Soil Science  
Stephen F. Austin State University  
Department of Agriculture  
**Semester:** Fall 2019

**Courses:**  
Soil Science (AGN 331)  
Soil Science Lab (AGN 331L)  

**Location and time:**  
Lecture  
MWF  
10:00 AM – 10:50 AM  
McGee 161  
Laboratory 020  
M  
12:00 PM – 01:50 PM  
Agriculture 108 / 109  
Laboratory 021  
M  
03:00 PM – 04:50 PM  
Agriculture 108 / 109  
Laboratory 022  
T  
03:00 PM – 04:50 PM  
Agriculture 108 / 109  
Laboratory 023  
F  
08:00 AM – 09:50 AM  
Agriculture 108 / 109

**Information:**  
https://d2l.sfasu.edu (D2L)  
All course information, supporting documents and scores for this course will be maintained on this website so check the site regularly for updates. All course related communication will be conducted via your SFA email (@jacks.sfasu.edu), not the D2L email. Lab fee $10.

**Instructor:**  
Dr. Franta Majs  
majsf@sfasu.edu (preferred contact)  
936-468-4390 office phone

**Office hours:**  
@ Agriculture 122A by appointment, or  
MTW  
09:00 AM – 09:50 AM  
R  
11 AM – noon

**Required Materials:**  
non-programmable, non-graphing scientific calculator, cell phone app cannot be used

**Textbook:**  
Authors: Brady and Weil  
Publisher: Pearson Education  

**Instructional Methods:**  
The classroom component of the course will consist of lectures augmented with visuals aids. Lecture is a time when I can explain important concepts in the study of soil science. Attending lecture is thus very important.

**Peer Instruction:**  
This course implements an academic assistance program that utilizes peer-assisted study sessions to develop strong study and learning skills and facilitate the mastery of course content. Ultimately, this program will create a positive learning environment for students driven by the collaborative efforts of the peer leader and the instructor. Leaders demonstrate, model and involve students in critical thinking exercises and effective learning strategies. Leaders will begin to professionalize their own practices, engage in active teaching skills and understand how they learn through participation in ongoing training and class sessions.

**Peer Leader:**  
Mr. Dillon Telger  
telgerds@jacks.sfasu.edu
Course Description: A comprehensive introduction to, and a hands-on experience in, classification, physical, chemical, and biological properties, and fertility of soils. Emphasis will be given to sustainable management of this non-renewable natural resource with applications for the environment, agriculture, forestry, engineering, and society. Material learned in this class will provide foundational knowledge for more advanced courses, and for professional and civic engagement.

Studying about soils for the first time is difficult because one must learn lots of new terms to build the technical vocabulary and understand lots of new concepts; just like in introductory courses in any other discipline of Science, Technology, Engineering, and Mathematics. To achieve the desired outcome, I expect you to take yourself and the material seriously and invest time and effort. Reasonable amount of student work per credit hour of direct faculty instruction is two hours of out-of-class student work per week, i.e. 3 credit hour face-to-face course should approximate at least 6 hours of out-of-class work per week.

Program Learning Outcomes (PLOs):

1. The student will demonstrate entry level skills needed for success in agronomy, horticulture and related fields
   a. Plant physiology and anatomy,
   b. Practical experience in plant management systems,
   c. Basic knowledge of plant genetics and reproduction,
   d. Identification and knowledge of crops, and
   e. Management of soils and soilless media.
2. The student will demonstrate quantitative competence related to agronomy, horticulture.
3. The student will exhibit problem solving skills based on quantitative and analytical reasoning.
4. The student will demonstrate effective communication skills
5. The student will exhibit leadership and other interpersonal skills needed for career placement and advancement.

Proficiency Levels for PLOs for B.S. Agriculture

<table>
<thead>
<tr>
<th>Course</th>
<th>PLO 1</th>
<th>PLO 2</th>
<th>PLO 3</th>
<th>PLO 4</th>
<th>PLO 5</th>
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<tbody>
<tr>
<td>AGN 331</td>
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<td>I</td>
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<tr>
<td>NA – not applicable</td>
<td>B – Basic</td>
<td>I – Intermediate</td>
<td>A – Advanced</td>
<td>M – Mastery</td>
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Student Learning Outcomes: Upon completing this course students will:

1. Understand the technical language and basic theories of Soil Science, and comprehend the application, scope, and limitations of Soil Science.
   a. Understand the basic processes and systems that occur on Earth as a function of time and location.
   b. Understand the unifying principles common to all soils (soil forming factors), and recognize ways in which the mechanisms of soil formation and human alteration have influenced the diversity and condition of the World’s soils.
   c. Understand the precision of expression related to abstracting and translating soils, a natural phenomenon in the environment, into graphic and text description with a help of a concise, universal scientific language.
   d. Enhance skills in scientific experimentation, collection, analysis, and interpretation of data.
2. Learn about five major areas of Soil Science and the role of soils in a variety of terrestrial ecosystems:
   a. How soils are formed and classified,
   b. What some of the physical, chemical, and biological properties of soil are,
   c. How soils provide nutrition to plants, and the role of fertilizers and fertilization,
   d. Soil role in water infiltration and mobility, and
   e. Fundamental processes, consequences, and mitigation of soil erosion and compaction.

3. Recognize interdependency of soils, people, nations and ecosystems across the globe with emphasis on environmental issues, human health, utilization of soil for food security, and fiber and timber production, and sustainable management of this non-renewable natural resource:
   a. Interconnectedness of Pedosphere with Atmosphere, Lithosphere, Hydrosphere, and Biosphere,
   b. Understand energy and matter flows through Pedosphere,
   c. Implication for resistance and resilience of Pedosphere to natural and anthropogenic disruptions, and
   d. Examine personal cultural context using a comparative global perspective.

4. Develop an understanding of scientific knowledge over the course of human history as well as its applications through technology that, for example, extended the quality and length of human life or created new strategies that reduce pollution:
   a. The impact of soil on culture development, and
   b. The role of soil in human population growth and environmental implications of soil fertility management.

5. Develop work and career preparation skills.

University Policies:

Academic Integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism. Academic Dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better score on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit. Please read the complete policy at www.sfasu.edu/policies/academic_integrity.asp. Academic Dishonesty could result in a letter grade of F.

Disability Accommodations: To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, Room 325, 936-468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, the ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to www.sfasu.edu/disabilityservices/. Accommodations cannot be provided retroactively.

Student Code of Conduct: Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program. Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This policy applies to all instructional forums,
including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full
discretion over what behavior is appropriate/inappropriate in the classroom.
Students who perform poorly on class projects/exams and do not attend class regularly may be referred to
the iCare: Early Alert Program at SFA. Information regarding the iCare program is found at
www.sfasu.edu/judicial/earlyalert.asp or call the office at 936-468-2703.

University Closings / Cancelled Classes: When SFA State University campus is closed, students, faculty and staff will be
notified via emergency notification system; update your contact information! If classes are meeting, but
you feel that you cannot find a safe way to get to class, you should notify the Instructor as soon as
possible.

Course Policies:

Electronic Devices: The use of any electronic devices, including cell phones, during class is not permitted. Especially
during examination there will be no electronic devices within reach or in sight. During lectures, electronic
devices may be used only if required for compliance with a directive by The Office of Disability Services or
for note taking.

Food and Drink: There should be no food in the classroom. Beverages are permitted only in spill-proof containers. No
beverages are permitted in the classroom or laboratory when any chemicals are used.

Attendance, Unforeseen Emergency, and Preparation: Students are expected to read the assigned sections of the
textbook or other material prior to class, and attend class and actively participate*. You are responsible to
inform your instructor concerning any expected absences ahead of time. In the event of an unforeseen
emergency on an exam day, contact me as soon as possible. You may be asked to document your excuse.
Acceptable unforeseen emergencies include severe illness, family emergencies, or other unavoidable
events including dangerous weather conditions and serious car accidents. Proper communication MAY
create a possibility to make up missed exams.
*Participation = being on time, paying attention, engage in discussion, keeping good lecture and lab notes.

Laboratory: There will be fourteen laboratory periods during the semester. Some laboratory exercises or assignments
may take more than one lab period. Your overall lab score will be calculated on highest twelve lab period
scores (the lowest scores will be dropped); however, know that you must complete at least eleven lab
periods to pass the course. The laboratory is designed to help you learn about concepts presented in
lecture and in the readings. Because I want you to be able to use these terms and concepts in real world
situations, description of demonstrations and your laboratory experiments will require use of these terms
and concepts. Every student is expected to keep laboratory notebook and may be asked to present their
notes to the instructor for evaluation. Laboratory reports are to be prepared in Microsoft Word. All
laboratory reports, including tables and figures, are to be prepared with great care, and attention to
accuracy and aesthetic values. Please submit your work via D2L before the deadline. Late assignments
are subject to a 10% score reduction per day with a 50% maximum (i.e. five days’ worth). No work will be
accepted after the day five and student will receive zero points.

Testing: You will learn many new terms and concepts in this class. Because I want your learning to be incremental,
you will be tested frequently, at the end of each lecture block, on your understanding of these terms and
concepts. In addition, three lecture exams will be given and a final. All exams will be comprehensive. The
exams are closed book. Makeup lecture exams will be allowed only with preapproval of the instructor and
for acceptable reason, though the format may be different, i.e. oral exam. Final exam has been scheduled for Wednesday, 11 December 2019, 10:45 AM – 1:15 PM; www.sfasu.edu/registrar/.

<table>
<thead>
<tr>
<th>Grading:</th>
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<tbody>
<tr>
<td>Laboratory</td>
<td>20%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
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<td>Exams: 10% + 15% + 20% =</td>
<td>45%</td>
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<tr>
<td>Final exam</td>
<td>25%</td>
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<td>Total score</td>
<td>100%</td>
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**Attendance condition 11/14**

**Letter grade:**  A > 90.0%  B > 80.0%  C > 70.0%  D ≥ 60.0%  F < 60.0%

**Incomplete** – Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Amending this Syllabus:** The instructor may initiate changes to this syllabus. Any changes will be clearly communicated via email and posted on D2L. The instructor reserves the right to make minor changes to the course schedule (attached) and to make changes to the grading policy that are of benefit to ALL students enrolled in the course. Neither of these two types of changes is subject to student vote/approval.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Tentative Course Schedule</th>
<th>Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>26 Aug</td>
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<td></td>
<td>28 Aug</td>
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<td>Recitation I.: Dimensional Analysis</td>
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<td>30 Aug</td>
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<td>2</td>
<td>2 Sep</td>
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<td>Minerals / Rocks</td>
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<td>4 Sep</td>
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<td>3</td>
<td>9 Sep</td>
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<td>Recitation II.: Texture Calculation</td>
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<td>11 Sep</td>
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<td>13 Sep</td>
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<td>4</td>
<td>16 Sep</td>
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<td>Texture &amp; Color</td>
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<td>18 Sep</td>
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<td>20 Sep</td>
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<td>5</td>
<td>23 Sep</td>
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<td>Soil Fertility Sampling</td>
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<td>25 Sep</td>
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<td>27 Sep</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; lecture exam</td>
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<td>6</td>
<td>30 Sep</td>
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<td>Soil Density Sampling even on Tuesday,</td>
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<td>2 Oct</td>
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<td>10/1 College Experience Day</td>
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<td>7</td>
<td>7 Oct</td>
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<td>Recitation III.: Soil Erosion Calculation</td>
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<td>9 Oct</td>
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<td>11 Oct</td>
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<td>8</td>
<td>14 Oct</td>
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<td>Cooperative Soil Survey and Its History</td>
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<td>16 Oct</td>
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<td>9</td>
<td>21 Oct</td>
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<td>Recitation IV.: Soil Water Calculations</td>
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<td>23 Oct</td>
<td>Last day to drop a course &amp; withdraw w/out “W”</td>
<td>Recitation IV.: Soil Water Calculations</td>
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<td>25 Oct</td>
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<td>10</td>
<td>28 Oct</td>
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<td>Respiration I.</td>
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<td>1 Nov</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; lecture exam</td>
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<td>11</td>
<td>4 Nov</td>
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<td>Respiration II.</td>
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<td>12</td>
<td>11 Nov</td>
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<td>Tour of the Soil, Plant and Water AnalysisLaboratory</td>
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<td>13 Nov</td>
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<td>22 Nov</td>
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<td>14</td>
<td>25-29 Nov</td>
<td>No class: Thanksgiving Holiday Break</td>
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<td>15</td>
<td>2 Dec</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; lecture exam</td>
<td>Cation Exchange Capacity</td>
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<td>4 Dec</td>
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<td>6 Dec</td>
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<tr>
<td>16</td>
<td>11 Dec</td>
<td>Final exam, 10:45 AM – 1:15 PM</td>
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</tbody>
</table>
Lecture readings:

Block No. 1. SYLLABUS

Block No. 2. INTRODUCTION: Introduction to soil and soil science 1.1 – 1.16

Block No. 3. SOIL FORMING FACTORS: Formation of soils: Parent materials 2.1 – 2.3

Block No. 4. TEXTURE: Soil texture 4.2 – 4.3

Block No. 5. COLOR

Block No. 6. STRUCTURE: Soil forming factors, soil horizons & soil profile 2.4 – 2.10, 4.1 and selected Ch. 11

Block No. 7. DENSITY AND OTHER PHYSICAL PROPERTIES: Soil structure and soil density 4.4 – 4.10

Block No. 8. TAXONOMY: Soil taxonomy & Soils of Texas 3.1 – 3.18

Block No. 9. WATER AND HYDROLOGICAL CYCLE: Soil water 5.1 – 5.10 & selected Chapter 6.1 – 6.6

Block No. 10. AIR: Soil aeration and temperature 7.1 – 7.11

Block No. 11. CHEMISTRY: Soil mineralogy and Soil chemistry 8.1 – 8.14, Cation exchange in soils, Soil pH and alkalinity 9.1 – 9.10 and 10.1

Block No. 12. BIOGEOCHEMICAL CYCLE: Soil carbon cycle and soil organic matter 12.1 – 12.11, Soil nitrogen cycle 13.1 – 13.15

Block No. 13. FERTILITY AND CONSERVATION: Soil fertility 1.17 – 1.18 & Phosphorus and potassium 14.1 – 14.16, Trace elements – Selected Chapter 15

Block No. 14. EROSION: Soil health, soil degradation, and soil resilience 1.19, 6.7 – 6.9, and 17.1 – 17.14

Block No. 15. SPECIALTY SOILS: Hydric soil and forest soils