

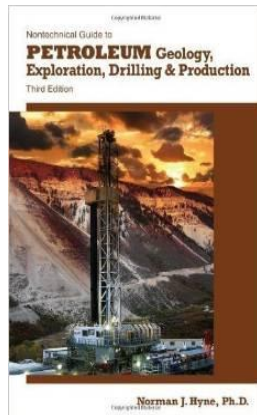
### **COURSE DESCRIPTION**

Principles of geological patterns, rock shapes and structures, and reservoir formations associated with petroleum operations

#### *Learning Outcomes:*

Students will be able to understand the fundamentals of geology in terms of environments of sedimentary deposition, petroleum occurrence, exploration, and recovery. The students will also learn an integrated overview of petroleum geology concepts and vocabulary in clear, easy-to-understand language.

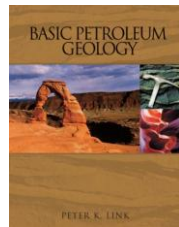
### **TEXTBOOK**



Petroleum Geology, Exploration, Drilling & Production by Hyne PennWell, 3<sup>rd</sup> Edition

Additional materials may be provided by the instructor

#### Supplementary Textbook:



Basic Petroleum Geology, 3<sup>rd</sup> edition 2007, by Peter K. Link, PennWell ISBN10 0-930972-22-8

### **INSTRUCTOR**

Abi Olowe, Ph.D Materials Science and Engineering, MCP

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Dr. Olowe has been involved with academics and training most of his career. He was Associate Professor at Western Michigan University (1993-1999). Dr. Olowe worked in the Petroleum industry as a programmer, chemist, and corrosion engineer. Among other things, his expertise is in Curriculum Development, Professional Training, Internet Applications Development, and Technical Projects Management. Dr. Olowe is also a Microsoft certified programmer; he has published 12 theological books and over 45 scientific publications. Professor Olowe currently teaches Petroleum Engineering Technology at HCC.

#### *Education:*

- BS Mechanical Engineering from the University of Ibadan, Nigeria, 1981
- M.Phil Materials Science from the University of Lorraine, Nancy, France, 1985
- Ph.D (with distinction) Materials Science and Engineering from the University of Lorraine, Nancy, France, 1988

Office Hours: Thursday 1– 2 pm or by appointment

## COURSE OUTLINE

### Introduction, Rules, Syllabus, and Overview of Course

1. Introduction to Petroleum
  - Definitions: Fossil fuels, Petroleum and Crude oil
  - World petroleum reserves
  - Chemistry of oil and gas
  - Chemical and physical properties of crude oil
  - Petroleum products
2. Earth Structure
  - Chemical makeup of Earth Layers
  - Techniques used to study Earth Layers
  - Earth Crust: oceanic and continental
  - Temperature Gradient of Earth's Crust
  - Offshore Geology - Salt Basins
3. Rocks and Minerals
  - Minerals
  - Types of Rocks
  - Igneous rocks and their formation
  - Metamorphic rocks and their formation
  - Sedimentary rocks and their formation
  - Rock cycle
4. Geological Time and Fossils
  - Age dating techniques
  - Geological Time Scale
  - Fossils and Microfossils
5. Deposition of Sedimentary Rocks
  - Weathering: physical and chemical
  - Erosion and deposition
  - Unconformities
  - Facies
6. Ocean Environment and Plate Tectonics
  - Continental margins: shelf, slope, and rise
  - Pangaea and continental drift
  - Plate tectonics
  - Plate boundaries: divergent, convergent, and transform
  - Forces acting and impact of forces at plate boundaries
7. Deformation of Sedimentary Rocks
  - Forces on rocks: sources and types
  - Stress and Strain
  - Elastic and plastic deformation
  - Ductility and Brittleness: influence of temperature
  - Types of Rock Deformation: Folds and Fractures, dip and strike
  - Physical factors that affect deformation of rocks
  - Types of folds: anticlines, synclines, and domes
  - Types of fractures and forces: joints and faults
8. Mapping
  - Topographic Maps
  - Latitude and Longitude
  - Geologic Maps
  - Subsurface Maps
9. Source Rocks
  - Properties and examples of source rocks
  - Generation, migration, and accumulation
10. Reservoir Rocks
  - Properties and examples of reservoir rocks
  - Porosity: types, measurement, sorting, factors that affect porosity
  - Permeability: measurement, factors that affect permeability
  - Saturation
  - Sandstone reservoirs: dune, shoreline, river, and delta

- Carbonate reservoirs: reefs, limestone, karst, chalk, and dolomite
  - Fractured reservoirs
11. Petroleum Traps
- Types of Traps: structural, stratigraphic, and combination
  - Structural traps, Stratigraphic traps, Combination traps

## **GRADING POLICY**

### *Assessments:*

Assignments and Quizzes:	32%
Tests:	48%
Final Exam:	20%

There will be a minimum of 3 tests. Each test is multiple choice. Bring scantron when coming for test or Final. Tests may be taken online at <http://quizstar.4teachers.org>.

The student will be assigned *username* and *password*.

### *Grading Assignments*

The course grade is recorded as A (90-100%), B (80-89%), C (70-79%), D (60-69%) or F (0- 60%). In accordance to HCC policy, plus or minus grades are not given.

### *Make up Tests*

Generally, there will be no make-up tests given.

### *Attendance Requirement*

All students are required to be on time for lectures and highly encouraged and challenged to participate during lectures in the course. The instructor uses attendance for borderline grades.

## **ATTENDANCE AND WITHDRAWAL POLICY**

All students are required to be present during class sessions. Students must communicate timely with the instructor in cases they need to be absent from a class period.

Withdrawal policies apply as they are described in the HCC policy, rules, and regulations. All students must consult the HCC Student Handbook and College Catalogue regarding withdrawal policies.

## **ACADEMIC HONESTY**

All HCC rules, policies, and regulations apply as they are described in the 2007 HCC Student Handbook.

## **STUDENTS WITH DISABILITIES:**

"Any student with a documented disability (e.g. physical, learning, psychiatric, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the Disability Services Office at the respective college at the beginning of each semester. Faculty is authorized to provide only the accommodations requested by the Disability Support Services Office." For questions, contact Donna Price at 713-718-5165 or the Disability Counselor at your college. To visit the ADA Web site, log on to [www.hccs.edu](http://www.hccs.edu), click Future Students, scroll down the page and click on the words Disability Services.

*Emergency Preparedness:* Call HCC Police at 713-718-8888: Place number in your phone now if you have not already done so.

## **HCC INSTRUCTIONS TO THE STUDENTS**

1. HCC is a college institute, so the professional behavior will be applied in the class and during the class time between the students and Instructor and/or between the students themselves.
2. All the HCC rules and regulations will be applied in the semester, and for all courses/classes.

3. Any student's attempt to cheat or actual cheating alone or with another student will be given ZERO grade and dismissed from the class (for both). Additionally, a report will be written against he/she/they and submitted to the appropriate HCC officials, and all the other related HCC rules will be applied.
4. Students will not be allowed to speak directly to each other during class or reply to a question without the required permission from the Instructor.
5. Students must respect the class time, Instructor, and other students. No acceptance for any student later than 20 minutes from lecture start time for any reason, and the student will be considered absent since the attendance will be calculated in the beginning of the class period.
6. The Instructor will drop or FAIL any student from the class due to his/her absence reaching (4) classes or more of all the semester class time.
7. Any electronic devices (cell phone, iPhone, and any other similar) except laptops will not be permitted in the class for any reason and all the students must TURN OFF these devices before entering the class, and keep them in their bag or pocket.
8. No food or drinks are allowed in the class room with exception of one bottle of water.
9. Any misbehavior by any student, he or she will receive a verbal notice for the first time. If it is repeated he/she will be dismissed from class and a report will be written and issued to the Dean of the HCC/Northeast Campus. He or She will not be accepted back into class.
10. It is not allowed for any student to leave the class during test time for any reason (even for the restroom) unless he/she finishes the exam and delivers the exam's paper to the Instructor.
11. The student commitments: Read the chapters in the **Textbook, Handouts and watch VIDEOS.**

### **EGLS<sub>3</sub> (Evaluation for Greater Learning Student Survey System)**

At Houston Community College, professors believe that thoughtful student feedback is necessary to improve teaching and learning. During a designated time near the end of the term, you will be asked to answer a short online survey of research-based questions related to instruction. The anonymous results of the survey will be made available to your professors and department chairs for continual improvement of instruction. Go to [www.hccs.edu/egls3](http://www.hccs.edu/egls3) for more information.