Meeting Dates and Location: Lecture WF 9:10 am to 10:05 am, Lab F 10:20 am to 12:20 pm (meetings will take place using CarmenZoom; instructions will be provided on course Carmen page: https://carmen.osu.edu)

Course Format: 100% distance, synchronous

Instructor:
Dr. Nicholas T. Basta
School of Environment & Natural Resources
basta.4@osu.edu, 614-208-7280
410 C Kottman Hall
2021 Coffey Rd
Office hours: by appointment via Zoom

Course Coordinator:
Loryssa Lake
400 Kottman Hall, lake.195@buckeyemail.osu.edu
Office hours: by appointment via Zoom

Credit Hours: 3

Credit hours and work expectations: This is a 3-credit-hour course. According to Ohio State policy, students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Prerequisites: One semester of chemistry, or Grad standing.

Graduate Student Expectations: There are no differential expectations for graduate students versus undergraduate students in this course.

Textbooks/Readings:
None required. Course notes and materials provided on OSU Carmen Canvas (https://carmen.osu.edu).

Optional Readings:

Additional Required Materials: None

Other Fees or Requirements: None

Course Description:
Catalog Description: Environmental soil chemistry relevant to soil and contaminant remediation. Excessive phosphorus fertilizer, degraded coal mineland soils; salt degradation; heavy metal contamination; urban soils. Socioeconomic considerations including cost and community/regulatory agency acceptance. Laboratory focuses on hands-on soil investigation/problem solving using soil geochemical computer models.
**Full description/Topics list:** A comprehensive study of soil biogeochemical processes relevant to soil and chemical contaminant remediation. Emphasis is placed on soil and environmental chemical processes on human and ecological health, ecosystem function, and soil remediation. Water and soil solution chemistry; soil carbon/organic matter, soil minerals, precipitation/dissolution, adsorption reactions and models, redox chemistry, soil acidity. Restoration/remediation topics include human and ecological contaminant exposure in soil-water systems; environmental fate of fertilizer, pesticides in agricultural soil; remediation of severely degraded coal mineland soils and water (acidity, other); remediation of salt degraded soil (i.e. surface impact from subsurface shale fracturing); remediation of contaminated (heavy metals, toxic organics) soil; restoration of urban soils. Socioeconomic considerations for environmental remediation methods, including cost and community/regulatory agency acceptance, will be studied. Laboratory component focuses on using hands-on soil investigation and remediation of contaminated sites. Use of advanced spectroscopic data and hands-on experience using environmental soil chemistry computer models (e.g., USEPA and USGS geochemical speciation models).

**Goals:**
After completion of this course, students should:
1. Have a comprehensive understanding of biogeochemical processes in soil systems (i.e., soil, water, air, biotic) that impact environmental quality
2. Understand soil remediation sciences based on environmental chemistry, human and ecosystem function.
3. Be able to perform an environmental soil chemical investigation using laboratory data using the geochemical model Visual MINTEQ and evaluate remediation treatment success.

**Learning Outcomes:**
**Course Learning Outcomes**
1. Demonstrate an understanding of biogeochemical soil processes and environmental quality
2. Demonstrate an understanding of environmental soil chemical risk-based soil remediation
3. Demonstrate use of the geochemical model Visual Minteq to evaluate soil remediation

How students meet the outcomes: regular quizzes, discussion, lab assignments/reports

**Course Technology:**
For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at OCIO Help Hours, and support for urgent issues is available 24x7.

- **Self-Service and Chat support:** [http://ocio.osu.edu/selfservice](http://ocio.osu.edu/selfservice)
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

**Baseline technical skills for online courses**
- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the Canvas Student Guide.

**Technology skills necessary for this specific course**
- Zoom text, audio, and video chat

**Required equipment**
- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
• Microphone: built-in laptop or tablet mic or external microphone

Required software
• Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft’s Student Advantage program. Full instructions for downloading and installation is found https://ocio.osu.edu/kb04733.
• Visual MINTEQ version 3.1, https://vminteq.lwr.kth.se/download/

Carmen Access
You will need to use BuckeyePass multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:
• Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions.
• Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click “Enter a Passcode” and then click the “Text me new codes” button that appears. This will text you ten passcodes good for 365 days that can each be used once.
• Download the Duo Mobile application to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and the IT support staff will work out a solution with you.

