Sinclair Community College
444 E. Third St.
Dayton, OH 45402

Master Syllabus

EET 1121 - UAS Remote Sensing & Analysis

Division: Science, Mathematics and Engineering

Department: Electronics Engineering Technology

Credit Hour Total: 1.0 **Lecture Hrs:** 1.0

Date Revised: October 2014

Course Description:

This course introduces the foundations of remote sensing and data analysis. Students will acquire knowledge of the characteristics of various sensors and remote sensing applications applicable to civil unmanned aerial system (UAS) operations. Emphasis is placed on data acquisition and processing.

General Education Outcomes:

- Critical Thinking/Problem Solving Competency
- Oral Communication Competency
- Written Communication Competency
- Values/Citizenship/Community Competency
- Information Literacy Competency

Course Outcomes:

Remote Sensing Technologies
Demonstate a practical understanding of remote sensing systems, their respective capabilities, and their relationship to Unmanned Aerial Systems (UAS).

Assessment Method: Locally developed exams
Performance Criteria:

70% or higher

Data Analytics
Describe the consideration, tools and products related to the processing of Unmanned Aerial Systems (UAS) collected data.

Assessment Method: Locally developed exams
Performance Criteria:

70% or higher

Real World Applications
Provide a technical overview of Unmanned Aerial Systems (UAS) -based remote sensing technologies and the applicability of collected data to help solve real world problems.

Assessment Method: Locally developed exams
Performance Criteria:

70% or higher

Outline:

• Brief history of Remote Sensing• Electromagnetic spectrum overview• Mapping Cameras: Understanding of lenses, physics of light and cameras, other photography concepts, such as ISO, shutters, exposure time etc.• Overview of Photogrammetry• Aerial mapping and orthorectification • Overview of computer vision photogrammetry• Traditional Platforms used for Aerial Acquisition & Link to UAS• Image Interpretation and Stereovision• Image Scale• Image Resolution, including spatial, spectral, radiometric, temporal• Ground Control Points, including Root Mean Square Error (RMSE)• Accuracy and Precision of Imagery • Variety of common payloads and how these tie into the spectrum, including: o Electro-Optical (EO) o Near-Infrared (NIR) o Multi/Hyperspectral (MSI/HSI) o Light Detection and Ranging (LiDAR)• Understanding of lenses, physics of light and cameras in context of remote sensing• Other photography concepts, such as International Organization of Standards (ISO) for film speed, shutters, exposure time etc.• Types of algorithms and applications commonly used to exploit data• Change detection• Normalized Digital Vegetation Index (NDVI)• Classification of material• Object recognition• Change Detection• Examples of Applications, including Plant Sciences, Earth Sciences, Hydrospheric Sciences, Land Use• Aerial mapping: purpose, map scale etc.