Instructor: Edith Chopin, Ph.D., Assistant Professor
Department of Chemistry
Office: 252 SEB
Phone: 248-370-2339
Email: chopin@oakland.edu

Class: Tuesdays & Thursdays 7:30 – 9:17 PM in 130 SEB

Office hours: “open door” 252 SEB or by appointment

Objectives:

1. Identification and characterization of different types of soils.
2. Understanding of the soil mineralological, physical, biological and chemical properties and how these properties influence soil functions.
3. Knowledge of soil functions, relationship with soil properties and classification, and how it relates with soil use and management.
4. Understanding of the human impact on the soil environment.
5. Knowledge of environmental contamination and deficiency issues and of possible remediation practices.

Tentative schedule and Topics:

1. Introduction to Soil Science
2. Processes of soil formation
   a) Weathering, erosion and leaching processes
   b) Environmental factors governing soil formation
   c) Soil classification and associated soil functionality and land use purpose
3. Soil mineralogy
   a) Clay minerals: classification, structure and reactivity
   b) Oxides and hydroxides: classification, structure and reactivity
4. Soil ecosystem
   a) Organisms: nature, activities and role
   b) Organic matter: characterization, accumulation and decomposition
   c) Rhizosphere: rhizospheric soil properties, element uptake and translocation,

5. Soil water
   a) Water fluxes
   b) Water chemistry: element mobility and transport

**Mid-term Exam**

**Thursday Feb.18 7:30 - 9pm in 130 SEB**

6. Soil physical, chemical and biological properties
   a) Soil classification
   b) Impact on soil-plant-water relationships/interactions

7. Soil biogeochemistry
   a) Speciation, transformation, bioavailability, fate, and transport of inorganic elements
   b) Nutrient cycling
   c) Element deficiency and contamination issues

8. Soil function
   a) Source and sink of essential elements: nutrients, water
   b) Exchange and filter: atmosphere-hydrosphere-biosphere interface, element retention/release, natural contamination attenuation
   c) Structure and support against erosion
   d) Suitability for agricultural and other uses

9. Soil management and land use
   a) Soil and water management against runoff, erosion, contamination
   b) Agricultural and other human practice impact on soil conservation
   c) Soil remediation: treatments, amendments and phytoremediation

10. Analytical and statistical methods for soil characterization and analyses

**Final Exam**

**Tuesday April 27 7 - 10pm in 130 SEB**
Expectations:

1. Acquire practical soil science experience through field and laboratory work.
2. Acquire critical knowledge pertaining to land use and management and apply this knowledge to real study cases.
3. Chose critically field, analytical and statistical methods for specific cases and objectives.
4. Adequately present research findings using oral, graphic and written means.

Policy on Academic Misconduct:

The University’s regulations that relate to academic misconduct will be fully enforced. Any student suspected of cheating and/or plagiarism will be reported to the Dean of Students and, thereafter, to the Academic Conduct Committee for adjudication. Anyone found guilty of academic misconduct in this course may receive a course grade of 0.0, in addition to any penalty assigned by the Academic Conduct Committee. Students found guilty of academic misconduct by the Academic Conduct Committee face suspension or permanent dismissal.

Grading Scale:

<table>
<thead>
<tr>
<th>Considered “A”s</th>
<th>Considered “B”s</th>
<th>Considered “C”s: 2.0-2.9</th>
<th>Considered “D”s: 1.0-1.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0 95.00-100</td>
<td>3.4 78.38-80.74</td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
<tr>
<td>3.9 92.63-94.99</td>
<td>3.3 76.00-78.37</td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
<tr>
<td>3.8 90.25-92.62</td>
<td>3.2 73.63-75.99</td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
<tr>
<td>3.7 87.88-90.24</td>
<td>3.1 71.25-73.62</td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
<tr>
<td>3.6 85.50-87.87</td>
<td>3.0 68.88-71.24</td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
<tr>
<td>3.5 80.75-85.49</td>
<td></td>
<td>Considered “C”s: 2.0-2.9</td>
<td>Considered “D”s: 1.0-1.9</td>
</tr>
</tbody>
</table>

Formula: GPA = % points awarded / 23.75

Methods of evaluation: based on a total grade of 100%

1. Home- and in-class work: 25% of the total grade
2. Mid-term Exam: 25% of the total grade
3. Oral presentation: 25% of the total grade
4. Final Exam: 25% of the total grade