Course Schedule:

<table>
<thead>
<tr>
<th>INSTRUCTIONAL WEEK</th>
<th>DATE</th>
<th>TOPICS, ASSIGNMENTS, DEADLINES, EVENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/26</td>
<td>8/28 INTRODUCTION; SOIL AND WATER CHEMICAL ENVIRONMENT; SOIL REMEDIATION GOALS; REVEGETATION AND SOIL CHEMISTRY</td>
</tr>
<tr>
<td>2</td>
<td>9/2-4</td>
<td>WATER AND SOLUTION CHEMISTRY LAB 1 MINTEQA2 SOIL SOLUTION</td>
</tr>
<tr>
<td>3</td>
<td>9/9-11</td>
<td>MINERALS AND ORGANIC MATTER QUIZ 1; LAB 2 MINTEQ SOLID PHASES</td>
</tr>
<tr>
<td>4</td>
<td>9/16-18</td>
<td>CHEMICAL PRECIPITATION REACTIONS QUIZ 2; LAB 2 MINTEQ SOLID PHASES</td>
</tr>
<tr>
<td>5</td>
<td>9/23-5</td>
<td>SOIL CHEMICAL ADSORPTION REACTIONS QUIZ 3</td>
</tr>
<tr>
<td>6</td>
<td>9/30, 10/2</td>
<td>ENVIRONMENTAL CHEMISTRY AND REMEDIATION OF EXCESSIVE PHOSPHORUS SOILS; QUIZ 4; LAB 3 CARBONATE EQUILIBRIA</td>
</tr>
<tr>
<td>7</td>
<td>10/7-9</td>
<td>SOIL REDOX CHEMISTRY LAB 4 MINTEQ REDOX REACTIONS</td>
</tr>
<tr>
<td>8</td>
<td>10/14-16</td>
<td>REMEDIATION OF SALT AFFECTED SOILS QUIZ 5</td>
</tr>
<tr>
<td>9</td>
<td>10/21-23</td>
<td>SOIL ACIDITY AND REMEDIATION OF MINING SOILS QUIZ 6; LAB 5 REMEDIATION ASSSIGNMENT</td>
</tr>
<tr>
<td>10</td>
<td>10/28-30</td>
<td>EXPOSURE / REMEDIATION OF CHEMICAL CONTAMINANTS AT SUPERFUND, METAL MINING, AND BROWNFIELD SITES LAB 5 REMEDIATION ASSSIGNMENT --DISCUSSION</td>
</tr>
<tr>
<td>11</td>
<td>11/4-6</td>
<td>RISK-BASED BIOAVAILABILITY BASED REMEDIATION</td>
</tr>
</tbody>
</table>
Instructor’s policy on late or make work:
Late work will have 10% of the total points deleted for each calendar day it is late. This is based on the timestamp in Carmen, anything after the deadline is the next day and 10% off. Students should reach out to the instructor ASAP in the event of extenuating circumstances. Students will not be penalized for late assignments due to sickness or other approved extenuating circumstances. Documentation must be provided to the instructor.

Evaluation:

How your grade is calculated

<table>
<thead>
<tr>
<th>ASSIGNMENT CATEGORY</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes, 7 (10 points each)</td>
<td>70</td>
</tr>
<tr>
<td>Laboratory Worksheets for Labs 1, 2, 3, and 4 (5 points each)</td>
<td>20</td>
</tr>
<tr>
<td>Laboratory Reports/projects, 2 comprehensive (15 points each)</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

See course schedule below for due dates.

Description of Evaluation Activities:

Quizzes
Quizzes will be administered on Carmen and will be multiple choice. Quizzes are open book/notes, but students may not collaborate with others. You must complete regular quizzes yourself, without any external help or communication. Either the instructor or the graduate assistant will be available via email on Carmen for you to ask questions during the quiz. Quizzes will have to be completed in a predetermined time interval.

