

Palomar College – Graphic Communications

GCIP 168 Digital Imaging with Drones

Six hours lecture/laboratory (3 units)

Instructor: Mark Bealo Email: mbealo@palomar.edu
Office: MD-146 Telephone: 760-744-1150 x 2958
Office Hours: MD-119 M 2:30PM-5:30PM, every 1st/3rd/5th W 2:30-5:30PM

Course Description

An introduction to using drones or unmanned vehicles for digital imaging. This hands-on course covers building, operating, and outfitting for still and video imaging and image capture.

Student Learning Outcomes

Drone digital image capture: Demonstrate successful drone operation and image capture.

Drone Mapping: Demonstrate successful mission planning, drone operation and image capture of mapping project within two hours of solar noon, and use photogrammetry software to post-process.

Requirement for the following Certificates and/or Degrees

Digital Video • Drone Technology A.S. • Unmanned Aircraft System (UAS) C.A.
New Media Compositing, Authoring and Distribution •

Web Site

<http://www2.palomar.edu/users/mbealo/>

Follow the GCIP 168 link. The site contains the syllabus, a calendar detailing the content covered each week, details on the rules and regulations, and grading requirements. Supplemental material may be found on the page as well.

Required Reading

The Photographer's Guide to Drones, August 15, 2016
Rocky Nook Publishing. ISBN: 9781457189661

<https://learning.oreilly.com/library/view/the-photographers-guide/9781457189661/>

Recommended Reading

Building Multicopter Video Drones, August 26, 2014
Packt Publishing. ISBN: 9781782175438

Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs,
September 10, 2015
Que Publishing. ISBN: 9780789755988

Required Writing

Aerial image/video story boards/proposals (500 words).

Software

Photoshop CC, AgiSoft MetaShape, video editing (iMovie/FCPX/Premiere).

Materials

Professor will provide instructions on how to gather and create images needed to complete projects and obtaining additional material that may be required.

Required Supplies

USB3 thumb drives help out or a Thunderbolt HD. A big smile and a healthy dose of enthusiasm goes a long way as well.

Open Lab Access

Open lab hours are subject to change - check lab schedules for updates.

Evaluation

Evaluation for this course will consist of a series of projects, assignments, written proposals and class participation. Assignments are evaluated on demonstration of concept assigned, use of media, handling of techniques, and completion by due date. These include but are not limited to the following:

1. **Aerial Photos:** Each student will select a building or structure on campus and capture a digital photo in addition to creating a panorama from several images of a different subject.

Grading - Aerial Photos (100 pts. possible)

Storyboard and plan (screen shots from Google Earth): 20 pts.

Aerial Photo: 30 pts.

Photo matches plan for Aerial Photo: 10 pts.

Aerial Panorama (different subject than Aerial Photo): 30 pts.

Panorama matches plan for Aerial Panorama (include Left, Middle, and Right images from Google Earth): 10 pts.

Example file names (ALWAYS LastnameFirst Initial!) placed in a folder named BealoM Prj1 Photos [Your name is not BealoM, that's mine]:

BealoM Aerial.psd

BealoM Aerial previs.png

BealoM Pano.psd

BealoM Pano previsL.jpg

BealoM Pano previsM.jpg

BealoM Pano previsR.jpg

2. **UHD/4K Aerial Video (single operator):** Each student will select a building or structure on campus and capture and edit a digital video for promotional purposes.

Grading - Aerial Video - Single (100 pts. possible)

Storyboard and plan the shots: 20 pts. (BealoM Vid previsL.jpg,

BealoM Vid previsM.jpg, BealoM Vid previsR.jpg)

Capture Aerial Video: 30 pts.

Edited video: 30 pts. (BealoM Video.mp4 or .mov or .m4v)

Video matches plan: 20 pts.

3. **UHD/4K Aerial Video (dual operators):** Each student team will select a building or structure on campus and capture and edit digital video for promotional purposes.

Grading - Aerial Video - Dual (100 pts. possible)

Storyboard and plan the shots: 20 pts. (BealoM Dual previsL.jpg, BealoM Dual previsM.jpg, BealoM Dual previsR.jpg)

Edited Video where you were:

Camera Operator: 40 pts.

