Date: 1/5/2022

SYLLABUS
GEL 216: TECTONICS
WINTER, 2022

Eric Cowgill
EPS 3121

Office Hours: TBD
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LAND ACKNOWLEDGEMENT:
We should take a moment to acknowledge the land on which we gather for this course. For thousands of years, this land has been the home of Patwin people, including the Yocha Dehe Wintun Nation today. The Patwin people have remained committed to the stewardship of this land over many centuries. It has been cherished and protected, as elders have instructed the young through generations. We are honored and grateful to be working here today on their traditional lands.

-Approved by Yocha Dehe Tribal Council (May 14, 2019)

PROFESSOR:
Eric Cowgill (he/his/him; pronounced "coe-gill"), EPS 3121, escowgill@ucdavis.edu

LECTURE:
EPS 1119 (Moores Room), M & W 10:00-11:30 (*except holidays on 1/17 and 2/21*)

PREREQUISITES: GEL101 & GEL101L (or by permission).

READING will be from textbooks and primary research literature distributed via Canvas.

TEXTBOOKS:
Kearey, Klepeis, & Vine, 2009, *Global Tectonics*, 3d Ed., Wiley – Blackwell, Chichester, 482 p.
Scarselli, N., Adam, J., Chirella, D., Roberts, D.G., and Bally, A.W., 2020, Regional Geology and Tectonics Volume 1: Principles of Geologic Analysis: Amsterdam, Elsevier, 878 p., https://doi.org/10.1016/C2017-0-00442-1.
Frisch, W., Meschede, M., and Blakey, R., 2011, Plate Tectonics: Continental Drift and Mountain Building: Heidelberg, Springer-Verlag, 212 p.
Cox & Hart, 1986, *Plate Tectonics How it Works*, Blackwell Scientific, Boston, 392 p.
Moores & Twiss, 1995, *Tectonics*, Freeman, New York, 415 p (reissued in 2014 by Waveland Press, Long Grove IL).

OBJECTIVES:
- Provide synoptic view of tectonic processes and systems.
- Exercise problem-solving and analytical thinking.
- Conduct an in-depth analysis of a tectonic setting, process, or problem by integrating primary research literature.
- Hone your ability to present your work clearly, succinctly, and systematically.

FORMAT:
Components of the class include:
- Two weekly lectures/discussions
- Three problems sets
- A term paper
- An AGU/GSA style presentation on your term paper

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SUBMITTING WORK: via Canvas in a single file for each assignment.

SCHEDULE: Please see attached table for topics and due dates.

GRADING:

25% Discussion
30% Problem Sets
30% Term paper & peer review
15% Presentation

Note: see separate file for itemized breakdown of points.

PROBLEM SETS:

- Problem sets will be due 8PM on Thursdays via Canvas.
- Your work should be explained clearly and presented systematically.
- All calculations should be shown and explained.
- Written answers should be typed.
- Grading will focus on approach, thought process, and clarity of presentation.

TERM PAPER:

Topic: The term paper is on a topic in tectonics of your choice. If you're stumped, discuss with me. Use this as an opportunity to read all those papers that are related to your research that you really should be reading but somehow never seem to get around to. Or follow a question that piques your curiosity.

Approach: The paper can be focused on a specific location (e.g., the geology and tectonic history of the Oman ophiolite), process (e.g., ophiolite obduction), or problem (e.g., do ophiolites form in mid-ocean ridge or supra-subduction settings, or is it both?). You can write a review paper, synthesize data to investigate a question, or conduct your own calculations.

References: You must read and synthesize a large number of papers (e.g., at least 30) from the primary research literature.

Figures: are required.

Format: Standard journal article (Title, Abstract, Introduction, Background, Discussion, Conclusions, References (GSA format), Figures with Captions.

Length: no more than 12 pages, double-spaced, not including figures, tables, or references. Feel free to include supplemental material to support your work, if needed.

Due Dates: Components of the term paper are due by 8 PM on Thursday via Canvas by 8 PM. Please see the schedule for specific dates. These items are:

- Topic: a clear statement of your proposed paper topic (i.e., the goal or purpose of your paper and your line of inquiry; ½ page max).
- Reading list: A list of papers you plan to work with, sorted into topical threads. There should be 1.5-2x as many papers on this list as you actually read and use.
- Figures & Outline: A set of figures for your term paper that are numbered in the order in which you will present them and which include captions that you have written to explain each figure and relate it to the other figures in your paper. These should be from different papers and the scope, content, and narrative of your term paper should be clear from the figures and captions alone. Include a detailed outline of your term paper that cites the figures by the numbers you've given them.
- Submission: The complete term paper (i.e., what you would normally turn in as your final submission in a class without peer review). I will then distribute these for peer review.
- Review: Your comments and feedback on another student's paper (a peer review).

- Revisions: A final term paper that has been revised in response to reviewer comments, together with a separate file that provides your detailed responses to each reviewer comment or suggestion.

