ESS 305 Geology of the National Parks
Spring 2020

Instructor: Mike Harrell, mharrell@ess.washington.edu, 206-543-0367 (a land line, so no text messages)
Office Hours: Wednesdays 1:30-2:20 pm or by appointment

Strongly Suggested Text: *Parks and Plates*, Robert J. Lillie. Chapters listed below are from this text.
Entirely Optional Text: *Geology of the National Parks*, Sixth Edition, Harris *et al*.

Course Websites: UW Canvas *and* https://courses.ess.washington.edu/ess-305/
Everything for the course, except the occasional administrative email, will be either posted directly on the Canvas site or linked to it. Some items intended for wider access will be hosted on the ESS departmental site, but again with a link from Canvas. Lectures, office hours, submissions, and exams will be handled through Canvas.

Exam Dates: Midterm on Monday, 4 May, 1:30-2:20 pm
Final on Monday, 8 June, 2:30-4:20 pm

Grading:

Online Discussion	10%
Midterm Exam	20%
Group Field Trip Guide	15%
Paper	20%
Group Presentation	15%
Final Exam	20%

Objective: Selection and creation of most of our national parks and monuments has involved the consideration of each region's distinctive geographic and geologic (tectonic, historical, and geomorphic) characteristics. We will examine a variety of national parks, seashores, and monuments as specimens of these characteristics as a basis for the appreciation of the interactions between geology and geography in defining these often striking features, as well as for an understanding of the variability of geologic and geographic regions in North America.

Among the goals of this course:

- Understand the evolution of the North American continent over time
- Research and analyze data and literature on geologic and geographic processes
- Use photos, satellite imagery, and maps to identify and make interpretations about the formative geologic and geographic processes in a region
- Effectively communicate relevant findings in both written and presentation formats

Group Field Trip Guide: Form a group of three and create a field trip guide to a national park. The guide should include an overview of the park, followed by defining the route (by road, trail, or waterway) including approximate distances along the route to different features that help define it as a park. Each stop along the route must be accompanied by a short description of whatever defines the feature(s) there as worthwhile, with an emphasis on either the direct or the indirect contribution of geologic factors to the significance of the stop. Photos of the features should be included in the guide. The guide should contain a reference list as well as suggested additional reading.

Each three-person group must choose a different park for this, with parks claimed on a first-come, first-served basis. Submit your list of group members and your choice of park to me via email as soon as you like but no later than **15 April**; I will keep an updated list of selected parks on the course website. You may not reserve a park for this until you have formed a group. Use the discussion forum on Canvas for group selection. National monuments and other similar locations may also be chosen as topics, provided the location's distinctiveness has a strong geologic component. See **Provinces and Parks** below. Washington's three national parks and Mt. St. Helens NVM may not be chosen, as these will be presented as examples.

Paper: Individually compose a six- to ten-page, double-spaced paper on a park of your choice, again first-come, first-served. You must choose a different location than the one used for your own group's field trip guide and group presentation but you may choose a park that a different group is using, if nobody else has already picked it for a paper. For the paper you may not choose one of the parks covered in lecture, as listed on the final page of this syllabus. Submit your choice of park as soon as you like, but again by **15 April**. Address such matters as location, topography, past and present climate, geologic significance, and cultural significance. Include a section that addresses the challenges facing your park, which may or may not include the following:

Personal vehicles (e.g. automobiles, snowmobiles, whitewater kayaks)
Relocation of species
Fire suppression
Grazing rights
Visitation limits/quotas
Climbing restrictions
Native American rights
Invasive species
Resource extraction
Handicap accessibility

Figures and photographs are encouraged but do not count towards the page length. All work must include references.

Group Presentations: Again working in a group of three (either the same group as the field trip guide or a different group), prepare an online presentation in a style similar to the lectures and present it via Canvas during the week of 2-5 June. You may use the same park as your field trip guide (as long as it's not one I'm covering in lecture; see below) or a different park but each presentation must be of a different park than the other presentations. This may raise a conflict if a field trip group later ends up with members in different presentation groups who want to do the same park, but again the rule of first-come, first-served will be used to resolve any such issues. Choose your group and park by **15 April**.

Each group will give a 10-minute presentation on their park. The presentation should address the same general matters as the paper, although the time limit means that your group should focus upon whatever is geologically most relevant for your park. You are *strongly* encouraged to stay within the allotted time; success in planning and presenting a talk of the appropriate depth, breadth, and length is one aspect of your grade. I encourage everyone to watch all of the presentations. Material from these will appear on the final exam, so at a minimum plan to to be familiar with at least three presentations other than your own. Presentations must be posted during the week of 1-5 June with specific deadlines to be determined by random draw. You will be notified of your group's deadline before the end of April.

Provinces and Parks: A full list of parks and monuments is available on pp 12-13 of *Parks and Plates* and I am amenable to other choices if you can make a compelling case. To summarize your options:

<u>For the field trip guide</u> your group may choose any site except Mt. Rainier, Mt. St. Helens, the North Cascades, and the Olympics. Each group must choose a different site from other field-trip groups, first-come, first-served.

<u>For the paper</u> you may choose any site except those listed on the last page of this syllabus. Your selection must be different than your own group's field trip guide and your own group's presentation. Each paper must be on a different site than the other papers, first-come, first-served.

<u>For the presentation</u> your group may choose any site except those listed on the last page of this syllabus. Each presentation must be on a different site than the other presentations, first-come, first-served.

A Few Useful Websites:

National Parks Service	nps.gov	
US Geological Survey	usgs.gov	Parks are at usgs.gov/science-support/osqi/yes/national-parks/
US Forest Service	fs.usda.gov	
Bureau of Land Management	blm.gov	

Accommodation: Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW's policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/students/religious-accommodations-request/). Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/).

Schedule (subject to revision):

30 March - 3 April	introduction to course	
6-8 April	review of Earth's structure and plate tectonics	Chapters 1 and 2
10-13 April	geologic time scale and continental cratons *Voyageurs NP*	Chapter 10
15 April	rocks **topics due for groups and individuals by 5:00 pm**	
17 April	geologic provinces of North America	
20-22 April	passive margins *Mammoth Caves NP* formation and slow demise of the Appalachians *Great Smoky Mountains NP*	Chapter 4 and pp 221-227 Chapter 6
24-27 April	passive margins continued *Grand Canyon NP*	
29 April - 1 May	convergent plate boundaries uplift, accreted terranes, and alpine glaciers *Denali NP, North Cascades NP, Olympic NP, Rocky Mountain NP*	Introduction to Part III Chapters 5 and 11
4 May	**midterm exam, 1:30-2:20 pm**	
6-11 May	subduction zones *Mt Rainier NP, Mt St Helens NVM, Yosemite NP*	
13-18 May	continental rifts and transform boundaries *Death Valley NP*	Chapters 3 and 7
20-22 May	oceanic hotspots *Hawaii Volcanoes NP*	Chapter 8
27-29 May	continental hotspots *Yellowstone NP*	Chapter 9
1-5 June	**group presentations (deadlines assigned throughout the week)**	
5 June	**group field trip guide due by 5:00 pm**	
8 June	**final exam, 2:30-4:20 pm**	
10 June	**paper due by 5:00 pm**	