Welcome to OS204-A - Physical Geology!

Physical Geology is the study of Earth processes, timescales and forms: mineral crystallization, salt precipitation, rock metamorphism, landform deformation; plate tectonics, volcanic eruptions, earthquakes; ore formation and mining; rivers and coasts; glaciation; erosion and deposition of sediment; human interactions with the landscape and who and how defines the Anthropocene.

Note: We will have the opportunity to visit the Maine Coast Heritage Trust (MCHT) salt marsh restoration site on Old Pond Marsh in Hancock, ME during this semester; OS is collaborating with MCHT on the long-term monitoring of the marsh restoration. The monitoring assessment will likely take place on a weekend early in the semester; we'll discuss scheduling and transportation during the first week of class to confirm interest and availability. Participation is optional, but is definitely encouraged.

Assessments:

- Weekly Post and/or Discussion - 15%
- STEM and Society Discussion - 10%
- Research Article Reviews - 10%
- Lab Participation + Deliverables - 10%
- Exam 1 - 15%
- Exam 2 - 15%
- Class Presentation - 10%
- Final Exercise - 15%

Grade Assignment

90 and above = A; 80-89 = B; 70-79 = C; 60-69 = D; Below 60 = F

Assessments Details

- **Weekly Discussion:**
  - Discussion on themes/topics connected to the week's class content.
- **STEM and Society Discussion** – open class discussion; guiding questions provided in class.
  - **Week 6**: Barra (2021). Good Sediment: Race and Restoration in Coastal Louisiana. Annals of the American Association of Geographers, 111:1, 266-282.
  - **Week 12:** Hardy et al. (2017). Racial coastal formation: The environmental injustice of colorblind adaptation planning for sea-level rise. Geoforum. 87: 62-72.
- **Research article review** – questions provided (due Week **5** and Week **10**; pick 2 of the 3).
  - **Article 1**: Seddon et al. (2020). Understanding the value and limits of nature-based solutions to climate change and other global challenges. Phil. Trans. R. Soc. B 375.
  - **Article 2**: Valiela et al. (2018). Transient coastal landscapes: Rising sea level threatens salt marshes. Science of the Total Environment. 640 – 641: 1148 -1156.
  - **Article 3:** Raposa et al. (2023). Evaluating Thin-Layer Sediment Placement as a Tool for Enhancing Tidal Marsh Resilience: A Coordinated Experiment Across Eight US National Estuarine Research Reserves. Estuaries & Coasts. 46: 595 – 615.
- **Lab - Deliverables** - details to be provided in lab for relevant lab exercises.
- **1st Exam** – Week 7 – In class
- **2nd Exam** - Week 11 – In class
- **Class Presentation** - A 15 min. presentation on a course-relevant subject of your choosing
- **Final Exercise** – details to be provided prior to the exercise.

Class and Lab Schedule (schedule may change; changes will be announced in class)

Dates (Week [W])	Content Syllabus	Location
Aug 30 (W1)	Introduction and Understanding Science	
Sept 1	Scientific Revolutions: Plate Tectonics	
Sept 1 - LAB	Lab Safety + Introduction to Geology	Lab
Sept 5 (W2)	Structural Models of the Earth	
Sept 7	Field Trip – CLASS AND LAB	Pond Island
Sep 12 (W3)	Geological Processes - Time Scales	
Sept 14	Formation and Deformation Processes	
Sept 14 - LAB	Grain Size Analysis	Lab
Sept 19 (W4)	Mapping Pond Island Data	
Sept 21	Mineralogy and Crystallization	
Sept 21 - LAB	Mineralogy ID	Lab
Sept 26 (W5)	Igneous Petrology	[Article #1 due]
Sept 28	Ore Deposits and Callahan Mine	
Sept 28 - LAB	Crystallization Demonstration	Payson Roof Deck
Oct 3 (W6)	Sedimentary and Metamorphic Petrology	
Oct 5	Field Trip – CLASS AND LAB	Callahan Mine
Oct 10 (W7)	**Exam 1**	
Oct 12	STEM and Society Discussion - Barra (2021)	
Oct 12 - LAB	Sediment Transport Studies (Part I)	Hatch Cove

Dates (Week [W])	Content Syllabus	Location
Oct 17 (W8)	Sediment Transport	
Oct 19	Documentary (River)	
Oct 19 – LAB	Sediment Transport Studies (Part II)	Hatch Cove + Lab
Oct 24 (W9)	Analysis of Cohesive Sediments	
Oct 26	Coastal Geomorphology	
Oct 26 - LAB	Sediment Erosion + Turbidity Lab (Part I)	Waterfront
Oct 31 (W10)	Glaciology	
Nov 2	Paleoclimatology	[Article #2 due]
Nov 2 - LAB	Sediment Erosion + Turbidity Lab (Part II)	Waterfront
Nov 7 (W11)	**Exam 2**	
Nov 9	Topographic Maps	
Nov 9 - LAB	Topographic Treasure Hunt – Landforms	Castine
Nov 14 (W12)	Environmental Geology & Public Health	
Nov 16	Groundwater and Surface Water Chemistry and Treatment	
Nov 16 - LAB	Field Trip – Castine Water Supply	Castine
Nov 20 – 24	THANKSGIVING BREAK	
Nov 28 (W13)	Introduction to GIS - Social Vulnerability Mapping	
Nov 30	STEM & Society Discussion - Hardy et al. (2017) + Sapelo (Doc)	
Nov 30 - LAB	Science Communications	Classroom
Dec 5 (W14)	Castine - Geology and Infrastructure	
Dec 7	Restoration & Ecological Engineering	
Dec 7 - LAB	Class Presentations	Classroom
Dec 11 – 15	**Final Exercise**	**Classroom**