UAS Pilot: 40 pts.

(Edited video with titles depicting the shot where you operated Camera, and the shot where you were the pilot)

4. **UHD/4K Smart Shots/Intelligent Mode:** Each student will program a flight and capture video using smart shots. (Same file naming scheme as other projects)

Grading - Smart Shots/Intelligent Modes (100 pts. possible)

Storyboard and plan the shots: 20 pts. (as many as necessary to show the plan for EACH Smart Shot /Intelligent Mode)

Edited Orbit/Point of Interest (POI) video: 20 pts.

Edited Student Choice video: 20 pts.

Edited Course Lock (Two waypoints in straight line) video: 20 pts.

Edited Waypoint flight plan (at least 4 points) video: 20 pts.

5. **Surveying/Mapping:** Each student will select a building or structure on campus from which to create a 3D map. Mission is to be flown within 2 hours of solar noon.

Grading - Surveying/Mapping (100 pts. possible)

Plan the mission and acquire images: 20 pts.

Export Ortho Tiff from Metashape with KML and World files: 20 pts.
(BealoM Ortho.tif, BealoM Ortho.kml, BealoM Ortho.tfw)

Export DEM Tiff from Metashape with KML and World files: 20 pts.
(BealoM DEM.tif, BealoM DEM.kml, BealoM DEM.tfw)

Use Metashape to create a pdf of the 3D Model: 20 pts.
(BealoM 3D.pdf)

Export Report in pdf: 20 pts.
(BealoM Report.pdf)

6. **UHD/4K Group Video Project:** Use aerial digital video techniques to put together a 2-5 minute production. Script must be finished and cleared by instructor before production starts.

Grading - Group Video Project (200 pts. possible)

Effectively participate and work with a team: 25 pts.

Storyboard and script idea: 25 pts.

(as many as necessary to show the plan for EACH shot)

Capture aerial digital video: 25 pts.

Editing: 25 pts.

Final Video: 100 pts.

Projects and assignments will account for approximately 83% of your final grade, whereas classroom participation will account for 17%. Each project will reflect specific digital imaging techniques and may have special output properties. Details will be given defining the parameters of each project. The instructor reserves the right to retest on material that was not adequately comprehended. The grading scale for the course is as follows:

90-100%=A 80-90% = B 70-80% = C 60-70% = D < 60% = F

Teaching Methods

Lectures and Hands-on Demos: Important material from the text and outside sources will be covered in class. You are advised to take detailed notes on all lectures and information in the readings. Participation in classroom discussions is a necessary aspect of a healthy learning environment. Students are also encouraged to bring in additional educational materials from outside sources (podcasts, tutorials, articles, etc) related to topics being discussed.

Assignments and Projects: Various projects and readings are assigned throughout the course to solidify material learned in textbook lessons and lectures. Projects are designed such that each student will have enough practice to become proficient in understanding and correctly applying concepts and techniques learned through the course. Various software applications might be used in creating the final files.

Online Materials: Additional items pertinent to the course and that enhance the student's ability to learn the material may be posted. Refer to the class web site for more information.

Course Objectives

Successful students will be able to do the following by the end of the course:

1. Learn to properly operate a basic drone;
2. Understand the components, equipment, and technology to set-up a working drone;
3. Capture still or video image while operating a drone;
4. Work as a team of four individuals with each, in turn, learning the different operator rolls: camera operator, person piloting/operating the controls of the drone, visual observer, and remote Pilot In Command (PIC);
5. Operate and program a drone equipped with a variety of sensors including GPS, video and/or still photography;
6. Understand post-processing techniques to obtain the desired outcome.

Outside Assignments

Students are expected to spend a minimum of **three hours per unit per week in class and on outside assignments**. Students are to read text, study lecture/lab notes, research and write required paper(s), and complete lab assignments. Keep a notebook of all storyboards, flight logs, and projects.

