GEOG 172: Earth from Space

Department of Geographical Sciences
Summer II, 2021

COURSE INFORMATION:

INSTRUCTOR
Rachel Marks
E-mail: rmarks.umd.geog@gmail.com
Office: Online
Office hours: By Appointment

COURSE SCHEDULE
Lecture:12:00 pm – 2:30 pm, Monday – Friday
Online via Zoom (***Zoom link to be provided via ELMS prior to each class)*

COURSE SUMMARY
The overall goal of the course is to introduce students to the world of remote sensing, how remote sensing is used to address real world issues, and to interest them in potentially pursing a degree and/or career in remote sensing.

This introductory survey course will focus on the big question -> "Why are Earth observations from space critical for monitoring our changing planet?" Through this course, students will gain an understanding of the capabilities offered by current Earth-observing satellite missions including how satellites view the Earth, what they can observe, and what significant problems can they solve.

During the first week of the course, students will learn the material from lectures presented by the primary course instructor. The students will learn about how satellites view the Earth, what they can observe, and why they are designed to collect information that way. Further, students will learn about the methods that are used to extract meaningful information from satellite images ranging from statistical clustering to deep learning algorithms.

During the second and third weeks of the course, students will take a deeper dive into a series of earth observation specialty areas. Each day will focus on one specialty area, such as landuse change, forests, or agriculture, and will feature guest lectures given by experts working across the spectrum of federal, state, non-profit, and university organizations.

LEARINING OUTCOMES

At the completion of this course, students will be able to:

1. Identify the major questions and issues related to satellite Earth Observations. Specifically, how satellites view the Earth, what they can observe, and why they are designed to collect information that way. Further, students will demonstrate an understanding of basic terms, concepts and approaches in Earth Observations, such as:

    - what ranges of electro-magnetic spectrum are particularly useful for observing different objects and processes on the Earth's surface.
    - what are spatial, spectral, temporal, and radiometric resolutions of imagery means for Earth observations
    - what methods are commonly applied to satellite imagery to extract information
    - how Earth observations contribute to solving environmental and societal problems

2. Demonstrate a broad understanding of scientific principles and the ways scientists in a particular discipline conduct research.

3. Demonstrate an understanding of the political, social, economic and ethical dimensions of global environmental change that is made possible through satellite observations.

4. Articulate how this course has invited them to think in new ways about their place in the global community and global change issues.

COURSE REQUIREMENTS:

PREREQUISITES

None

COURSE MATERIALS

No text book will be required for this course.

All necessary course materials can be accessed through Canvas: www.elms.umd.edu

COURSE STRUCTURE

- Lectures will begin at 12:00 pm, lasting roughly 2.5 hours. Lectures will be held online via ZOOM. Links to the ZOOM classroom will be posted on ELMS prior to each class.

- Attendance will be taken during the first 5 – 10 minutes of each class. Attendance is MANDATORY.

- During the first week of class, there will be one "worksheet" per lecture that should be completed during or after the lecture period.

- During the second and third weeks of class, students will be asked to write 2 guest lecture summaries based on the guest lectures given that week. Summaries should include researchers name, organization, area of expertise, and a summary of the specialization area, data, and techniques they use in their research. Summary should include the real world questions the research addresses and/or the ways in which the research outputs are applied to solving real world problems.

- Students will be asked to write one summary of a scientific journal article related to remote sensing and earth observation.

- There will be **2 quizzes** which will test your knowledge of materials learned during lectures.

- There will be a **final exam** on the last day of class, 7/30/21. Details to follow.
ASSIGNMENT SUBMISSION:

- Assignments will be accessed and submitted through the course website on ELMS.
ATTENDANCE:

- **Attendance** is **MANDATORY**, and will be recorded during each class.

- Lecture absences, late work, and make-up exams will be possible only for students having proof of a University approved excused absence.

- In the event of an excused absence, students should try to notify the Instructor **at least 24 hours BEFORE** a given due date to make alternative arrangements. Students also need to provide valid documents for absence, late work and make-ups. **Otherwise, no late work and make-ups will be accepted.**

COMMUNICATION:
- **Course Email:** rmarks.umd.geog@gmail.com
I have created an email account for the course. Directing all here will ensure timely responses, as I will check this email throughout the day.

