TEXT: - Principles of Sedimentary Deposits, by Friedman, Sanders and Kopaska-Merkel, 2nd edition, Macmillan, Publisher (out of print, but copies may be purchased on web) - (FSKM) - Invertebrate Paleontology and Evolution, by E.N. K. Clarkson, George Allen & Unwin, Publisher; or you can use any Invertebrate paleontology book – (CL)

Stratigraphy integrates the principles and knowledge from Physical Geology (Intro to Earth Sciences), Mineralogy, Petrology (Earth Materials), Structural, Paleontology, Oceanography, and other fundamental sciences such as Chemistry and Physics. Knowledge you acquired in these subjects will allow you to understand the stratigraphic record of sedimentary rocks for paleoenvironmental and tectonic reconstructions. The main objective is to make you become proficient in all paleoenvironmental aspects that can be deduced from the analysis of sedimentary rocks.

In order to achieve this objective, we will first review all the fundamental rules about proper naming and identification of fossils, which provide the bulk paleoenvironmental information. You will also review the fundamental properties of the igneous and metamorphic minerals, which provide information about geodynamic activities of the earth crust.

COURSE OUTLINE

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>READING</th>
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<tbody>
<tr>
<td>Aug 21 - 23</td>
<td>Introduction – – Preliminary Test.</td>
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<tr>
<td>Aug 28 - 30</td>
<td>Methods and Objective of Stratigraphy Nomenclature Rules Taxonomic problems. Taxonomic Assignment (5% Total grade)</td>
<td>Hand out</td>
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<tr>
<td>Sept 04 –06</td>
<td>Part I Paleontology and Stratigraphy: Importance of fossils as indicators of environments and time. Reviews of the main groups of Invertebrates as rock-forming components of sedimentary strata. Environmental significance. Prokaryotes (Cyanobacteria ).</td>
<td>Hand out</td>
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<tr>
<td>Sept 11-13</td>
<td>Protista: Diatoms, Nannos, Radiolaria and Foraminifera.</td>
<td>Hand out</td>
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<td>Sept 18 (T)</td>
<td>Porifera, Archaeocyathids, Stromatoporoids and Cnidarians</td>
<td>CL + Hand out</td>
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<tr>
<td>Sept 20 (R)</td>
<td>Bryozoan, Brachiopods, Mollusks, Arthropods and Echinoderms</td>
<td>CL + Hand out</td>
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<tr>
<td>Sept 25-27</td>
<td>Graptolites; Origin of Chordates. Vertebrates. (T) Assignment on minerals (10% Total Grade) Due Oct. 04.</td>
<td>CL + Hand out</td>
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<tr>
<td>Oct 02 (T)</td>
<td>Part II (FSKM): Provenance of sedimentary particles; sedimentary Textures; shape; size; fabric.</td>
<td>Ch. 2 +Hand out</td>
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<tr>
<td>Oct 04 (R)</td>
<td>Fabric; packing; statistical meaning of sedimentary textures Mineral properties and weathering mechanisms.</td>
<td>Ch. 5, 7, 9</td>
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<tr>
<td>Oct 09 (T)</td>
<td>Sedimentary Structures -Secondary or epigenetic structures concretions, stylolite, cone-in-cone, microfracture, liesegang ring, etc.</td>
<td>Ch. 5, 7, 9</td>
</tr>
</tbody>
</table>

Oct. 11 (R) MID-TERM 30 % TOTAL GRADE
Oct 16 - 18  Transport mechanisms - Hydraulic transport of particles:
               Fluid properties - laminar, turbulent flows
               Particle motions in turbulent flows: traction; saltation, creep
               Particle behavior in stationary fluids, Stoke’s law - suspension
               Hydraulic fractionation; eolian transport
Oct 23- 25 Classification of sedimentary rocks; Siliciclastic rocks
               Carbonates; origin and classification; Shallow-water and Deep-water
               Carbonates. Ch. 3, 4
               Ch. 10, 12, 13, 14
Oct 30- Nov 01: Other pelagic deposits and methods; Dolomite - Dolomitization
               Depositional systems
Nov.  -06  - 08  Stratigraphic concepts and methods; The data base.
               Biostratigraphic concepts in correlation.
Nov. 13 – 15  Biostratigraphy: Biozonation, significance; index taxa; graphic correlation
               Hand out
Nov. 20(T)  Chronostratigraphy and geologic time; Stratigraphic methodologies

Nov. 22 (R)  THANKSGIVING HOLIDAY

Nov. 27 -  Lithostratigraphy; Sequence stratigraphy
               Stratigraphic Correlation
               Ch. 6
               Hand out
Nov. 29  Oral presentations of independent projects  10% TOTAL GRADE

THURSDAY  DECEMBER 06  FINAL EXAMINATION  12:00 – 2:00 PM

GRADING: The final grade will be computed as an average of the total scores of the
assignment, mid-term, independent project, and final exams = 300 points. Mid-term exams
cover all lectures since the previous exam. The final exam is comprehensive: covers all
lectures. Passing Grades are based on the following numerical values of total points earned in
exams plus bonus points: for instance: A = 288 and above, A- = 287-270; B+ = 269-258;
B = 257-255; B- = 254 - 240; C+ = 239 – 231; C = 230 – 224; D = 222 - 203; F = below 202.

NOTE: Students should make arrangement to discuss their independent projects individually.
There will be two (2) to three (3) field trips to be scheduled toward the end of the term. Field trips
will be on Saturdays/Sundays and will last the whole day.

Sites to be visited will include Alice Wainwright Park; Coco Plum Circle, Virginia Key, and/or Key
Biscayne, Anastasia Formation of Martin and Palm Beach Counties, Jonathan Dickenson Park,
Juno Dunes, House of refuge;  Key Largo limestone, Windley Key Quarry, Bahia Honda Key

November 04 – 08: Geological Society of America Annual meeting, Indianapolis, Indiana.

SUGGESTED READING (classic papers, but you should regularly consult geology
journals: GSA; AAPG; SEPM; AGU; Sedimentology, and others) to keep you up-to-date.

population: examples from the Cretaceous and Eocene conglomerates of the San Diego
area, California: Journal of Sedimentary Petrology, v. 48, No. 1, p. 31-42.
Alling, H. L., 1941, A diaphragm method for grain size analysis : Journal of Sedimentary
Petrology, v. 11, p. 28-31
14, p. 103-114.


Beerbower, J. R., 1968, Search for the Past, Prentice Hall Publisher.


Emery, D., and Myers, K. J., editors, 1996, Sequence Stratigraphy. Blackwell Science Ltd., Publisher


Shrock and Twenhofel, 1968, Principles of Invertebrate Paleontology, MacGraw Hill, Publisher (QE770.T8)


Diagenesis
Noel, James, P., and Jonathan A. D. Clarke, editors, 1997, Cool-water carbonates, SEPM Special Publication No. 56, 440 p.

RESS IPSA LOQUITUR