Texas A&M University - Corpus Christi  
College of Science and Technology  
Department of Computing Sciences  
Geographic Information Science Program  
Spring 2012

COURSE INFORMATION:
Course: GSEN 5385, Analytical-Digital Photogrammetry
Lecture: online
Instructor: Peter Kuntu-Mensah, Ph.D., CP.
Office: CBI 105, 361-825-3419, Email: peter.kuntu-mensah@tamucc.edu
Office hours: 2:30 – 4:15 p.m. M, 9:00 – 11: (or by appt)

COURSE DESCRIPTION:
A study of the mathematical and geometric models of modern photogrammetry. Covers principles of stereoscopic vision, collinearity, coplanarity, epipolar geometry, ground control densification and extension by analytical aerotriangulation. Explores automation in photogrammetric procedures - digital aerotriangulation, automated data capture.

PREREQUISITES:
Photogrammetry (GISC 4302) or instructor’s permission.

REQUIRED TEXT: “Elements of Photogrammetry with Applications in GIS”, 3rd ed, Paul R. Wolf and Bon Dewitt
http://www.surv.ufl.edu/wolfdewitt
Recommended Text: “Introduction to Modern Photogrammetry” by Edward Mkhaile, James Bethel, and Chris McGlone;
“Manual of Photogrammetry”, 2nd Ed. C. C. Slama, ASPRS

COURSE OUTLINE:
- Review of Basic Photogrammetric principles:
  What is Photogrammetry?
  Geometric Elements of Aerial photographs
  Image Parallax
  Measurement using photographs
  Ground control
  Orthophotographs
  Mission planning
  Photogrammetric instruments
• Analytical photogrammetry
  Comparators and point-transfer devices
  2D-, 3D coordinate transformation
  Distortions
  Collinearity
  Rotation matrices
  Single photo resection and rotation
  Two-photo intersection
  Aerotriangulation
  Constraints
  Calibration

• Digital Photogrammetry
  Digital Cameras
  Edge Detection
  Image matching
  Object Extraction
  DEM, Orthophoto generation
  Automatic Aerotriangulation
  GIS data capture

OUTCOME OBJECTIVES
• Students will understand the basic concepts of Photogrammetry and its utility in collecting geospatial data for various applications
• Students will assess the importance of ground controls in all facets of photogrammetric mapping
• Students will apply concepts of collinearity condition in Analytical Photogrammetry.
• Students will understand and apply Least Squares Adjustment and Computational aspects of Analytical and Digital Photogrammetry.
• Students will understand the basis for epipolar geometry, image matching and stereo image creation in softcopy photogrammetry
• Students will utilize the digital aerial photography in automating the creation of following products (mosiacs, othophotos, DEM, orthomaps, topographic map etc)

EVALUATION AND GRADE ASSIGNMENT:
Grading will be based on the following weighted averages

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>Homework Assignments</td>
<td>30%</td>
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<tr>
<td>Projects &amp; Research</td>
<td>25%</td>
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<tr>
<td>Mid term Exam</td>
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<tr>
<td>Final Exam</td>
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Grade Computation:

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<th>Grade</th>
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<td>≥80 and &lt;90</td>
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<tr>
<td>C</td>
<td>≥70 and &lt;80</td>
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D \geq 60 \text{ and } <70 \\
F \text{ } <60