WILLIAM RAINEY HARPER COLLEGE
BUSINESS AND SOCIAL SCIENCE DIVISION
GENERAL COURSE OUTLINE

Course Prefix	Course Number	Course Title	Lec-Lab	Semester Hours
GEG	162	Small Unmanned Aerial Systems (sUAS) Data Acquisition and Analysis	(2- 2)	3

COURSE DESCRIPTION

Introduces students to the basic theories and techniques used to capture, process, analyze, and present Small Unmanned Aerial Systems (sUAS) data. Topics will include sUAS data applications, image and sensor characteristics, mission planning and safety best practices, data acquisition, post processing, and fundamental analysis.

Prerequisite: GEG 161

TOPICAL OUTLINE

I. UAS Applications
- A. Mapping and remote sensing
- B. Environmental monitoring
- C. Local government (public works, public safety, emergency management)
- D. Precision agriculture
- E. Structural inspection
- F. Photography and videography
- G. Simulator based training

II. Sensor Types
- A. Visible light sensors
- B. Multispectral sensors
- C. Thermal sensors
- D. Infrared sensors
- E. Laser scanners (LiDAR)

III. Mission Planning and Safety Best Practices
- A. Preflight and postflight checks
- B. Flight planning and crew resource management
- C. Emergency procedures

IV. Data Acquisition
- A. Automated and pilot controlled flight paths
- B. Camera settings
- C. Image and video capture

V. Post-Processing
- A. Basic sUAS image and video editing
- B. Image processing for mapping applications
- C. Photogrammetry fundamentals for sUAS image processing
- D. Generating information products for GIS uses
- E. Processing imagery for 3D export

METHODS OF PRESENTATION

1. Lecture
2. Computer-based learning
3. Lab and field-based exercises

STUDENT OUTCOMES: *(The student should…)*

1. describe existing uses of sUAS applications in various industries and emerging trends.
2. understand the different applications of LiDAR in the UAS industry.
3. identify the appropriate sUAS sensors for different applications.
4. demonstrate an understanding of mission planning and safety best practices in sUAS operations.
5. demonstrate successful autonomous drone operation and image capture
6. demonstrate industry specific flight maneuvers on a flight simulator
7. apply post-processing techniques to create image, video, 3D, and mapping products sUAS data.

METHODS OF EVALUATION

Grades are based on demonstrated proficiency in subject matter. Proficiency is determined from:

1. Laboratory exercises
2. Exams
3. Homework
4. Final project

TEXTBOOK & INSTRUCTIONAL MATERIALS

Pix4D Mapper – Course Workbook. 1st Edition. Pix4D, 2020

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