Policies

1. Any student with a verified disability may be entitled to appropriate academic accommodations. Please contact Disabled Student Services for more information.
2. The GC Labs are available for your convenience in practicing and completing course assignments. Lab hours are posted.
3. Classroom participation counts as part of your final grade. Because this course requires extensive hands-on application, attendance is imperative. If you choose to drop this class, it is your responsibility to do so, not the responsibility of the instructor. To drop the course use eServices otherwise, an F or FW will be recorded on your permanent record.

4. Students should be aware of Palomar's Student Rights and Responsibilities in the 2019-2020 Catalog. Please pay particular attention to the sections on Academic Integrity, Drugs and Alcohol Policy, Smoking Policy, Crime Awareness, Sexual Harassment Policy, Student Behavior Rules and Regulations, and the Student Conduct Code.
5. Meeting deadlines is critical. All projects must be properly completed and submitted by the assigned due date. If a project is turned in late, it is dropped a minimum of one full letter grade per week.

Important Dates

All outstanding fees must be paid within 10 days of registration to avoid being dropped from classes. If you need \$\$ for college, apply for a BOGW fee waiver. Questions? Call 760-744-1150 x8116. If students are not sure about their fee balances, they can check them through eServices at www.palomar.edu.

Last day to qualify for a semester class refund	Saturday, Feb 8
Last day to add with a code or drop with no notation on record	Monday, Feb 10
Last day to drop with a "W" on record	Saturday, March 21
Final Project Due	Wednesday, May 20

Excerpts from Palomar College's Mission Statement

from the 2000-2001 Catalog, p. 12

...We exist as an institution to enable our students to realize and achieve their goals both as individuals and as members of their communities and to become responsible citizens of an increasingly interdependent world. We seek to achieve this purpose through five interrelated themes that define our commitment to excellence in education.

Empowerment: We seek to empower students to formulate and realize educational goals that will promote their personal growth and facilitate their full participation in a rapidly changing world.

Learning: We invite and assist students to master a core of knowledge and skills that they need in order to pursue more advanced learning at other educational institutions or in the world of work or for personal growth and responsible citizenship.

Evaluation: We evaluate the relevant skills and knowledge of all of our students so as to guide them toward meaningful and productive educational experiences... as effectively as their preparation allows...

Discovery: We constantly seek to discover better ways to empower our students to learn and to grow. We are a learning institution in both our object and our method; we will assist our students to discover what they need and want to know...

Growth: We intend to grow each year in our ability to accomplish our mission...

Excerpts from Palomar's Educational Philosophy

from the 2000-2001 Catalog, p. 13

The educational philosophy of Palomar College is based upon belief in the value of the individual and belief in the individual's potential for intellectual, ethical,

personal, and social growth. Only through growth in these areas can a citizen come to understand personal rights...

Excerpt From Teaching to Learning – A New Paradigm for Undergraduate Education

By Robert B. Barr and John Tagg

In the Learning Paradigm... a college's purpose is not to transfer knowledge but to create environments and experiences that bring students to discover and construct knowledge for themselves, to make students members of communities of learners that make discoveries and solve problems. The college aims, in fact, to create a series of ever more powerful learning environments...

Selected Excerpts from Student Code of Conduct

- II. Standards of conduct. Here is a list of examples of conduct inappropriate and unacceptable for which students should expect to be held accountable.
 - A. Students are expected to avoid any type of dishonesty, including, but not limited to cheating, plagiarism, forgery, fabrication or counterfeiting documents, furnishing false information to the College, alteration or misuse of college documents or records, duplication of assignments, or aiding another in an act of dishonesty. As noted in the Statement of Academic Integrity, honesty is of utmost importance in all endeavors related to the College. A detailed discussion of academic dishonesty and related consequences are addressed in Section II.
 - I. Continued disruptive behavior, profanity or vulgarity, or defiance of the authority of, or abuse of College personnel.
 - L. Misuse of District computers, telephone, or telecommunications devices.

Also refer to : <https://www2.palomar.edu/pages/studentaffairs/home/policies/>

Final Note

Class projects should be suitable for family viewing, creative and original. Racial, ethnic, or subculture slurs; pornography, and hate are unacceptable. The instructor reserves the right to make any needed and appropriate adjustments to this syllabus.