Course Outline for NAVI 202

DRONE AERIAL SURVEY, PHOTOGRAPHY AND VIDEOGRAPHY

Effective: Fall 2022

I. CATALOG DESCRIPTION:
NAVI 202 — Noncredit

This course is an introduction to using drones and Unoccupied Aerial Systems (UAVs) to capture and process a wide array of remote sensing data and digital imagery. It will cover pre-flight planning, in-flight chorography, and post processing stages. An emphasis is developing post-processing skills for commercial applications with exposure to the craft of report writing, cartography, and desktop stills/video editing. This is a creative starting point to using drones in multiple disciplines and careers.

Strongly Recommended
NAVI 201 - Orientation to Drones and Unoccupied Aerial Systems (UAVs)
or

GEOG 15 - Introduction to GIS
or

PHTO 56 - Introduction to Digital Photography
or

PHTO 58 - Introduction to Videography
or

Grading Methods:
Pass/No Pass

Discipline:
- Aviation

Noncredit Category
J - Workforce Preparation

	MIN
Total Noncredit Hours:	27.00

II. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering this course, it is strongly recommended that the student should be able to:

A. NAVI201
1. Evaluate the legal (local, state, and federal) and ethical frameworks in order to safely operate common Unoccupied Aerial Systems (UAS), more commonly referred to as drones.
2. Describe the varied uses of an Unoccupied Aerial System (UAS) in multiple disciplines and careers.
B. GEOG15
1. Define Geographic Information Systems (GIS)
2. Identify and evaluate GIS data sources and the importance of metadata.
3. Identify, compare and contrast vector and raster GIS.
4. Evaluate the capabilities of various GIS software programs
5. Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature
6. Apply spatial analysis functions on a GIS to solve a Geospatial problem
C. PHTO56
1. Capture digital photographic image and make simple imaging corrections using imaging software
2. Use the vocabulary and terminology of digital imaging and photography
3. Utilize techniques used in photography to control digital image levels, contrast, hue and saturation, composition, lens flare, light, motion, gray scale and color balance
4. Employ digital imaging tools
5. Demonstrate selection techniques for minor adjustments and alterations of photographic images
6. Describe different methods for digital capture including how and when use of digital camera is best, its advantages and limitations
7. Demonstrate digital printing and image uploading for the web
8. Use service bureaus, photography store and custom services, and photo web processing sites
9. Transfer large digital photographic files within a local area network and among various removable storage media
10. Analyze the effect of digitally manipulated images on selected segments of society with emphasis on student understanding

of media ethics
    D. PHTO58
        1. Identify essential roles, phases, and tools for editing a video project
        2. Organize, prioritize, and plan sequences of tasks related to video editing project
        3. Use a major video editing program to produce completed compositions combining video, sound, and titles
        4. Assemble video and sound clips based on an edit-decision list (EDL)
        5. Evaluate the efficacy of a video/sound composition
        6. Apply effective communication skills in order to work creatively on a small project team
        7. Define major ethical and aesthetic issues in post production business today
        8. Assemble sound, graphics, and typography into a video composition

III. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

  A. Evaluate the legal (local, state, and federal) and ethical frameworks in order to safely operate common Unoccupied Aerial Systems (UAS), more commonly referred to as drones.
  B. Create and produce an original professional presentation to tell a story using aerial photography, Videography, and/or other remote sensing data set.
  C. Describe the varied uses of an Unoccupied Aerial System (UAS) in multiple disciplines and careers.

