Columbia Gorge Community College
sUAS Professional Remote Pilot – Level 1
Syllabus

Course Number:	**BLM-500**
Title:	sUAS Professional Remote Pilot – Level 1
Created:	February 16, 2021
Updated:	July 12, 2021
Total Credits:	4-5
Lecture Hours:	unknown
Lecture/Lab Hours:	unknown
Grading Option:	A-F (default), audit
Delivery Method:	Online

Course Description:

Provides an understanding of UAS Systems including Command & Control, Communication, Payload, Launch & Recovery, and Basic Maintenance considerations. Course covers Human Factors, CRM, ADM, Cybersecurity Risk Management and Ethics. The course provides and in-depth study of NOTAMS, Mission & Flight Planning and LAANC. Basic NIST flight training utilizing simulator technology is introduced. Stress Management is an integral part of this Course and is integrated into the simulator training. The Course is completed by a one-week, on-site NIST training and flight Exam.

Prerequisite: FAA Remote Pilot License

Intended Outcomes:

Upon successful completion of this course, students will be able to:

1. Identify the functions of the UAS system components.
2. Recognize the capabilities and limitations of various types and classes of UAS platforms
3. Prepare a mission plan using the components of the UAS mission planning process
4. Understand the civil applications of UAS
5. Basic Understanding of Photogrammetry and Automated Flights
6. Apply the requirements and processes necessary to achieve the minimum accepted level of the NIST sUAS flight exam.
7. Demonstrate the understanding of flight procedures, CRM, ADM, Risk Management and Human Factors.
8. Identify hazards associated with UAS operations and prescribe risk controls
9. Able to demonstrate and successfully complete all steps of a sUAS Mission.

Outcome Assessment Strategies:

The student will demonstrate competencies related to the following (via written test, verbal demonstrations and flight exam): Explain ADM, CRM and Risk Management. Demonstrate and evaluate the use of UAS systems and planning skills, demonstrate effective team/group process skills, employ analytical skills, demonstrate and evaluate aircraft operations. Demonstrate the understanding of all Mission steps. Understand the steps necessary to pass a NIST flight exam. Evaluation is done via exams, quizzes, assignments, simulator exercises and flight exams.

Text and Materials (supplied by College)

Emwave2 monitor
Access to the Simulator Training software
Simulator Controller
All other material is available (downloads) once registered in the class.

Course Activities and Design

Lectures, Quizzes, Assignments, Exams, Problem Solving, flight demonstrations and flight exams

Course Content

1. *ADM*
    a. Decision Making Process
    b. Situational Awareness
    c. Checklists
    d. Hazards
2. *Risk Management*
    a. Personal Minimums
    b. Identifying Hazards and Assessing Risk
    c. Mitigating Risk
    d. Threat and Error Management
    e. Risk Management Tools
3. *CRM*
    a) Team Building
    b) Workload Management
    c) Communication
    d) Principles of CRM
4. *Simulator Training*
    a. NIST Simulator Training and Practice
5. *Stress Management*
    a. Stress and the sUAS Environment
    b. emWave2 Training
    c. Practical Applications

6. *UAS Systems Components and Functions*
    a. Classes
    b. Propulsion
    c. Payloads,
    d. Guidance and Controls
    e. Sensor Data and processing
    f. State and Local Laws Governing UAS
7. *Safety of Flight*
    a. Human Factors
    b. Cybersecurity
    c. Risk Management
    d. Ethics
    e. NAS
8. *Flight Procedures*
    a. Mission and Flight Planning
    b. NOTAMS
    c. LAANC
    d. Environment
    e. Human Factors
    f. Restrictions
9. *Introduction to Automated Flight & Photogrammetry*
    a. Mission Planning – choosing the right flight path
    b. Basic understanding of Photogrammetry
    c. Image Capturing and Processing
10. *On-site flight Exam*
    a. Review of NIST required flight maneuvers
    b. Practical Exams from Instructor
    c. Final Flight Test by Examiner.

