Course title and number: PETE 643 - Oil Field Chemistry
Term: Spring 2014
Meeting times and location: TBD

Course Description and Prerequisites
The role of chemistry in well stimulation, water shut-off treatments, scale removal, mitigation, downhole corrosion issues, organic deposition, dementing, drilling fluids and various aspects of formation damage; includes problem identification as the first step in designing chemical treatment to remove formation damage.
Prerequisite: Graduate classification

Learning Outcomes or Course Objectives
The objectives of this course are for students to:

1. Highlight the importance of chemistry in well treatments. Oil, gas and water supply wells are damaged during their life time. Various types of damage can occur during drilling, completion and production.
2. Identify problems as the first step in designing chemical treatment to remove formation damage. Well completion, and type of fluids in the wellbore should be also considered. Failure to consider these parameters will result in more damage than originally thought.
3. Discuss field cases to reinforce the importance of problem identification and fluid selection that takes into account downhole equipment and well tubulars.

Instructor Information

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Textbook and/or Resource Material

Several textbooks will be used, including, but not limited to: Corrosion and Scale Handbook, J.R. Becker, 1998
Technology for Cleaning Industrial Equipment, W. W. Frenier, 2001
Chemicals for Oil Field Operations, J. I. DiStasio, 1981
Well Treatments and Water Shut-off by Polymer Gels, L.J. Zitha, 2000
Surfactants Fundamentals and Applications in the Oil Industry, L.L. Schramm, 2000
Grading Policies

Homework .......................................................... (40%)
Class Presentations ................................................... (30%)
Final Exam ............................................................. (30%)
Total .................................................................... (100%)

Grading Scale

A ........................................................................... 90-100%
B ........................................................................... 80-89%
C ........................................................................... 70-79%
D ........................................................................... 60-69%
F ........................................................................... 0-59%

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
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</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Inorganic Scale</td>
<td>Types of scales encountered in oilfield, Mechanisms of scale formation, Scale Removal Methods, Radioactive Tracer Logs, and Scale Mitigation Treatments</td>
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<tr>
<td>3-4</td>
<td>Organic Deposition</td>
<td>Asphaltenes and Waxes, Mechanisms of Organic Deposition, Removal of Organic Deposition, and Mitigation of Organic Deposition</td>
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<tr>
<td>5-7</td>
<td>Corrosion in the Oil Field</td>
<td>Review of corrosion theory, Corrosion protection during well stimulation, Corrosion protection in sour wells, Protection of Cr-based tubulars, Corrosion of organic acids, Microbial corrosion, and Removal of corrosion products</td>
</tr>
<tr>
<td>8-9</td>
<td>Acids Used in Carbonate Formations</td>
<td>Emulsified Acid, In Situ Gelled Acids, Viscoelastic Surfactant-Based Acids, Cement Bond Logs, and Foamed Acids</td>
</tr>
<tr>
<td>10-11</td>
<td>Acids Used in Sandstone Formations</td>
<td>Mud acids, Retarded HF-based acids, and Chelating Agents</td>
</tr>
<tr>
<td>12-13</td>
<td>Water Shut-Off Using Chemical Means</td>
<td>Sodium Silicate Gels, Inorganic scale as a means for water shut-off, Gelling Polymers using metal cross-linkers, and Relative permeability modifiers</td>
</tr>
<tr>
<td>14-15</td>
<td>Recent Advances in Cementing and Drilling Fluids</td>
<td>Light weight cements, Flexible cements, Acid Resistant cement, New weight material for drilling fluids, Emulsifiers used in oil-based mud, and techniques to remove various filter cakes</td>
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Other Pertinent Course Information
Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://www.tamu.edu/aggiehonor

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”