IV. CONTENT:
    I. UAS Uses
        A. UAS Uses
        B. Real Estate
        C. Agriculture
        D. Building Inspection
        E. Public Safety
            a. Police
            b. Fire
            c. Search and rescue
        F. Surveying/Mapping
        G. Wildlife management
        H. Forest management
        I. Video production
        J. Photography
        K. Architecture
        L. Journalism
        M. Equipment maintenance
    II. Mechanics of Flight
    III. UAS Equipment and Technology
        A. Size
        B. Type
        C. Features
            a. GPS
            b. Cameras
            c. Controllers
        D. Performance
            a. Speed
            b. Battery Life
        E. Camera and Video
        F. Remote Sensing
    IV. Safety and Ethics
        A. Personal Safety
        B. Property Safety
        C. Privacy Concerns
    V. UAS Laws and Regulations
        A. FAA Regulations
            a. Airspace Issues
            b. Hobby vs. Commercial usage
            c. Licensing
        B. FAA Certification
        C. Local Law
        D. State Laws
    VI. Flying
        A. Flight planning
        B. Hovering and Tilting
        C. Flight Patterns
            a. Tracking
            b. Following
            c. Waypoints
        D. Flight Logging
        E. Aircraft Maintenance
    VII. Cinematography
        A. Camera Settings
        B. Depth of Field
        C. Stills
        D. Panoramas
        E. Time-Lapse
    VIII. Videography
        A. Video Settings
        B. White Balance
        C. Gimbals
    IX. Choreography & Story Boarding Techniques
        A. Framing
        B. Static versus Dynamic Video
    X. Drone Land Survey
        A. Pre-flight planning
        B. Resolution
        C. Photogrammetry

               D. 3D Surface relief
               E. Point Cloud Models
               F. DEMs and Contour Maps
     XI. Infrastructure Inspection
     XII. Post-Processing Software Options
     XIII. Image Editing
     XIV. Report Writing and Deliverables
     XV. Professional Presentations

V. LAB CONTENT:

I. Create a Project Proposal
   A. Define Client Needs
   B. Describe Flight Path
   C. Describe Deliverables

II. Describe and test Cinematography
   A. Camera Settings
   B. Light Settings
   C. Filters
   D. Special actions

III. Story Board and Choreography
   A. Desritpion of total result
   B. Create map of area
   C. Direction/motion/action
   D. Camera Settings
   E. Program Flight

IV. Drone Land Survey
   A. Desribe survey type
   B. Describe survey area
   C. Describe survey Specs
   D. Camera Settings
   E. Program Flight

V. Infrastructure Inspection
   A. Desribe survey type
   B. Describe survey area
   C. Describe survey Specs
   D. Camera Settings
   E. Program Flight

VI. Post-Processing Software Options
   A. Migrate and backup data
   B. Choose appropiate options
   C. Review data report
   D. Summarize data collected
   E. Critique and Feedback

VII. Image Editing
   A. Migrate and backup data
   B. Organize and rate
   C. Develope (adjustments)
   D. Output
   E. Critique and Feedback

VIII. Report Writing and Deliverables
   A. Decide contents
   B. Choose images
   C. Choose software (MS word/Adobe)
   D. Critique and Feedback

IX. Professional Presentations
   A. Oral presentation
   B. Image Presentation
   C. Lessons Learned
   D. Critique and Feedback

VI. METHODS OF INSTRUCTION:

A. **Critique** - Instructor will review various professional projects and critique each based on a standardized methodology.
B. **Directed Study** - Instructor will help each student to develop individualized proposals for a professional contract.
C. **Projects** - Instructor will mentor cinematographic or survey based project that involve the students to process a data set from start to finish for a potential client.
D. **Student Presentations** - Instructor will mentor students presentation techniques to create a summary of a project including a review of methodology, analysis, and budgetary concerns.

VII. TYPICAL ASSIGNMENTS:

A. Ten to twenty pages reading per session
B. Short essay critiques
C. Forum posts on class-related topics per session
D. Practice and graded quizzes per session.
E. Group and Individual projects
F. Final project presentations
G. Written paper discussing job possibilities in this developing industry

VIII. EVALUATION:
Methods/Frequency

A. Exams/Tests
   Once
B. Quizzes
   Weekly
C. Projects
   Once
D. Group Projects
   Once

IX. TYPICAL TEXTS:
1. Marloh, Ivo , and Michael Sanderson. *The Drone Camera Handbook: A complete step-by-step guide to aerial photography and filmmaking.*First ed., Aurum Press, 2017.
2. LIghtworks. LWKS Software Ltd, (2021.1).
3. OpenDroneMap. OpenDroneMap, (2.3.1).

X. OTHER MATERIALS REQUIRED OF STUDENTS: