I. **Description of Course**: This course offers a multi-disciplinary overview of soil science. Topics include soil formation and development, classification, soil mechanics, soil chemistry, soil hydrology, soil nutrients, soil erosion, soil biology, and soil contamination. As well as how soil relates to environmental quality, climate change and sustainable development.

II. **Prerequisite**: None required. However, understanding of basic principles of elementary chemistry is expected.

III. **Student Learning Outcomes**: The introduction to soil science aims to provide the students with basic knowledge in various areas of soil science. At the completion of the course students will be able to:

   a. Learn the difference between “soil” and “dirt”;
   b. Recognize and explain the importance of soil as a natural resource and gain an appreciation for soils as a dynamic, non-renewable resource;
   c. Describe the properties of soils; and
   d. Demonstrate how the principles of geology, chemistry, physics and biology relate to soil processes.


V. **Instructional Methods**: The instructional methods used in this course include lecture, visual aids, videos, textbook reading, outside reading assignments, and field trip.

VI. **Reading assignments**: There will be readings assigned during the semester. Including

   - Know Soil, Know Life
   - Select chapters from: Collapse (Jared Diamond)
   - Select chapters from: The soil will save us (Kristin Ohlson)
   - Other required reading in the form of news articles and easy to understand journal articles
VII. **Standard of Evaluation:** The student will be evaluated based on his/her performance on group projects, quizzes, exit slips, oral presentation/research report, soils news summary, a midterm and a final exam. The breakdown for evaluation is:

   a. Dessert Project 10%
   b. Exit Slips 10%
   c. Debate 10%
   d. Quizzes 20%
   e. Soil News 10%
   f. Midterm 20%
   g. Final Exam 20%

   100%

VIII. **Grading Scale:** The student's final grade will be determined as follows:

   A = 93; A- = 90; B+ = 85; B = 81; B- = 77; C+ = 73; C = 70; C- = 65; D+ = 61; D = 52

IX. **Methods of Evaluation:**
The course will be graded on your performance on:

*Group Activity:* Soil dessert.

   In this activity students are expected to create a dessert that resembles a soil profile. Students need to select a soil series before the creation of the dessert. This will be in groups of three students. Students will create a dessert (cake, gelatin, muffins, pies, etc.) and bring it to class to share with the rest of the class. Each group will have 5 minutes to present their dessert in front of the class. Students are required to explain each horizon (layer) of their dessert. Further details will be given in class. Each group will submit a two-page explanation that includes the soil series description, recipe of the dessert, pictures of the group members creating the dessert and a short explanation of similarities of the dessert with the soil series.

*Exit slips:* Exit slips will be given at the end of five (5) different random classes during the semester. These will consist of 5 short answer questions from the material given during the class of the same day the exit slip is administered. They are open book/notes.

*Final project (debate):* The final project is a group project. Each group will consist of four (4) students. Debate guidelines will be distributed.

*Quizzes:* two (2) quizzes will be administered. The quizzes will be closed book and will cover lecture and reading materials. Make-up quizzes will be allowed only if the student has notified the instructor one (1) week in advance of any quiz or with a written excuse. The make-up quiz will be administered by appointment (outside of normal class time) within three (3) days of the absence. Missed quizzes will result in a zero and cannot be dropped from the student’s grade determination.
Soil News: Each student will submit a short summary of a news article that the main topic relates to soils. The length of the summary should be 250-words. You will be using information that you learned from the Soil Health documentary. Further details will be provided.

Midterm Exam: A midterm exam will be administered approximately half-way through the semester. It will be open book and open notes and will be on lecture material covered up to this point.

Final Exam: A comprehensive final exam will be administered during the scheduled final exam week. It will be open book and open notes, covering course material that was presented over the full semester.

*Makeup opportunities will be given for missed quizzes, midterm and final exam provided a valid written excuse is provided prior to the event. No bonus questions or extra-credit opportunities will be made available. Incompletes will not be given unless pre-arranged with the instructor.

<table>
<thead>
<tr>
<th>Method of Evaluation</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dessert project</td>
<td>6/14</td>
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<tr>
<td>Quiz #1</td>
<td>6/14</td>
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<tr>
<td>Midterm</td>
<td>6/28</td>
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<tr>
<td>News article</td>
<td>7/12</td>
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<tr>
<td>Quiz #2</td>
<td>7/19</td>
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<tr>
<td>Final project- Debate</td>
<td>7/19</td>
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<tr>
<td>Final Exam</td>
<td>7/26</td>
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X. Additional Course Assistance: It is the student's responsibility to request assistance from the instructor beyond the normal class period, should the student desire that assistance. The instructor will meet with students during posted office hours or by appointment.

XI. Attendance: It is expected that students attend every lecture. If you miss a class period, it is your responsibility to obtain the course notes.

XII. General: No eating, drinking, or smoking is permitted in the classroom. The use of electronic devices (except for course purposes) during class is discouraged.

XIII. GE Credit
ENR 3000, Soil Science is available for GE credit when taken with ENR 3001, Soil Science Laboratory. That is, both courses must be completed for GE credit, yet both need not be taken during the same semester. ENR 3000 & 3001 fall under the GE Category Natural Science: Physical Science.

XIV. GE Expected Learning Outcomes
1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.
3. Students describe the interdependence of scientific and technological developments.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

XV. Additional Statements

Submitting or representing another’s work as your own for any assignments in this course shall be considered grounds for charges of academic misconduct and will result in appropriate disciplinary action.

All students with disabilities who need accommodations should see the instructor privately to make arrangements. Special needs must be discussed, and arrangements made well in advance of when they are required (preferably during the first week of the semester). Special accommodations may be arranged through the OSU Office of Disability Services.

XVI. Class Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
<th>Topic/Lecture</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>*Earth as an apple (Know Soil Know Life)</td>
<td>Syllabus/ Introduction to soils</td>
<td>-Define soil, why is soil important?</td>
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<td></td>
<td></td>
<td>What is soil?</td>
<td>-soil vs dirt</td>
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<td>How is soil formed? What does soil consist of?</td>
<td>-Soil functions (services)</td>
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<td>-Factors of soil formation</td>
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<td>-The geological processes that formed soils in Ohio</td>
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<td></td>
<td>*Monolith</td>
<td>Soil Physical Properties; texture, color,</td>
<td>-Human utilization of soils</td>
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<td></td>
<td>*Different texture samples</td>
<td>aggregates, density, porosity</td>
<td>-Web soil survey</td>
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<td></td>
<td>*Dessert presentation</td>
<td>How are soils classified? Soil Surveys;</td>
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<tr>
<td></td>
<td>*Quiz #1</td>
<td>Soil and Land Use</td>
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<td></td>
<td>*Exit slip #1</td>
<td>Dessert presentation</td>
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<td></td>
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<td>Quiz #1</td>
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<td>2</td>
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<td>3</td>
<td>*Field trip</td>
<td>Soil Water Properties and Processes</td>
<td>-Key soil properties that support infrastructure and development,</td>
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<td>*Observation of soils under different practices</td>
<td>Soil air/ soil temperature</td>
<td>(engineering applications)</td>
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<td>Soil mechanics</td>
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<tr>
<td></td>
<td>*Exit slip #2</td>
<td>Field Trip to Waterman farm</td>
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<tr>
<td>4</td>
<td>Speaker: Dr. McCoy</td>
<td>Man-made soils/turfgrass soils</td>
<td></td>
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</tbody>
</table>
| **5** | **Speakers:**  
| - Dr. Sprunger  
| - Dr. Perez-Guzman  
| *Watch movie: Soil Health*  
| *Exit slip #3* | **Midterm**  
| **Use of technology in soils science: GIS**  
| **Soil Biology: rhizosphere**  
| **Soil Biology: microbiology, soil organisms**  
| **Documentary-Soil Health** | **-Organism interactions with soil processes: Nitrogen Fixation; Plant Pathogens**  
| **-Linking Microbial diversity to plant diversity and what this means for food security and human health.** |

| **6** | **Speakers:**  
| - Dr. Hattey  
| - Dr. Lal  
| *Soil News*  
| *Exit slip #4* | **Soil erosion: environmental concerns**  
| **Soil erosion: management and conservation**  
| **Soils and Climate Change: How are soil processes changing under a warming climate?** | **-Dust Bowl**  
| **- Loss and retention of soil carbon and how this impacts the environment and food production**  
| **- Essential for food production but often detrimental for the environment (N deposition; Lake Erie)** |

| **7** | **Speakers:**  
| - Dr. Demyan  
| *Bentonite activity*  
| - Dr. Wade  
| *Quiz #2*  
| *Debate* | **Soil mineralogy**  
| **Soil fertility**  
| **Quiz #2**  
| **Debate: Soil, Society, and a Sustainable future** | **- Goals of nutrient management from organic and conventional agriculture perspective**  
| **- One Island, Two Peoples, Two Histories: The Dominican Republic and Haiti** |

| **8** | **Speaker:**  
| - Dr. Basta  
| *Exit slip #5*  
| *Final Exam* | **Soil Chemistry**  
| **Soil Contaminants/ urban soils:**  
| **Restoration and Remediation** | **Final exam** |