SCSC 301 Soil Science
SYLLABUS
Fall 2014

SCSC 301 – Soil Science. Credits 4 (3 credit hours lecture, 1 credit hour lab). Evaluation of the nature and properties of soils; explanation of the various soils, their components, and their roles in the environment using scientific methods and technology. Prerequisite: Junior or Senior Classification or Approval of Instructor.

LEARNING OBJECTIVES: The student in SCSC 301 will:
1. Describe and quantify fundamental soil physical, chemical, biological and mineralogical properties and explain how properties impact natural and agricultural ecosystems;
2. Describe the formation of soils as they relate to their environment, their description, and their classification;
3. Define and describe the role of soils in infiltration, percolation, and storage of water;
4. Explain the role of macro- and micro-organisms in soil, their function and their requirements; and
5. Identify and describe the biogeochemical cycles of soil-provided plant essentials nutrients.

A. LECTURE: Dr. Sam Feagley, Room 350C, Heep Center; Office Phone - 845-1460
E-mail: sfeagley@ag.tamu.edu; lecture notes on the web at http://samfeagley.tamu.edu/ (additional information will be provided in class).
1. Time: MWF 11:30 - 12:20
2. Place: Room 101 Heep Center
3. Seating: Assigned on the second day of class
4. Attendance: No penalty for absences other than on days of announced exams and the missed opportunity to take bonus point quizzes. Bonus point opportunities will not be made-up, except in the case of University Excused Absences. Students are encouraged to read the Student Rule covering class attendance and absence at http://student-rules.tamu.edu/rule07/. In summary, the student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence. Excusable absences are: (1) participating in a university authorized activity; (2) death or major illness in the student’s immediate family; (3) illness to a dependent family member; (4) participation in legal proceedings that require the student’s presence; (5) religious holy day; (6) illness too severe or contagious to attend; (7) required participation in military duties; (8) mandatory admission interviews for professional or graduate school. Students shall inform the instructor of an absence prior to the absence, if feasible; otherwise, the student must notify the instructor within 2 working days of the first day of absence.
5. Assignment: Given on class schedule and intended to be read prior to lecture on the topic. Before each lecture, students are expected to read instructional objectives for each topic, which are found on pages 108-118 of lab manual.


Technicians for Undergraduate Instruction - Kathy Schmitt and Linda Carpenter.
2. Place: Room 113 Heep Center
3. Attendance: Required. Make-up quizzes may be taken only by students who inform their instructor, me or my office of the need to miss a lab before, if possible, they miss it or in cases of physical inability to make such notification for excused absences.
4. Grading: Session quizzes (100 points each) and two lab reports (100 points each) (75%) and soil sample report (25%). The two lab reports are both written and one will also be an oral presentation. The lowest two quiz grades will not be included in calculation of quiz averages.

C. GRADING SYSTEM
1. Lecture: Four 1 hour exams = 60% of final grade.
2. Laboratory: 20% of final grade (COMPLETION OF SOIL SAMPLE REPORT IS A COURSE
REQUIREMENT, if not completed, course grade will be reduced by 1 letter grade

3. Final Examination: 20% of final grade. Students having an 89.5 or better average for the four lecture exams and perfect attendance during the last week of classes will be exempted from the final exam. For students exempting the final, lecture exams are 75% of final grade and laboratory is 25% of final grade.

4. Bonus Points: Unannounced one question quizzes will be given during lecture sessions approximately 20 times during the semester. Each quiz, correctly answered, will add 0.2 to the final average for the course.

5. Letter grades for the course will be assigned based on the following scale: 88 and above – A; 78 to 87 – B; 68 to 77 – C; 58 to 67 – D; less than 58 – F.

D. Soil Sample: A soil sample must be obtained by each student for use in the laboratory. Each student must use a sample obtained independently of other student samples. The sample must be air-dry and ground to less than 2 mm in diameter (no. 10 sieve), except for three to four clods 3 or 4 cm in diameter, which should be saved. Samples should be obtained from arable or rangeland soils using an acceptable sampling method (see http://soiltesting.tamu.edu for soil collection methods using Soil Submittal Form or Urban Soil Submittal Form) as discussed during the first laboratory period. The sample should be ready for use as soon as possible, but no later than the lab of September 3-4.

E. Study Materials

F. Soil Sample Report: This report will constitute one-fourth of the laboratory grade (See page 171 in the lab manual). The completed report will be due at the end of your last laboratory period. The location of the sampled soil must be specified - county, nearest town, exact location with respect to roads, etc. All blanks on the report must be completed properly and on time for a maximum grade of 100. Each student must use a different sample and all of data must be collected independently. Copied or fraudulent data on any single item of the report means that a grade of zero will be given for the report and that disciplinary action for cheating may be initiated. If the soil report is not turned in, the course grade will be one letter grade lower than it otherwise would have been.

G. Field Trips: One field trip will be taken during a regular lab period and is required. A fee to cover the field trip was billed to you on registration for the class.

USE OF OTHER TEACHING RESOURCES IN SCSC 301 - SOIL SCIENCE

Several resources are available to supplement the standard lecture-lab format in the following ways:

1. A complete set of the power point slides is posted on the web at: http://samfegley.tamu.edu. Details for accessing the site will be given in class. Also, two old exams will be posted prior to each hour exam. Audio files that review all teaching objectives of Exam 1-4 are available on the website.

2. Slides, models and monoliths – Difficult to teach concepts such as soil development and classification and mineral structures are presented in summary form using visual aids, some of which are suitable for individual study but not for use in a lecture room. These materials are used in conjunction with discussion of instructional objectives. They will be made available as needed throughout the session.

CONCLUSION: The emphasis is on mastery of the course objectives - by whatever means you choose. Course objectives are found in the Laboratory Manual pages 108-118. Several alternative means of acquiring the same knowledge will be provided. Instructional objectives will be treated in two or more of the following ways: a) lecture; b) textbook; c) problem set; d) laboratory exercise; e) slides, models and monoliths; f) coverage of objectives on the web based virtual classroom. All theory objectives are covered in lecture; if the lecturer misses one on a topic, remind him as he completes coverage of the topic and asks for questions. Different students rely on different methods of mastering the objectives. Some rely primarily on lecture notes. Most students who make A's
have very few "cuts;" almost all students who make F's have many "cuts." Enough said! Some make good use of the text. Some rely on a combination of all the methods available. Whatever means you choose, the secret to success is keeping yourself current with coverage of objectives in the course. Master them as we go; ask questions as needed.

ADA (Americans with Disabilities Act) Statement

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 that you have a disability requiring an accommodation, please contact Disability Services in Cain Hall Room B118 or call 979-845-1637 (http://disability.tamu.edu).

Academic Integrity Statement and Policy

All students are expected to conform to the Honor Council Rules and Procedures (http://aggiehonor.tamu.edu) and adhere to the Aggie Code of Honor – "An Aggie does not lie, cheat or steal, or tolerate those who do."
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<tr>
<th>DATE</th>
<th>DAY</th>
<th>LECTURE TOPIC</th>
<th>TEXT ASSIGNMENT</th>
<th>LAB SCHEDULE BY EXERCISE</th>
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| 8/26  | 1   | Course organization and introduction         |                 | Tue. 8/27 - Wed. 8/28  
* Soils & soil materials                                          |
| 8/28  | 2   | Soils as natural bodies                     | 1:1-26, 2:52-56 |                                                                                             |
| 8/30  | 3   | Origin and nature of parent materials       | 2:27-32         |                                                                                             |
| 9/2   | 4   | Classification of parent materials          | 2:32-43         | Tue. 9/3 - Wed. 9/4  
* Physical characterization of soils - Part I  
* Items 1,2,4 due                                                   |
| 9/4   | 5   | Primary particles in soils                  | 4:96-104        |                                                                                             |
| 9/6   | 6   | Secondary particles in soils                | 4:104-123       |                                                                                             |
| 9/9   | 7   | Physical measurements in soils              | 4:123-131       | Tue. 9/10 - Wed. 9/11  
* Physical characterization of soils - Part II  
* Item 5 due                                                     |
| 9/11  | 8   | Soil air and soil temperature               | 7:201-234       |                                                                                             |
| 9/13  | 9   | Soil water concepts                         | 5:132-164       |                                                                                             |
| 9/16  | 10  | Soil water energy                           |                 | Tue. 9/17 - Wed. 9/18  
* Soil water  
Item 6,7,8 due                                                    |
| 9/18  | 11  | Movement of water in soils                  |                 |                                                                                             |
| 9/20  | 12  | Vapor and liquid losses of soil water       | 6:165-200       |                                                                                             |
| 9/23  | 13  | Soil drainage                               |                 | Tue. 9/24 - Wed. 9/25  
* Fertilizing soils                                              |
| 9/25  | 14  |                                            |                 |                                                                                             |
| 9/27  | 15  | Soil erosion                                | 14:499-534      |                                                                                             |
| 9/30  | 16  | Soil formation - variables involved         | 2:32-57         | Tue. 10/1 - Wed. 10/2  
* Soil erosion and conservation                                    |
| 10/2  | 17  | Soil development, horiztonation             |                 |                                                                                             |
| 10/4  | 18  | Soil classification                         | 3:58-87         | Tue. 10/8 - Wed. 10/9  
* Soil formation, classification & land judging, field trip       |
| 10/7  | 19  | The soil orders, their occurrence           |                 |                                                                                             |
| 10/9  | 20  | Classification and soil survey              | 3:88-95         | Tue. 10/15 - Wed. 10/16  
* Soil survey  
* Items 3 due                                               |
<p>| 10/11 | 21  | Chemical reactivity in soils                | 8:235-240       |                                                                                             |
| 10/14 | 22  | Expression of cation exchange capacity      | 8:252-268       |                                                                                             |
| 10/16 | 23  |                                            |                 |                                                                                             |
| 10/18 | 24  | Structure and genesis of clays             | 8:240-251       |                                                                                             |
| 10/21 | 25  | Other colloids and properties               |                 |                                                                                             |
| 10/23 | 26  | Life in the soil                           | 10:322-360      |                                                                                             |
| 10/25 | 27  | Cogenesis of organic matter                | 11:361-395      |                                                                                             |</p>
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<tr>
<th>Date</th>
<th>Topic</th>
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| 10/28 | Comp. and distribution of organic matter | 9:269-291 | Tue, 10/29 - Wed, 10/30 *
| 10/30 | Soil pH, soil acidity | 9:291-301 | Soil organisms and organic matter
| 11/1 | Soil pH changes, buffering | 9:288-296 | Item 10 due |
| 11/4 | Limestone and soil-plant relationships | 9:301-321 | Tue, 11/5 – Wed, 11/6 *
| 11/8 | Saline and sodic soils | 12:412-420 | Item 11 & 12 due |
| 11/11 | Nitrogen cycle and management | 12:420-432 | Tue, 11/12 – Wed, 11/13 *
| 11/13 | N; Chemistry and management of sulfur | 12:433-438 | Extractable nutrients for soil test recommendations
| 11/15 | Chemistry and management of phosphorus | 12:439-454 | Item 14 & 15 due |
| 11/18 | Chemistry and management of potassium | 13:455-475 | Tue, 11/19 – Wed, 11/20 *
| 11/22 | Review and catch-up | | Lab Report Due
| 11/25 | EXAM 4 (Lecture Days 31-39) | | Items 13 due |
| 11/27 | Nutrient management | | Tue, 11/26 – Wed, 11/27 *
| 11/29 | THANKSGIVING HOLIDAY | 15:535-565 | Other soil elements

**FINAL EXAM:** Wednesday 12/11, 10:30 am - 12:30 pm OTHER TIMES BY ARRANGEMENT ONLY

**SCSC 301 LECTURE EXAM OBJECTIVES**
(See Lab Manual, p. 108-118)

**EXAM 1 - (Web days 1-12)**
- Introduction, Weathering and Parent Materials, *(except objective 11)*
- Physical Properties of Mineral Soils, *(except objectives 2 and 3)*
- Soil Air
- Soil Temperature
- Soil Water – *(Objectives 1, 2, 3, 5, 6, 7, 11, 12)*

**EXAM 2 - (Web days 13-20)**
- Soil Water – *(Objectives 4, 8-10, 13-21)*
- Soil Formation
- Soil Classification
- Soil Survey

**EXAM 3 - (Web days 21-30)**
- Chemical Properties
- Mineralogical Properties
- Soil Organisms
<table>
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<tr>
<th>Soil Organic Matter</th>
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<tr>
<td>Soil pH - <em>(Objectives 1-10)</em></td>
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**Exam 4 - (Web days 31-39)**

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<thead>
<tr>
<th>Soil pH - <em>(Objectives 11-13)</em></th>
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<tbody>
<tr>
<td>Adjustment of Soil pH (Liming)</td>
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<tr>
<td>Soil Nitrogen, Sulfur</td>
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<tr>
<td>Soil Phosphorus</td>
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<tr>
<td>Soil Potassium <em>(except objective 3)</em></td>
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<tr>
<td>Other Macronutrients, Micronutrients, and Nutrient Management</td>
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