance between two points, A and B, the elevations of each of the points, A and B, and the bearing of the line AB. In the second task, teams will have to determine the elevation of a remote (inaccessible) building. The third task will consist of tape measurement over a varying terrain. Additionally, teams have the option to gain extra points through a timed instrument setup competition if they complete all scheduled tasks in the allotted 45 minutes. All three tasks need to be completed within a 45-minute block, with the extra credit task only for those teams who have already completed the three main tasks and wish to participate in the extra points competition.

## Objective

To evaluate team member's knowledge and understanding of land surveying equipment and techniques, as well as basic trigonometry in a timed setting

## Participant Rules

- Each University may enter only one team.
- Teams must be comprised of 4 members.
- Everyone on the team must be a registered participant of the PSWC 2017.
- The team must have at least one underclassman.
- The team must have at least one female.

## General Rules

1. Bearing, Distance, and Elevation
  - a. Using a total station, the team of four will need to determine the bearing and distance between two points and the elevation of each of the points. The team must first determine the location of each of the two points using given bearings and distances from a fixed back site point. Both a reflector and stakeout pole will be supplied to each team. Teams can spend up to a maximum of 20 minutes on this event.
2. Remote Building Elevation

- a. Teams will work to find the elevation of a building or other object from a remote location. A benchmark will be furnished. A single point observation is allowed. Total stations are permitted as long as it is not a reflectorless model.
3. Tape Measuring
    - a. The team of 4 will use a measuring tape no longer than 100 feet and of any material of their choice to measure the distance between two points over a varying terrain.
  4. Instrument Setup (Extra Points Competition)
    - a. From every team, 1 member may participate. Participant will be timed on how fast he/she can set up a tripod. All 3 legs of the tripod will be retracted in the shortest position and locked inside a bag prior to the start. Timing will begin once the judge signals the start. The participant must level the theodolite with optical plummet set on the tripod over a given plummet point. All teams will use the same theodolite provided at the start. The 3 teams with the best time will receive extra points according to the scoring below.

#### Instruments Allowed

- Total Station (can't be reflectorless)
- Tripod
- Level rod
- Measuring tape (no longer than 100 feet, any material is allowed)
- Pocket tape
- Plumbobs (Maximum 2)
- Non-programmable calculator (EIT qualifying)
- Two handheld 2-way radios

## Scoring

Every task will be scored based on accuracy, field book neatness and presentation. In case of a tie in the overall score among teams, the tie will be broken by submission times of the surveyor's field book.

1. Bearing, distance, and elevation:

a. Accuracy:

- i. First Place: 50 Points
- ii. Second Place: 40 Points
- iii. Third Place: 30 Points
- iv. Fourth Place: 20 Points
- v. Fifth Place: 10 Points
- vi. Participation: 5 Points

b. Field Book:

- i. First Place: 25 Points
- ii. Second Place: 20 Points
- iii. Third Place: 15 Points
- iv. Fourth Place: 10 Points
- v. Fifth Place: 5 Points

2. Remote Building Elevation:

a. Accuracy:

- i. First Place: 50 Points
- ii. Second Place: 40 Points
- iii. Third Place: 30 Points
- iv. Fourth Place: 20 Points
- v. Fifth Place :10 Points
- vi. Participation: 5 Points

b. Field Book:

- i. First Place: 25 Points
- ii. Second Place: 20 Points
- iii. Third Place: 15 Points
- iv. Fourth Place: 10 Points
- v. Fifth Place: 5 Points

c. Tape Measurement:

- i. Accuracy:
    - 1. First Place: 50 Points
    - 2. Second Place: 40 Points
    - 3. Third Place: 30 Points
    - 4. Fourth Place: 20 Points
    - 5. Fifth Place :10 Points
    - 6. Participation: 5 Points
  - ii. Field Book:
    - 1. First Place: 25 Points
    - 2. Second Place: 20 Points
    - 3. Third Place: 15 Points
    - 4. Fourth Place: 10 Points
    - 5. Fifth Place: 5 Points
- d. Instrument Setup (extra points competition):
- i. The three teams with the fastest instrument setup times will receive extra points as follows
    - 1. First Place: 15 points
    - 2. Second Place: 10 points
    - 3. Third Place: 5 points