Course Description
Overview of computer applications in exploration; covers the history, fundamentals, terminology and software for exploration; introduction to the principles of geology, geophysics and petrophysics. Credit: 4

Learning Outcomes:
In lecture sessions, students will learn the principles of geology, geophysics, and petrophysics applied to petroleum exploration.
In laboratory sessions, students will gain applying knowledge in managing and manipulating petroleum exploration data, creating work product such as maps and well logs montages. They will also demonstrate skills and competencies in cross sections, gravity and seismic interpretation. There will be emphasis on the use of spreadsheets.

Textbook
Petroleum Exploration Data Management Lecture Guide by Abi Olowe
Petroleum Exploration Data Management Laboratory Guide by Abi Olowe
Petroleum Exploration Data Management Laboratory Sessions by Abi Olowe

Additional materials may be provided by the instructor

Supplementary Textbook:
Petroleum Geology, Exploration, Drilling & Production by Hyne PennWell, 3rd Edition

Instructor
Abi Olowe, Ph.D
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E-mail: abiodun.olowe@hccs.edu

Dr. Olowe has been involved with academics and training most of his career. He was Associate Professor at Western Michigan University (1993-1999). 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 and has published 12 theological books. 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: flexible

NOTE: The instructor reserves the right to modify the syllabus, course requirements, assignments, grading procedures, and other related policies as changes take place during the semester; however, proper notice will be given.
Course Requirements and Grading Policy

Assessments:
Lab and Project: 38%
Tests: 42%
Final Exam: 20%

Tests may be taken online at http://quizstar.4teachers.org.
The student will be assigned userid and password which will be used for all the tests and final exam; you must store it.

Grading Assignments
The course grade is recorded as A (90-100%), B (80-89%), C (70-79%), D (60-69%) or F (0-59%). In accordance to HCC policy, plus or minus grades are not given.

Make up Tests
Generally, there will be no make-up tests given. However, the instructor reserves the right to allow for ONLY 1 make up test based on conviction; the student must provide written evidence for missing the test.

Attendance Requirement
All students must participate in Group Lab work to receive credit. The student is required to be on time for lectures and highly encouraged to participate during lectures. 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, 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/them 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 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\textsubscript{3} (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/egls\textsubscript{3}](http://www.hccs.edu/egls3) for more information.

**Lecture Outline**

8 am –1 pm; Classroom STECH 312

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. Introduction to Exploration
   - Exploration scientists and engineers: geologists, geochemist, geophysicist, petrophysicist
   - Geologists: petroleum, development, and exploration geologists
   - Source, reservoir, and trap
   - Exploration history, Seeps
   - Geological techniques: maps and correlation
   - Geochemical techniques
   - Plays and trends

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. Depositional Defects of Sedimentary Rocks
   - Weathering: physical and chemical
   - Erosion and deposition
   - Unconformities
   - Facies
6. Earth Crust and Plate Tectonics
   - Earth layers and compositions
   - Earth Crust: oceanic and continental
   - Temperature gradient of Earth crust
   - 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. Source Rocks
   - Properties and examples of source rocks
   - Generation, migration, and accumulation
9. Reservoir Rocks
   - Properties and examples of reservoir rocks
   - Porosity: types, measurement, sorting, factors that affect porosity
   - Permeability: measurement, factors that affect permeability
   - Relationship between porosity and permeability
   - Saturation
   - Sandstone reservoirs: dune, shoreline, river, and delta
   - Carbonate reservoirs: reefs, limestone, karst, chalk, and dolomite
   - Fractured reservoirs
10. Petroleum Traps
    - Types of Traps: structural, stratigraphic, and combination
    - Structural traps
    - Stratigraphic traps
    - Combination traps

Laboratory Outline

8 am – 1 pm; Library Computer Room 308

Laboratory Topics

1. Introduction to Excel: cells, functions, formulas, and charts
2. Mapping
   - Topographic Mapping
   - Geologic Mapping
   - Exact positioning: longitude and latitude, GPS
   - Interpolation and extrapolation
   - Geometry: degrees and radians, sin, tan, and cos
   - Base Map, Structural Map, Isopach Map, Percentage Map
   - Mapping software: GIS
3. Gravitational and Magnetic exploration
4. Seismic exploration and software
5. Well logs: lithologic log, time log, mud log, SP log, Resistivity log, Neutron log, Gamma log, density log, sonic log

6. Exploration software overview

Laboratory Sessions

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<thead>
<tr>
<th>Session</th>
<th>Subject</th>
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<tbody>
<tr>
<td>Session 1</td>
<td>Working with Microsoft Excel using world oil production statistics</td>
</tr>
<tr>
<td>Session 2</td>
<td>Topographic map case study</td>
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<tr>
<td>Session 3</td>
<td>Geologic Map: isopach map of Ewekoro limestone formation</td>
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<tr>
<td>Session 4</td>
<td>Structural Map: determination of dip and thicknesses of sedimentary layers</td>
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<td>Session 5</td>
<td>Gravity exploration of Taos</td>
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<td>Session 6</td>
<td>Seismic exploration analysis</td>
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<tr>
<td>Session 7</td>
<td>Projects: Exploration software submission and presentation (Teams of 3-4 People)</td>
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</tbody>
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**Tools**: 12in Ruler, pencil, Microsoft Excel

Note: This course outline may be reviewed as deemed appropriate at any time