Assignment Schedule

The first 10 weeks is an online program that the student can conduct at their own pace. However, I have outline these in week groups only to ensure the student completes these tasks within these minimum time frames. All online chapters must be successfully completed before the on-location flight training and flight exam.

Week 1: *ADM*

- Read Chapter 2 of the Pilot's Handbook of Aeronautical Knowledge
  - Download Handbook from Lesson Materials
  - Review the FAR's on the FAA Website
- Complete
  - ADM Quiz

Week 2: *Risk Management*

- Read the Risk Management Handbook
  - Download the Handbook from the Lesson Material
- Complete
  - Complete the Risk Management Quiz

Week 3: *CRM*

- Read the Crew Resource Handbook
  - Download the Handbook from the Lesson Material
- Complete
  - Complete CRM Quiz

Week 4: *Introduction to Simulator Training*

- Download and read all the Lesson Materials
- Complete
  - Simulator Practice
  - NIST simulator training

Week 5: *Stress Management*

- Listen to both Stress Management Modules (1 and 2)
- Go through the emWave2 training module and setup the unit
- Compete
  - Stress Training Assignments
  - Complete the emWave2 Quiz

Week 6: *UAS Systems*

- Read Chapter 5 of the Pilot's Handbook of Aeronautical Knowledge
  - Download the Pilot's Handbook of Aeronautical Knowledge from the Lesson Materials.
- Complete
  - All modules
  - Take the System quiz

Week 7 & 8: *Safety of Flight*

- Read all documents in the Lesson Materials.
- Complete
  - All modules
  - Complete the Quiz

Week 9: *Flight Procedures*

- Review the Lesson's Lecture series
  - Mission Planning
  - Flight Planning
  - Checklist
  - NOTAMs
  - LAANC
- Complete:
  - Lesson Quiz

Week 10: *Introduction to Automated Flight*

- Review Lesson Lecture Series
- Complete
  - Lesson Quiz

Week 11: *NIST Flight Exam Preparation and Flight Exam*

- NIST Flight Instruction
  - At CGCC location
- Complete
  - Practice testing
  - FINAL EXAM

Learning Outcomes:

1. The student will demonstrate an understanding of the basic functions of UAS components.
    a. Understand what makes up an Unmanned Aircraft system and demonstrate the relationship between each element.
    b. Demonstrate the function and purpose of each element (Command and Control, Launch and recovery, Payload, Communications, airframe and the Human Element).
    c. Demonstrate an understanding of commonly used UAS Technology and discuss the relative strengths and weaknesses.
    d. Understand the design process and able to describe the design tools available to designers.
    e. Identify the basic components of a sUAS and describe their functions.
2. Recognize the capabilities and limitations of various types and classes of UAS Platforms
    a. Understand the advantages and disadvantages of a VTOL UAS and a Fixed wing UAS.
    b. Discuss the relative strengths and weaknesses of the commonly used open source UAS autopilot technology.
    c. Student will demonstrate their understanding of Remote Sensors and describe their advantages and disadvantages.
    d. Understand the benefits of using UAS to gather data and identify the methods of collecting data.
3. Prepare a mission plan using the components of the UAS mission planning process.
    a. Understand the command and control subsystem/functionality and describe what role they play in UAS Navigation
    b. Student will demonstrate their understanding of navigation systems and describe the differences between sUAV and larger UAV.
    c. Demonstrate the understanding or preflight planning and mission design using Area Maps, Sensor Characteristics, Designing flight routes, sensor calibration and related preparation tasks.
    d. Understand the two main classifications for UAS Missions and describe the various applications.
    e. Demonstrate the ability to list and describe those items which must be considered prior to conducting any UAS mission.
4. Understand the civil applications of UAS
    a. The student will describe the basic principles behind Remote Sensing
    b. Demonstrate and discuss various sensors and able to list the various applications for which these would be used.
    c. Identify methods to select the optimal platform and payload package for the selected application.
    d. Describe the methods of control and discuss how mission, application and type of data to be acquired may determine which is used.

