Surveying Engineering Program
Department of Civil Engineering
College of Engineering
King Saud University

SE 422 Advanced Photogrammetry

Credit and Contact hours	3 / 2 (Lectures), 2 (Laboratory)
Required, or Elective	Required for a BSCE degree
Course Description	Coordinates systems in photogrammetry; coordinates transformation; measured photo coordinates refinements; mathematical models used in analytical photogrammetry; analytical relative & absolute orientations; analytical stereoplotters & map production; Introduction to terrestrial photogrammetry; mathematical models in terrestrial photogrammetry; automatic terrestrial photogrammetry; computer applications.
Prerequisites or Co-requisites	SE 331
Course Learning Outcomes	Students completing this course successfully will be able to

Course Learning Outcomes	***Related Student Outcomes (SO)***
CLO1: Compute refined and transformed photo-coordinates to be used in analytical photogrammetric models	**SO1**
CLO2. Use derived linearized collinearity equations to form analytical photogrammetric models: (space resection and analytical relative orientation).	**SO1**
CLO3. Compute survey data from terrestrial photos	**SO1**

Student Outcomes	**SO1**. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics, and using modern engineering tools.

<table>
<tr><td>Topics Covered</td><td>
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<tr><th>List of Topics</th><th>Related CLOs</th></tr>
<tr><td>Photogrammetric Coordinate Systems</td><td>CLO1</td></tr>
<tr><td>Measurement and refinement of image coordinates</td><td>CLO1</td></tr>
<tr><td>2D Conformal and Affine Transformation</td><td>CLO1</td></tr>
<tr><td>3D Conformal Transformation</td><td>CLO1</td></tr>
<tr><td>Collinearity Condition and Collinearity Equations</td><td>CLO2</td></tr>
<tr><td>Linearization of Collinearity Equations</td><td>CLO2</td></tr>
<tr><td>Space Resection with collinearity equations</td><td>CLO2</td></tr>
<tr><td>Stereo photogrammetric plotters: Types, Systems, Components and Operation (Orientation processes)</td><td>CLO2</td></tr>
<tr><td>Analytical Relative Orientation: Dependent and Independent methods</td><td>CLO2</td></tr>
<tr><td>Analytical Absolute Orientation</td><td>CLO2</td></tr>
<tr><td>Introduction to Terrestrial Photogrammetry</td><td>CLO3</td></tr>
<tr><td>Image coordinate system of oblique terrestrial photos</td><td>CLO3</td></tr>
<tr><td>Derivation of Survey information using terrestrial single and stereo photos</td><td>CLO3</td></tr>
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<tr><td>Textbook(s) and Other Required Material</td><td>Textbook: Paul, R. Wolf & Charles D. Ghilani, "Elementary Surveying: An Introduction to Geomatics" 14th Ed. 2014. Pearson.</td></tr>
<tr><td>Grading System</td><td>Homework 15%
Lab Reports 15%
2 Mid-Terms 30%
Final Exam 40%</td></tr>
<tr><td>Instructors</td><td>Dr. Mohammed D. Alheyf (2A18); e-mail: alheyf@ksu.edu.sa - (2nd Semester 20-21)</td></tr>
<tr><td>Date of Review</td><td>Nov. 2020</td></tr>
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