Virginia Community College System (VCCS)
Unmanned Systems (UMS) Approved Courses

UMS 112 Program and Flight Data Management

Course Description

Provides an introduction to device programming and data management, archiving and manipulation of data and report generation. The students will learn programming topics and logic design concepts. They will take the programs created and use them to the download material from the devices. The data collected will be analyzed to manipulate and modify the programs and device usage.

Lecture 3 hours a week. 3 credits.

General Course Purpose

This course is intended to prepare those interested in learning the basics of programming the instructions to a device (robotic systems including drones). Then the students will retrieve data from the device and learn how to import the data into a database for storage and future usage.

Course Prerequisites/Co-requisites

None

Course Objectives

Upon completing the course, the student will be able to:

- Setup devices for usage
- Record the data from device
- Download the data from the device
- Interpret the data from the device
- Understand CSV files
- Understand DAT files
- Write Java Programs to read in the files
- Manipulate Data from the files
- Create databases to house the information

Major Topics to be Included

- Set up a Java programs and read data from files
- Understand protocol for information from device
- Plan logic design for a device program using Java API
- Code and implement the tasks for the device using Java API
- Understand variables and methods using Java API
- Students will create and use databases
- Students will be able to manipulate data
- Students will view and organize information in forms and reports

UMS 211 Small Unmanned Aircraft Systems (sUAS) II

Course Description:

Advanced UAS mission planning and operation of small Unmanned Aircraft Systems (sUAS). Topics include mission planning, operations, communications, autonomous flights, ground control station operations, crew management, emergency procedures, safety/air vehicle pilot checklist procedures, sensor selection, data collection, and analysis. Also includes advanced coverage of maintenance, operations support, and introduces geospatial product workflow. Emphasizes the ethical, legal, and safe use of sUAS.

Lecture 2 hours per week. Lab 2-3 hours per week. Total 4-5 hours. 3 credits

Course Prerequisites/Corequisites

Prerequisite: UMS XX1 Small Unmanned Aircraft Systems (sUAS) I

General Course Purpose

This course builds on the introductory operational concepts provided in UMS XX1 Small Unmanned Aircraft Systems (sUAS) I. It provides in-depth coverage of the operational requirements needed to plan and complete advanced manual and autonomous missions while meeting FAA regulations covering the operation of sUAS. It adds additional coverage in all areas including piloting, crew management, maintenance, cyber security, data processing, and risk management.

Course Objectives

Upon completion of this course, the student will be able to:

- Plan and implement advanced UAS missions, both manual and autonomous, to collect and analyze data.
- Perform the operations required to support advanced missions, e.g. plan, fly, collect data, maintain, repair, select sensors, collect/analyze data, and report results.
- Recognize the requirements of completing advanced missions in controlled airspace.
- Perform risk assessment and produce operational procedures to address issues.
- Provide customers with products based on their requirements.

Major Topics to be Included:

- Planning and completing advanced manual and autonomous missions including small unmanned aircraft system rating privileges, limitations, and complex flight operations,   both fixed wing and multi-rotor.
- Use and limitations of the United States airspace classification, operating requirements, and flight restrictions affecting small unmanned aircraft operation in advanced mission planning.
- Multiple aviation weather sources and effects of weather on small unmanned aircraft performance.
- Sensor selection and processing requirements for intermediate autonomous missions.
- Determining the performance of small unmanned aircraft with modified sensor platforms.
- Application of knowledge of risk assessment and emergency procedures.
- Application of crew resource management during completion of an advanced mission.
- Radio communication procedures and use in the completion of advanced missions.
- Performance evaluation of small unmanned aircraft with modified platforms.
- Knowledge and application of advanced maintenance and preflight inspection procedures.
- Recording and reporting required FAA documents pertinent to accidents, maintenance, flight paths, and other situations as required.
- Application of safety and security procedures as applies to physical aircraft and wireless communication.