5. Apply the processes necessary to manage operator stress levels
    a. Students will demonstrate the understanding of Stress
    b. Understand the FAA guidelines on stress
    c. Demonstrate the understanding and use of the emWave2
    d. Students will be able to list the tools to minimize stress.
6. Identify hazards associated with UAS operations and prescribe risk controls
    a. Describe the Human Factors related to safe UAS operations
    b. Students will demonstrate the understanding of a sUAS Risk Assessment.
    c. Understand Crew Resource Management (CRM) and how it can identify and resolve problems in real-time operations.
    d. Understand all four aspects of situation awareness and demonstrate the implementation within a group.
7. Identify and demonstrate an understanding of
    a. Weather
    b. NAS
    c. Regulations
    d. NOTAMS
    e. ADM
    f. CRM
    g. Risk Management
    h. Stress Management

Grading

Mid Term Exam	25%
Final Exam	25%
NIST Flight Exam	50%

Grade Criteria

The course is divided into 11 weeks containing a variety of

assignments. A-90%, B-80%, C-70%, F-<70%

Unless otherwise stated, you can expect your assignments to be graded within one week.

Discussion

Students are expected to seek assistance with lecture topics or ask subject matter questions to the instructor or classmates. Additionally, the instructor can be reached directly via e-mail or text. Be professional and courteous when posting topics to this forum.

Quizzes

There is a total of 8-10 quizzes. These quizzes are based on that week's subject matter and are designed to gauge your assimilation of that material prior to going to the next chapter/lesson.

Late Work Policy:

If there are assignments, no late work will be accepted for credit, so plan accordingly.

Assignment Descriptions:

Quizzes: The quizzes will be comprised of multiple choice, matching, ordering, multiple select and true/false questions. You are given a certain amount of time to complete the quizzes and all the questions are derived from the assigned reading. Each quiz should be completed in one sitting.

Mid Term and Final Exam: Both the midterm and the final exam will be comprised of multiple choice, matching, ordering, multiple select and true/false questions. You will be given time limit. Each exam must be completed in one sitting. Once you begin the exam you will not be able to stop and start again later.

Email

Students can get ahold of the instructor via email at any time. Turnaround time is typically 24 hours but you will rarely have to wait that long.

Academic Honesty Statement:

Students are expected to be honest and ethical in their academic work. Academic dishonesty includes cheating and plagiarism. All work submitted in this course is to be your own new, original work written in response to the assignments. Consciously or unknowingly presenting the ideas or writings of others as your own will result in academic sanctions that may include a grade of F for the assignment or for the class and possible institutional sanctions including suspension or expulsion. See the Code of Student Conduct and the Students Rights and Responsibilities policy for further information.

ADA Statement:

CGCC is committed to providing support for students with disabilities. If you are a student with physical, leaning, emotional, or psychological disabilities you are encouraged to stop by Student Services and make an appointment with Shayna Dahl, the Disabilities Coordinator at 506-6046 or by email at sdahl@cgcc.cc.or.us. If you have an accommodation plan, please see me as soon as possible so we can make any arrangements necessary for your learning. No accommodations can be provided until a Reasonable Accommodation Plan is in place. Please remember plans are not retroactive and cannot be used for assignments prior to the date of my signature.

Flexibility Statement:

Assignments, flight labs, and exams schedule may be changed in response to institutional, weather, or class changes or problems.

CGCC Mission Statement

To provide quality instructional programs and services which are community-based, responsive, and accessible, offering individuals the opportunity to achieve their educational goals.

CGCC Drop/Withdrawal Statement:

Formal withdrawal from CCC must be made through the Student Services Office. Students, who merely stop attending classes without formally withdrawing will receive the grades assigned by their instructors. Students receiving financial aid or veterans' benefits must notify the appropriate office of their intentions to withdraw.
A "W" will be granted if the student processed a formal withdrawal by he date listed in the appropriate Schedule of Classes. Students are eligible for 100% tuition refund when a course is dropped during the first two weeks of the term. Lab fees may not be refunded. Refunds are not given after the second week of the term regardless of when a student registered or whether a student attended class. Refunds are first applied to the other charges outstanding in your account, even if payment is not yet due.

EOE Statement:

Columbia Gorge Community College is an equal opportunity educator and employer.