GEO3341 EXTREME FLOODS: FALL 2025

GEO6348 FLOODS SEMINAR

FALL 2025

T | Period 6 - 7 (12:50 PM - 2:45 PM) in TUR 3012

R | Period 6 (12:50 PM - 1:40 PM) in TUR 3012

Instructor: Dr. Joann Mossa

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CATALOG DESCRIPTION: Examines the world's most extreme floods from the Pleistocene through present due to various causes. Discusses physical and human aspects of flood warning, preparedness, response and recovery throughout the world. **(GE-PN)**

DIFFERENCE BETWEEN GRADUATE AND UNDERGRADUATE SECTION RESPONSIBILITIES: Graduate students will be expected to show leadership and a higher level of work and involvement on group projects and related literature reviews. Otherwise, grading is similar.

COURSE LEARNING GOALS AND OUTCOMES:

- *apply terminology in the earth sciences, and in-depth descriptions about the geography, geology, and basic hydrology of rivers, coasts, and floodwaters, and glacial landscapes*
- *better interpret landscapes from photographs, videos, and using Google Earth*
- *know the varied physical mechanisms of floods*
- *evaluate the role that humans play in changing flood patterns, modifying streamflow, and exacerbating floods*
- *know how decisions at different levels (individual, community, state, nation, international) affect the preparation, response, recovery and mitigation of floods*
- *assess differences in values, attitudes and norms of different cultures and nationalities that affect flood decisions and responses*
- *find, interpret, and critically evaluate data from federal agencies about high water, streamflow, and flood zones*
- *develop improved competence using spreadsheets while analyzing flood data through assignments*

COURSE OBJECTIVES INCLUDE:

- *Understanding of the causes of floods* including excessive precipitation, excessive snowmelt, climatic oscillations, tsunamis, coastal storm surges, glacial lake outburst floods (GLOFs), ice jams, landslides, natural dam failures and other physical processes. Floods are also caused or augmented by failures, overtopping, mismanagement or intentional destruction of constructed dams and artificial levees and floodwalls.
- Examining methods for assessing paleofloods, paleoclimate and historical change with PSI-SWD-(paleostage indicators slack water deposits) and varied geologic and chronologic techniques (radiocarbon dating, tephrochrology, dendrochronology, lichenometry, stratigraphic methods), remote sensing for interpreting landscapes and change; Use of GIS and GPS for flood response, recovery and mitigation including search and rescue, flood frequency analysis, hydrologic modeling, and floodplain mapping
- Knowing that *values, attitudes and norms of different cultures and nationalities affect flood decisions and responses*. Extreme floods are influenced by settlement choices, land use change, governmental behaviors, and public education about disasters. *Individuals of different nationality, age, culture, gender, race, and income may be disproportionately and differentially affected by floods* in terms of lives, homelessness, displacement, and property damage due to variations in vulnerability and resilience in differing parts of the world. Sensitive topics will be covered objectively, without endorsements of viewpoint and observed from multiple perspectives (e.g., for gender, we show varied examples across the world where either women or men can be more vulnerable to floods).
- Examining *problems beyond direct inundation* including the erosion done by water, the debris brought in by water, ensuing famines, the spread of disease due to poor drinking water, disrupted sanitation facilities, inadequate and dysfunctional medical care, contamination of water (sewage, dam failures at mines), etc.
- Considering *varied outcomes of floods and lessons learned*. Discussing how floods have influenced history, culture, art, music, historic preservation, migration patterns, crime and crime-control attempts, mental health, seismology, animals, agriculture, livelihoods, engineering, policy, relief efforts, fund raising, tourism and more. Some stories regarding public education, advertising, memorializing, policy, government conflicts, and engineering.

DISCLAIMER/WARNING Please use your judgment as to whether the content of this course is suitable given your history and background, especially if you have experienced trauma or distress due to a disaster. We view some documentaries and witness accounts of recent floods that are sad or disturbing.

BASIC TEACHING APPROACH

- Want to create a positive learning environment
- Big believer in resource availability, all Power Points posted on Canvas; Use them
- I ask open-ended questions in class to help in retention, learning and thinking
- Bring your questions to assist in understanding and recollection
- Attendance, responsible behavior and engagement encouraged by in-class work
- Some in-class discussion after shorter videos
- Some Canvas discussion, posting, thinking
- Many items graded (approximately 50). These are designed to reinforce terms, apply data, learn through different examples on video, class lectures, readings.
- I work to learn students' names. You will not be anonymous.

GRADING SCALE: (grades do not round)

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
Percentage	93 % +	<93% - 90%	<90% - 87%	87%-83 %	<83% - 80%	<80 % - 77%	<77% - 70%	<70% - 68%	<68% - 66%	<66% - 62%	<62% -60%	< 60%
Grade Points	4.0	3.67	3.33	3	2.67	2.33	2	1.67	1.33	1.0	0.67	0

See link for more information: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

READINGS: EXAMPLES OF READINGS (IN CANVAS, NO TEXTBOOK PURCHASE)

- O'Connor, Jim E. and John E. Costa, 2004, The World's Largest Floods, Past and Present: Their Causes and Magnitudes, U.S. Department of the Interior, U.S. Geological Survey Circular 1254 (pdf file on Canvas)
- O'Connor, Jim E. and John E. Costa, 2003, Large Floods in the United States: Where They Happen and Why. U.S. Department of the Interior, U.S. Geological Survey Circular 1245 (pdf file on Canvas).
- Readings on Florida Floods
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TENTATIVE TOPICS, SCHEDULE, AND ASSIGNMENTS