PRESENTATION:
During finals week, we will hold a poster or oral session in standard GSA/AGU format. If we do talks, they will be 12 minutes for presentation, 3 minutes for questions/transition. If we do posters, they should fit on 36" wide paper and be no more than 48" tall.

HEALTH AND SAFETY:
- Monitor your symptoms and stay home if you are feeling sick.
- Take the Daily Symptom Survey to access campus facilities.
- Be fully vaccinated or hold an approved exception for religious or medical reasons.
- Wear face coverings inside & on mass transit (+outside & in crowds if unvaccinated).
- Test every 2 weeks (or less) if vaccinated.
- Eat only in designated areas and never in classrooms. Students may remove their masks very briefly to drink while in class.
- If you can't attend class due to Covid, remote participation should be possible.
- If I can't attend class due to Covid, then either one of my colleagues will present the material for me, or I will deliver it remotely.

CODE OF CONDUCT:
I expect each of us to treat people the way they want to be treated and to contribute to building a supportive and collaborative environment where everyone feels safe. Any type of harassment or discrimination by, or of, any member of the course community will not be tolerated. Expected behavior includes (but is not limited to):
- Treating all participants with respect and consideration
- Communicating openly with respect for others
- Critiquing ideas rather than individuals
- Avoiding personal attacks directed toward others
- Complying with UC Davis' Principles of Community
- Abiding by principles of academic integrity and ethical professional conduct.

I expect that no one will discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy, physical or mental disability, age, medical condition, ancestry, marital status, citizenship, sexual orientation, service in the uniformed services, or status as a Vietnam-era veteran or disabled veteran.

Responsibilities for the students, instructors, and all members of the community are:

Students:	**Instructors:**	**Community:**
- Attend course sessions. - Come to class prepared. - Submit complete work on time. - Participate in course discussions. - Ask questions - Ask for help	- Attend course sessions. - Generate prompt and constructive feedback. - Foster an environment where students feel safe asking questions, and for help.	- Be respectful of everyone in the course. - Be willing to work with, and learn from, everyone in the course. - Listen - Show patience and compassion

This Code of Conduct applies to all activities related to the class (in-person / virtual).

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Plagiarism is a violation of the UCD student responsibilities and conduct standards, as well as the UC Davis Code of Academic Conduct. Plagiarism consists of presenting as your own work (ideas, writing, illustrations, etc.) created by another. You are committing plagiarism if you copy the work of another person and turn it in as your own, *even if you have the permission of that person*.

The UC Davis Code of Academic Conduct exists to support high standards of behavior and to ensure fair evaluation of student learning. The code is available at: https://supportjudicialaffairs.sf.ucdavis.edu/code-academic-conduct. Students who violate the Code of Academic Conduct are subject to disciplinary sanctions that include Censure, Probation, Suspension, or Dismissal from the University of California. See the UC Davis Policy on Student Conduct and Discipline section 102.01.1for details.

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. I am committed to educational equity in the academic setting, and in serving a diverse student body. I encourage all students who are interested in learning more about the Student Disability Center (SDC) to contact them directly at sdc.ucdavis.edu, sdc@ucdavis.edu or 530-752-3184. If you are a student who requires academic accommodations, please submit your SDC Letter of Accommodation to me as soon as possible, ideally within the first two weeks of this course.

RESOURCES:

Are you new to UC Davis and need help navigating the university? Do you need help coping with the pandemic? Are you in need of food or housing? Do you need help finding academic assistance for this class or others?

There is information about learning remotely and links to information on health & well-being at this *Student Resources* page [https://keepteaching.ucdavis.edu/student-resources]. ASUCD has excellent resources to address basic needs. The ASUCD Mental Health Initiative [https://www.facebook.com/UCDMentalHealth/] actively works to provide students with mental health resources.

Many students at UC Davis need food and/or housing. If you are skipping or stretching meals, concerned about spending money on food and/or having difficulties accessing food, visit the Aggie Compass Basic Needs Center [aggiecompass.ucdavis.edu] located on the first floor of the MU, next to the UC Davis Market. Aggie Compass can provide immediate food and access to additional resources. The ASUCD Pantry [https://thepantry.ucdavis.edu/] (located at 154 MU) provides free food for students.

You can find answers to a number of questions frequently asked by your fellow UC Davis students here: https://ebeler.faculty.ucdavis.edu/resources/faq-student-resources/

Additional information is available at:

UC Davis Student Academic Success Center [http://success.ucdavis.edu/]

UC Davis Student Resources [https://www.ucdavis.edu/students/resources/]

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You can also contact your major department or the academic advising office in your college to get connected to a student services advisor for assistance. To get started, see the College of Letters and Science [https://lettersandscience.ucdavis.edu/advising]

GROUP NORMS
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Making mistakes is how we learn.
Be engaged and present during our time together.
Listen actively: We are here to learn. Allow time for reflection. Silence is ok.
Step back (if you tend to talk a lot) /Step up (if you tend to be quiet)
Respect different working styles and personalities.
Come prepared. If you haven't done reading, let the group know & adopt a "listening" mode.
Seek to include each person in the discussion. Solicit input.
Keep the discussion on topic. Pursue highly specialized discussions outside the group.