- **E-mail Subject Line**: GEOG172_LastName_[lecture or assignment in question]
Please use this format for the subject line of your emails, to allow for easy sorting/ organization. If your question does not pertain to a particular lecture or assignment, you can use an alternative keyword, such as GEOG373_Marks_Attendance.

- **Communicate, communicate, communicate**!
DO NOT hesitate to contact the instructor if you have any concerns, critiques and suggestions. I want you to feel comfortable and confident with all concepts and

processes. Keep in mind, the earlier you ask a questions, the better and more thoroughly it can be addressed.

GRADING

Student learning will be assessed through a variety of assessment instruments including:

1. Class attendance
2. Class Worksheets
3. Guest Lecture Summaries
4. Journal Article Review
5. Quizzes
6. Final Exam

GRADE BREAKDOWN:

Assignment	# of Assignments	Pts per Assignment	Total Points	% of grade
Attendance	15	1	15	0.05
Class worksheets	5	15	75	0.25
Guest Lecture Summary	2	15	30	0.1
Journal Article Review	1	30	30	0.1
Quizzes	2	30	60	0.2
Final Exam	1	90	90	0.3

GRADING SCALE:

A+ 100-97	A 96-93	A- 92-90	B+ 89-87	B 86-83
B- 82-80	C+ 79-77	C 76-73	C- 72-70	D+ 69-67
D 66-63	D- 62-60			

CLASS SCHEDULE (subject to change)**:**

Date	Topic	Due Dates
WEEK 1		
Mon 7/12	- Earth Observation Defined - History of Remote Sensing - Properites of Remote Sensing Data	Class worksheet 1
Tues 7/13	- Passive Remote Sensing - Active Remote Sensing	Class worksheet 2
Wed 7/14	- Image preprocessing - Biogeophysical variable extraction	Class worksheet 3
Thurs 7/15	- Image interpretation - Change detection	Class worksheet 4
Fri 7/16	- Machine Learning / Modeling - Data Access	Class worksheet 5
WEEK 2		QUIZ 1: Due Sun 7/18
Mon 7/19	Landcover Landuse	
Tues 7/20	Forests	
Wed 7/21	Agriculture	
Thurs 7/22	Snow and Ice	Guest Lecture Summary 1
Fri 7/23	NASA DEVELOP Program	
WEEK 3		QUIZ 2: Due Sun 7/15
Mon 7/26	Wetland, Coastal, and Ocean Proesses	
Tues 7/27	Urbanization, Human Health	
Wed 7/28	Surface Water, flooding, hydrology	Guest Lecture Summary 2
Thurs 7/29	Future Steps for Remote Sensing Education and Careers	Paper Summary Due
Fri 7/30	Final Exam (During Class Period)	

ADMINISTRATIVE

CAMPUS POLICIES:
Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

ACADEMIC INTEGRITY:
The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://shc.umd.edu/SHC/Default.aspx.

HONOR CODE:
The University also has a nationally recognized Honor Code, administered by the Student Honor Council. The Student Honor Council proposed and the University Senate approved an Honor Pledge. The University of Maryland Honor Pledge reads:
"I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination."

DISABILITIES:
If you have a documented disability and wish to discuss academic accommodations, please speak to the instructor on the first day of class. We will make every effort to accommodate students who are registered with the Disability Support Services (DSS) Office and who provide us with a University of Maryland DSS Accommodation form by **Thursday, 7/15/21.**

STUDENT CONDUCT:
Students must abide by the university's Code of Student Conduct. Please treat your peers and instructors with respect, turn off cell phones during class, remain quiet until called upon, and so forth. We do not anticipate any problems. However, as instructors and staff of the university, we have the right to ask any student disrupting the class to leave immediately. Such disruptions will be referred to the Office of Student Conduct (http://www.jpo.umd.edu).

INLCEMENT WEATHER POLICY:
Online classes will continue as normal even if the university is closed due to inclement weather, however the university's operating status is available on the school website (http://www.umd.edu) or by phoning 301-405-SNOW.