(Subject to change, details and updates in Canvas)

WEEK	Tentative Assignments	Points
	MODULE 1: BACKGROUND	
1	M1 Introduction Thread	10
1	**TOPIC: BACKGROUND TO FLOODS**	
1	M1 Current Event: Flood News discussion thread	20
2	M1A Watersheds, Rivers and Floodplains video worksheet	10
2	M1A Floodplains and Levees video worksheet	10
2	M1A Background to Floods Mini Quiz	10
3	**TOPIC: SCIENCE OF FLOODS**	
3	M1B Factors affecting Flooding	10
3	M1B Types of Flooding	10
3	M1B Killer Floods video worksheet	20
3	M1B In Class Breakout Group Hydrograph Interpretation	10
3	M1B Introduction to the Science of Floods Mini-Quiz	10
3	M1B Reading Large Floods in the United States Where they happen and why	10
3	M1B Data synthesis of large floods in Florida	30
4	**TOPIC: FLOODS AND SOCIETY**	
4	M1C Historic flood news discussion thread regarding Florida and brainstorming group projects	20
4	M1C Flood maps and understanding flood zones video worksheet	10
4	M1C Floodplain Maps Flood Risk and NFIP terms video worksheet	10
4	M1C Floodplain Maps-Understanding features of floodplain maps worksheet	10
4	M1C What is your flood zone?/Advice for a prospective flood zone resident	30
5	M1C Frontline-The Storm Video video worksheet	20
5	M1C Floods and Society Mini-Quiz	10
5	M1C Mitigation Assignment: Action Time Data Analysis with spreadsheets	30
	MODULE 2: PLEISTOCENE FLOODS	
6	**TOPIC: WHAT IS THE PLEISTOCENE?**	
6	M2A Pleistocene and its Floods BBC -The Big Freeze video worksheet	20
6	M2B Mystery of the Megaflood NOVA video worksheet	10
6	M2 In-class activity: Learning Google Earth and Flood Question Escape Room	20
7	M2 Crossword Puzzle Pleistocene Terms	10
7	M2A The Pleistocene-What was it Like? Mini-Quiz	10
7	**TOPIC: PLEISTOCENE FLOODS CASE STUDIES**	
7	M2B Missoula Megaflood Mini-Quiz	10
7	M2 Pleistocene Floods Film Fest Video Worksheet	10
8	M2 Reading The World's Largest Floods, Past & Present, Causes Magnitudes	10
8	M2C Lake Bonneville flood Mini-Quiz	10
8	M2 Jeopardy Review, Background to Pleistocene Floods	20
8	M2 Group Projects check-in	50

TOPICS, SCHEDULE AND ASSIGNMENTS (CONTINUED) (Subject to change, details and updates in Canvas)

	MODULE 3: HOLOCENE FLOODS	
9	**TOPIC: HOLOCENE FLOODS CASE STUDIES**	
9	M3 Storrega Britain's Stone Age Tsunami-Video Worksheet	20
9	M3 Geological Terms X-Word	10
9	M3A Aniakchak Megaflood Mini-Quiz	10
10	M3 Fronts and extratropical cyclones Video Worksheet	10
10	M3B Holocene Netherlands Mini-Quiz	10
10	M3 Bridge of Gods Landslide Dam Video	10
10	M3C Holocene Columbia River Mini-Quiz	10
10	In-class activity: Crowdsourcing International and Florida Floods	10
	MODULE 4: MODERN MIXED MARINE FLOODS	
11	**TOPIC: COASTAL AND MARINE FLOODS CASE STUDIES**	
11	M4 What are hurricanes, typhoons and tropical cyclones?	10
11	M4A Modern Marine Mixed-South Florida Hurricanes Mini-Quiz	10
11	M4 Tsunamis and Geologic Floods Videos Worksheet	10
11	M4 Florida Coastal Floods Literature Review	50
11	M4 Indian Ocean Tsunami-Wave that shook the world Video Worksheet	20
12	M4B Modern Mixed Marine Floods-Venice Mini-Quiz	10
12	M4 What is a Monsoon Video Worksheet	10
12	M4C Modern Marine Mixed-Bangladesh Mini-Quiz	10
12	M4 Business of Disaster Video Worksheet	20
12	M4 Varied Terms, Crossword Puzzle	10
	MODULE 5: MODERN RIVER FLOODS	
13	**TOPIC: RIVER FLOODS CASE STUDIES**	
13	M5 Ice Jam Flooding Video Worksheet	10
13	M5A Modern River Floods Red River of the North Mini-Quiz	10
13	M5 In-class activity: River floods news stories Crowdsourcing	10
13	M5 Mississippi River 1927-Fatal Flood Video Worksheet	20
13	M5 Florida River Floods Literature Review	50
14	M5B Modern River China Many Floods Mini-Quiz	10
14	M5 In-class activity: Google Earth and Flood Question Escape Room	20
14	M5 Dam Disasters Video Worksheet	20
15	M5 Jeopardy Review	20
15	M5 Projects Completion and Update	100
	TOTAL POINTS	1000

TENTATIVE DATES OF INTEREST IN RELATION TO THIS CLASS (NOTE: FALL MAY BE DISRUPTED BY TROPICAL SYSTEMS)

- August 22: First day of class
- October 14: Jeopardy Review
- October 21-23: Mossa out of town in Tuscaloosa
- November 11: Veterans Day
- November 18: Jeopardy Review
- November 23-28: Thanksgiving holiday
- December 4 and 5: Reading Days

COURSE AND UF POLICIES:

This course complies with all uf academic policies. For information on those polices and for resources for students: https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/