Special Topics and Cave and Karst Processes

GEOB 589-01/GEOC 572-02

Spring 2020
T 12:00-2:00 PM, MSEC 202

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Office hours: M 10:00 AM-11:00 AM
Th 2:00-3:00 PM, or by appointment.

Course overview: This course will be a deep dive into select topics related to cave and karst processes through discussion of classic and recent papers on topics such as carbonate chemistry, epigene and hypogene speleogenesis, and cave geomicrobiology.

Place in Curriculum: This course is an elective for graduate degrees offered in the Earth and Environmental Science Department.

Course learning outcomes: By the end of this course, students will have learned fundamental processes impacting solution caves through a series of case studies of classic and recent publications and will be able to apply these concepts appropriately to their own research.

Program learning outcomes: Learning outcomes for undergraduate and graduate degrees in Earth and Environmental Science: https://nmt.edu/academics/ees/Outcomes.php

Prerequisites: Graduate standing or consent of instructor.

Field trips: There will be two field trips during the course. Details will be provided in class.

Course website: Canvas course website, http://learn.nmt.edu

Readings: Readings will be taken from the scientific literature, and electronic versions of all articles will be made available through the course webpage.

Recommended text: *Cave Geology* by Palmer (2007; ISBN 978-0939748662). A copy is available at the Skeen library, and for purchase at the New Mexico Bureau of Geology bookstore.

Course Requirements: Attendance is mandatory. Each student will present and lead discussion twice over the course of the semester, once on a topic and readings selected by the instructor and once on a topic of their choosing. On weeks that they do not present, students are expected to read the papers, participate in discussion, and support their classmates by asking questions and responding to prompts by discussion leaders.

Grade basis:

Presentations	30%
Participation	40%
Writing assignment	30%

Writing assignment: Students will be asked to write one paper over the course of the term. The goal of the assignment to write an article summary that is suitable for submission to the science news site Sciworthy (https://www.sciworthy.com). Sciworthy is a website devoted to science communication, and is a place for scientists to report recent discoveries in a news-style format that is accessible to the public. Sciworthy is supported by the 501(c)(3) non-profit organization Blue Marble Space and run by scientists. Anyone can volunteer to write for Sciworthy, and many of the contributing writers and editors are graduate students and postdocs.

Students will select an article published in the last 2 years and write a 500-700 word layperson summary of the major findings and significance of the work. This assignment will help you familiarize yourself with primary scientific literature in the field of cave and karst studies, as well as to hone your science communication skills.

Once you turn in your articles, I will evaluate them and determine if they are of sufficient quality. As a class, we will submit all acceptable articles to sciworthy.com, and the Sciworthy editors will publish those that they deem acceptable.

Academic Honesty: New Mexico Tech's Academic Honesty Policy for undergraduate and graduate students is found in the student handbook, which can be found at: https://www.nmt.edu/academicaffairs/docs/policies/NMT_Student_Handbook_2018-19.pdf. You are responsible for knowing, understanding, and following this policy.

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Counseling Services: New Mexico Tech offers mental health and substance abuse counseling through the Office of Counseling and Disability Services. These confidential services are provided free of charge by licensed professionals. To schedule an appointment, please call 575-835-6619.

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Title IX Reporting: Sexual misconduct, sexual violence and other forms of sexual misconduct and gender-based discrimination are contrary to the University's mission and core values, violate university policies, and may also violate state and federal law (Title IX). Faculty members are

considered “Responsible Employees” and are required to report incidents of these prohibited behaviors. Any such reports should be directed to Tech’s Title IX Coordinator (Dr. Peter Phaiah, 20D Brown Hall, 575-835-5187, titleixcoordinator@nmt.edu). Please visit Tech’s Title IX Website (www.nmt.edu/titleix) for additional information and resources.

Language on New Mexico Tech policies from https://www.nmt.edu/academicaffairs/policies.php

GEOB 589-01: Special Topics in Cave and Karst Processes

Spring 2020, T 12:00-2:00 PM

Course schedule

Lec/Week		Date	Topic	Reading	Presenter
1	T	14 Jan	Introductory day		DSJ
2	T	21 Jan	Karst fundaments	Palmer (1991)	DSJ
3	T	28 Jan	Carbonate equilibria	Select readings from Palmer (2007) and White (1988)	DSJ
4	T	4 Feb	Carbonate equilibria, mixing, and flank margin caves	Mylroie and Carew (1990); Plummer (1975); Wigley and Plummer (1976)	MB
5	T	11 Feb	Hypogene versus epigene speleogenesis; origin of maze caves	Palmer (1975); Klimchouk (2009); Palmer (2011)	ZH
	S	***15 Feb***	***Fieldtrip 1 (karst landscapes)***		
6	T	18 Feb	Sulfuric acid speleogenesis: development of the theory	Jagnow et al. (2000); Egemeier (1981); Davis (1980); Galdenzi (1990); Hill (1990)	NH
7	T	25 Feb	Sulfuric acid speleogenesis: enter the microbes	Hose et al. (2000); Engel et al. (2004); Jones et al. (2015)	JU
8	T	3 Mar	Student topic	*TBA*	ZH
9	T	10 Mar	Student topic	*TBA*	MB
	S	***14 Mar***	***Fieldtrip 2***		
10	T	17 Mar	Spring break	no class	
11	T	24 Mar	No class (ACS meeting)	no class	
12	T	31 Mar	Student topic	*TBA*	NH
	S	***4 Apr***	***Alternative day for Fieldtrip 2***		
13	T	7 Apr	Student topic	*TBA*	JU
14	T	14 Apr	Caves as model systems for ecology and evolution	Culver (1970); Engel (2010); Poulson and White (1969)	
15	T	21 Apr	Cave geomicrobiology: microbial contributions I	*TBA*	
16	T	28 Apr	Cave geomicrobiology: microbial contributions II	*TBA*	