

## SE 212 Spatial Measurements

<b>Credit and Contact hours</b>	3 / 2 (Lectures), 1 (Tutorials), 2 (Laboratory)	
<b>Required, or Elective</b>	Required for a BSCE degree	
<b>Course Description</b>	Introduction & definitions; surveying types & importance, measurements units; basics of Linear Measurements (tape, optical & electronic); theodolites & angular measurements; levels & levelling operations; applications of levelling (contouring); planimetric (cross-sectional area & volume determination); introduction to total station; setting out; introduction to underground surveying; introduction to photogrammetry & remote sensing.	
<b>Prerequisites or Co-requisites</b>	Math 107	
<b>Course Learning Outcomes</b>	Students completing this course successfully will be able to	
	<b>Course Learning Outcomes</b>	<i>Related Student Outcomes (SO)</i>
	<b>CLO1.</b> Compute corrected horizontal distances and planimetric areas from land (direct and indirect methods), aerial and space survey data.	<b>SO1</b>
	<b>CLO2.</b> Compute reduced levels and earthwork volume from field data and plotted sections or contours	<b>SO1</b>
	<b>CLO3.</b> Conduct field measurements and analyze the data accuracy to produce detailed maps that can be interpreted.	<b>SO6</b>
<b>Student Outcomes</b>	<p><b>SO1.</b> an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics, and using modern engineering tools [ABET 1].</p> <p><b>SO 6.</b> an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</p>	

<b>Topics Covered</b>	<b>List of Topics</b>	<b>Related CLOs</b>
	Introduction: Definitions, Types of Surveying, Tasks	CLO1
	Direct Distance Measurements	CLO1
	Types of errors and corrections	CLO1
	Collection of field data using ground survey instruments.	CLO3
	Plotting planimetric maps using field collected data and map scale	CLO3
	Planimetric area determination from maps and field measurements	CLO1
	Differential Levelling	CLO2
	Longitudinal, cross-sectional sections and volume computation	CLO2
	Grid levelling and volume computation	CLO2
	Contouring and volume determination	CLO2
	Introduction to Theodolites, EDM and Total Station	CLO3
	Indirect distance measurements using theodolites, EDM and Total station.	CLO1
	Introduction to Space-based measurements: Photogrammetry, RS and GPS	CLO1
<b>Textbook(s) and Other Required Material</b>	<ol style="list-style-type: none"> <li>"Introduction to Geomatics" by: P. Wolf and C. D. Ghilani</li> <li>"Surveying: with construction Applications " by: Barry F. Kavanagh. Prentic Hall, Columbus, Ohio, USA.</li> </ol>	
<b>Grading System</b>	Tutorials problems and attendance    10% 2 Field work reports                            20% 2 Mid-Terms                                        30% Final Exam                                         40%	
<b>Instructors</b>	Dr. Ashraf Farah (2A73); email: <a href="mailto:afarah@ksu.edu.sa">afarah@ksu.edu.sa</a>	
<b>Date of Review</b>	November, 2020	