

ORIGIN OF SEDIMENTARY ROCKS

3 Credits; Lecture MF 11:30-12:20 (POST 703), Lab W 1:30-4:20 (POST 703)

Instructor: Craig Glenn (POST 720; glenn@soest.hawaii.edu; Tel X62200)

GG/OCN 641 examines processes that form sediments and sedimentary rocks, their sedimentology, petrography/petrology, stratigraphy, and sedimentary facies analysis. The course is cross-listed between Geology and Geophysics and Oceanography. Lab work follows the lectures. Grades are determined on the basis of lab work and quizzes (33%), a midterm exam (30%) and a final exam (37%). Lab work must be handed in on time, neat, detailed and complete. Time necessary for lab work normally exceeds the scheduled afternoon lab period, so, plan accordingly. Field trips on Oahu are required and we will also make some short visits to a few of the analytical facilities here at UHM.

TEXTS and READINGS:

1. Tucker, M.E., 2001, *Sedimentary Petrology*, Third Edition
2. Other specific reprints will also be assigned periodically.
3. 3 Ring Binders: Get Ready for Lots of Handouts!

SUPPLEMENTAL:

- Adams et al., 1984, *Atlas of Sedimentary Rocks Under the Microscope*
- Bathurst, R.G.C., 1975, *Carbonate Sediments and their Diagenesis*, 2nd edition.
- Blatt, H., Middleton, G. and Murray, R., 1972, *Origin of Sedimentary Rocks*.
- Blatt, H., 1992, *Sedimentary Petrology*, Freeman and Co., New York, 514pp.
- Boggs, 1992, *Petrology of Sedimentary Rocks*
- Friedman and Sanders, 1978, *Principles of Sedimentology*.
- Morse, J.W., and Mackenzie, F.T., 1990, *Geochemistry of Sedimentary Carbonates*
- Pettijohn, 1975, *Sedimentary Rocks*
- Pettijohn, Potter and Siever, 1973, *Sand and Sandstone*
- Pettijohn and Potter, 1964, *Atlas and Glossary of Primary Sedimentary Structures*
- Reading, H.G., (Ed.), 1986, *Sedimentary Environments and Facies*, 2nd ed.
- Reineck and Singh, 1973, *Depositional Sedimentary Environments*
- Rezak, R., and Lovoie, D.L., Eds., 1993, Springer-Verlag, New York, 313pp.
- Scholle, P.A., 1978, *A Color Illustrated Guide to Carbonate Rock Constituents, Textures, Cements and Porosities*. AAPG Mem. 27.
- Scholle, P.A., 1979, *A Color Illustrated Guide to Constituents, Textures, Cements and Porosities of Sandstones and Associated Rocks*. AAPG Mem. 28.
- Tucker, M.E., and Wright, V.P., 1990, *Carbonate Sedimentology*. Blackwell, Oxford, 482pp.
- Williams, Turner and Gilbert, 1982, *Petrography - An introduction to the study of rocks in thin section*, 2nd edition.
- Wilson, J.L., 1975, *Carbonate Facies in Geologic History*

- GG 641 TENTATIVE LECTURE AND LABORATORY OUTLINE -

<u>Ed.</u>	<u>DATE</u>	<u>TOPIC</u>	<u>Tucker, 3rd</u>	
August	25 (Mon)	Lec: Course overview, the rock cycle revisited	Ch. 1	
	27 (Wed)	Lab: <i>Microscope Assignments & Calibration</i>		
	29 (Fri)	Lec: Weathering Reactions	Handouts	
Sept.	1 (Mon)	HOLIDAY: LABOR DAY		
	3 (Wed)	Lab: SOEST Analytical Facilities Tour		
	5 (Fri)	Lec: Weathering, Soils. Sedimentary Textures.	Ch. 2.1 & 2.2	
	8 (Mon)	Lec: Sedimentary Textures, Textural Maturity		
	10 (Wed)	Lab: <i>Sedimentary Textures</i>		
	12 (Fri)	Lec: Sedimentary Structures	Ch. 2.3.2 - 2.3.4 & 2.11	
	15 (Mon)	Lec: Introduction to Siliciclastic Rocks & Provenance Studies	Ch. 2.5-2.6, 2.8	
	17 (Wed)	Lab: <i>Sedimentary Structures</i>		
	19 (Fri)	Lec: Tectonic Reconstructions/ Provenance Studies	Ch. 2.8	
	22 (Mon)	Lec: Quartzose and Arkosic Sandstones	Ch. 2.7	
	24 (Wed)	Lab: <i>Sandstone Petrology I</i>		
	26 (Fri)	Lec: Arkoses/Litharenites	Ch. 2.7	
	Oct.	29 (Mon)	Lec: Graywackes and the "Graywacke Problem"	Ch. 2.7
		1 (Wed)	Lab: <i>Sandstone Petrology II</i>	
		3 (Fri)	Lec: Siliciclastic Diagenesis	Ch. 2.9 - 2.10
6 (Mon)		Lec: Midterm Examination		
8 (Wed)		Lab: Actually a Lecture: Carbonate Mineralogy and Chemistry	Ch. 4.1-4.6	
		Nomenclature exercise DUE: October 17		
10 (Fri)		Lec: The Wonder of Carbonate Systems		
13 (Mon)		Lec: Carbonate Petrology		
15 (Wed)		Lab: <i>Carbonate Lab I: Components and Classification</i>		
17 (Fri)		Lec: Reefs and Other Carbonate Buildups	Ch. 4.10.2 –4.10.8	
20 (Mon)	Lec: Slides and Film: Modern Carbonates			
22 (Wed)	Lab: Open Lab			
24 (Fri)	Lec: Film Arid versus Humid Carbonates			

	27 (Mon)	Lec: Carbonate Diagenesis	Ch. 4.7, 4.9
	29 (Wed)	Lab: <i>Field Trip to Barbers Point</i>	
	31 (Fri)	Lec: Carbonate Diagenesis	
Nov.	3 (Mon)	Lec: Dolomites and the Dolomite Problem	Ch. 4.8
	5 (Wed)	Lab: <i>Barbers Point Petrology Lab</i>	<i>Sherman et al. Reprint</i>
	7 (Fri)	Lec: Dolomites and Evaporites	Ch. 4, Ch. 5
	10 (Mon)	Lec: Evaporites	
	12 (Wed)	Lab: <i>Barbers Point Petrology Lab</i>	
	14 (Fri)	Lec: Deep Sea Sediments	Ch. 4, Reprints
	17 (Mon)	Lec: Deep Sea Sediments (Film)	
	19 (Wed)	Lab: <i>Carbonate Platform Exercise</i>	
	21 (Fri)	Lec: <i>Siliceous Sediments and Cherts</i>	Ch. 9/7
	24 (Mon)	Lec: Phosphorites	Ch. 7
	26 (Wed)	Lab: <i>Chemical Sediments Laboratory</i>	
	30 (Fri)	Instructional Holiday for Thanksgiving	
Dec.	1 (Mon)	Lec: Phosphorites, glauconites (Film)	
	3 (Wed)	Lab: <i>Chemical Sediments Laboratory Cont'd</i>	
	5 (Fri)	Lec: Ironstones, Iron Formations	Ch. 6
	8 (Mon)	Lec Review for Final; Bring Questions!	
	10 (Wed)	Lab: <u>All Labs Due</u>	
	15 (Fri)	FINAL EXAM 9:45-11:45, POST 703	