AGEN 135  
Construction Surveying  
Fall 2017  

Third Examination Study Guide  
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- Understand how to work with map (plan) scale in its different forms and how to use scale in both location and layout surveys.  
- Understand what is unique about topographic maps and how to interpret them.  
- Know what contour lines correspond to and how these provide an idea of topography.  
- Understand how to read contour lines.  
- Understand how to use trigonometric functions whenever needed.  
- Define trigonometric leveling and when it is used.  
- Understand the steps involved in trigonometric leveling.  
- Understand stadia principles and how to make distance measurements using stadia lines, both with a level and an inclined telescope.  
- Know the terms hi, HI, RR, and RI (RI=TW-BW) as well as how these are used to determine elevations and distances in stadia measurements.  
- Know how to solve problems involving stadia measurements and trigonometric leveling.  
- Define GPS and know what does it stands for.  
- Know the three segments of GPS and how these segments function.  
- Know how a GPS receiver determines its position.  
- Know the key to measuring distances from satellites using GPS.  
- Understand how to apply GPS in surveying.  
- Understand the use of EDM and total stations.  
- Understand the differences among electronic theodolites and total stations.  
- Understand the use of EDM instruments with reflectorless technology.  
- Find horizontal angles when given a list of data from a repeating theodolite.  
- Know how to work with vertical angles and how they are referenced in transits, theodolites, and total stations (horizontal, zenith, and nadir).  
- Know how to work with closed and open traverses.  
- Understand the methods for measuring angles or line directions in traverse surveys.  
- Know why, when, and how deflection angles are measured.  
- Know and be able to use formulas for the sum of interior angles [i.e., (n-2)\(\times\)180°].  
- Define the difference between true and magnetic north.  
- Understand magnetic declination and how it changes over time and location.  
- Establish a direction of a line if given a bearing.  
- Establish a direction of a line if given an azimuth.  
- Convert among bearings, reverse bearings, azimuths, and reverse azimuths.  
- Compute the bearings and/or azimuths for lines in a traverse (open or closed) given pertinent angles and distances of the lines and the direction of one of the lines.  
- Understand how to adjust interior angles for an open traverse.
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Third Examination
Equations Sheet

1 ch = 100 links = 66 ft = 4 rods
1° = 60'; 1' = 60"; 1° = 3600"
1 yd = 3 ft
1 m = 3.2808 ft

1 mi = 5280 ft = 1.609 km
1 ac = 43,560 ft²
1 ft = 12 in

\[ \sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \]

\[ \cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \]

\[ \tan \theta = \frac{\text{opposite}}{\text{adjacent}} \]

\[ \text{hypotenuse}^2 = \text{opposite}^2 + \text{adjacent}^2 \]

\[ \text{Grade} = \tan \theta = \frac{\text{rise}}{\text{run}} = \frac{\text{opposite}}{\text{adjacent}} \]

\[ \Sigma \text{of angles} = (n - 2) \cdot 180° \]

\[ S = (TW - BW) \cdot 100 \cdot \cos \theta \]

\[ H = S \cdot \cos \theta \]

\[ V = S \cdot \sin \theta \]

\[ \text{Elev}_B = HI \pm V - RR_B \]