Don't be afraid to ask "basic" questions -- someone else also probably has the same question!
If there is lack of consensus on a topic (bickering)- agree to disagree and/or take it offline
Encourage collaboration with folks with different knowledge bases

GEL216 SCHEDULE, WINTER 2022							
Version:	1/5/22						
Week	**Date**	**Day**	**L#**	**D#**	**Topic**	**Research Paper Benchmarks**	**Problem Sets**
1A	1/3	Mo	1		Introduction		
1B	1/5	We	2		EQs, Plate kinematics on a plane		
2A	1/10	Mo	3		Plate Kinematics on a sphere 1		
2B	1/12	We	4		Plate Kinematics on a sphere 2		
	1/13	Th				Topic due	PS1 assigned
3A	1/17	Mo			HOLIDAY		
3B	1/19	We	5		MOR		
	1/20	Th					PS1 due
4A	1/24	Mo		1	MOR-paper discussion		
4B	1/26	We	6		Rifting & Passive Margins		
	1/27	Th				Reading list due	PS2 assigned
5A	1/31	Mo		2	Rifting paper discussion		
5B	2/2	We	7		Subduction zones 1		
	2/3	Th					PS2 due
6A	2/7	Mo		3	SZ paper discussion 1		
6B	2/9	We	8		Subduction zones 2		
	2/10	Th				Figs & outline due	PS3 assigned
7A	2/14	Mo		4	SZ paper discussion 2		
7B	2/16	We	9		Collisions 1		
	2/17	Th					PS3 due
8A	2/21	Mo			HOLIDAY		
8B	2/23	We		5	Collisions paper discussion 1		
	2/24	Th				Submission due	
9A	2/28	Mo	10		Collisions 2		
9B	3/2	We		6	Collisions paper discussion 2		
	3/3	Th				Review due	
10A	3/7	Mo	11		Tectonics & Life		
10B	3/9	We		7	Tectonics & Life paper discussion		
	3/10	Th				Revisions due	
Finals	TBD	TBD				Presentation	
NOTES:							
L# & D# indicate the lecture and discussion number, respectively							
After 2/21 holiday we switch to lectures on Mon and discussions on Wed.							

GEL216 Assignment Weighting, W22			
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Assignment group	**% per item**	**Number of items**	**Total %**
Article Discussions*	5	5	25
Problem Sets	10	3	30
Term Paper & Peer review**			
topic	1.5	1	1.5
reading list	1.5	1	1.5
figures & outline	3.0	1	3
1st submission	12.0	1	12
peer review	4.5	1	4.5
revision & response	7.5	1	7.5
Final Presentation	15	1	15
TOTAL			100
NOTES:			
*Only 5 of the 7 are graded to build in flexibility.			
(e.g., absences for COVID, fieldwork, labwork, etc.)			
**%/item in term paper & review group sums to 30%			

GEL216 TEXTBOOK CORRELATION, WINTER 2022

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Global Tectonics (Keary, Klepeis, Vine, 2009)					*Plate Tectonics (Frisch, Meschede, Blakey, 2011)*					*Regional Geology & Tectonics (Scarselli et al., 2020)*					*Tectonics (Moores & Twiss, 1995)*				
Chp	**start**	**end**	**# pgs**	**Topic**	**Chp**	**start**	**end**	**# pgs**	**Topic**	**Chp**	**start**	**end**	**# pgs**	**Topic**	**Chp**	**start**	**end**	**# pgs**	**Topic**
2	9	53	45	Earth Structure						2	7	20	14	Earth Structure					
3	54	71	18	Continetal Drift (Reconstructions, Pmag)	2	15	26	12	Plate motions	5	61	92	32	Plate reconstructions	4	49	85	37	Plate Tectonics
5	91	120	30	Framework of Plate Tectonics															
4	72	84	13	Sea Floor Spreading											5	86	129	44	Divergent margins & Rifting
6	121	151	31	Ocean Ridges	5	59	74	16	Midocean ridges	3	21	40	20	Oceans					
7	152	209	58	Cont. Rifts & Passive Margins	3	27	42	16	Cont. Rifting										
					4	43	58	16	Passive margins & ocean basins										
9	249	285	37	Subduction Zones	7	91	122	32	Subduction zones						7	155	196	42	Convergent Margins
10	286	345	60	Orogenic Belts	11	149	158	10	Mountain building						9	212	246	35	Collisions
11	346	378	33	pC tectonics	13	171	186	16	Young orogens						10	263	300	38	Anatomy of Orogenic Belts
					12	159	170	12	Old orogens						12	319	369	51	Case studies of Orogenic Belts
12	379	403	25	Mechanism of plate tectonics						4	41	60	20	Plate boundaries & driving mechs					