Laboratory Worksheets
Completion of problem sets in laboratory worksheets will be required for the first four computer laboratory exercises. Example calculations to complete the worksheets will be given in the lab. Students will be required to complete the worksheet on their out of class time and turn it in for grading via Carmen dropbox. Due dates for each worksheet will be announced in class and on Carmen. Anticipated due dates are one week after completion of the lab exercise.

Laboratory Reports/Projects
Laboratory activities during the semester will provide skills and knowledge to design two laboratory reports/projects on soil remediation: (i) remediation of soil acidity from agricultural and coal mining activities and (ii) remediation of heavy metal contaminated soils by in situ soil amendment. Soil data from soil
remediation projects will be provided to students. Students will analyze actual soil data from remediation projects to identify successful remedial practices. Laboratory reports will be written report including background information, remedial approach, remediation data (provided), data analysis, results/discussion and recommendations for remedial design.

Grading Scale: Final grades will be calculated on a percentage basis (e.g. total points earned of 120 possible points)

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100</td>
<td>A</td>
<td>73-76.9</td>
<td>C</td>
</tr>
<tr>
<td>90-92.9</td>
<td>A-</td>
<td>70-72.9</td>
<td>C-</td>
</tr>
<tr>
<td>87-89.9</td>
<td>B+</td>
<td>67-69.9</td>
<td>D+</td>
</tr>
<tr>
<td>83-86.9</td>
<td>B</td>
<td>60-66.9</td>
<td>D</td>
</tr>
<tr>
<td>80-82.9</td>
<td>B-</td>
<td>&lt;60</td>
<td>E</td>
</tr>
<tr>
<td>77-79.9</td>
<td>C+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COURSE POLICIES

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. Email is the best way to reach me. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)

- **Grading and feedback**: For large weekly assignments, you can generally expect feedback within 7 days.
- **E-mail**: I will reply to e-mails within **24 hours on school days**.

Attendance Policy: Because this is a distance-education course, your attendance is based on your online activity and participation. The following is a summary of everyone’s expected participation:

- **Logging in and participation**: Students will be logging in to the course in Carmen each week, including weeks with holidays or weeks with minimal online course activity. Also, evidence of participation on a weekly basis via completed assignments, quizzes, and other documented participation is required. If you have a situation that might cause you to miss an entire week of class, discuss it with me as soon as possible.
- **Live sessions**: All synchronous live, scheduled events for the course are required. For live presentations, I will provide a recording that you can watch later in the event you must miss class. If you are required to discuss an assignment with me, please contact me or the course coordinator.

E-Mail Etiquette:

**DO**
- Include a descriptive statement in the subject line.
- Use proper salutations when beginning an e-mail.
- Be concise in the body of the e-mail, use complete sentences and proper grammar.
- Use an appropriate closure at the end of each e-mail followed by your first and last name.
- If replying to an e-mail, reference the original e-mail and its content.
- Be selective of your choice of words. Emotions are difficult to convey in text and without the benefit of facial expressions your sentiment can be lost in the words you choose to write.

**DON’T**
- Use all capital letters; this conveys a tone of ANGER.
• Use e-mail as a format to criticize other individuals.
• Ask for your grade via e-mail. Grades will not be discussed by e-mail. If you need to discuss a graded item make an appointment to do so in my office.
• E-mail to inquire when grades will be posted. We will work toward submitting grades promptly, however, recognize that grading assignments and exams requires considerable time to ensure uniformity and fairness.
• Send an e-mail out of frustration or anger. Learn to save the e-mail as a draft and review at a later time when emotions are not directing the content.

Other course policies

Ohio State’s academic integrity policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university’s Code of Student Conduct (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university’s Code of Student Conduct and this syllabus may constitute “Academic Misconduct.”

The Ohio State University’s Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: “Any activity that tends to compromise the academic integrity of the university or subvert the educational process.” Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university’s Code of Student Conduct is never considered an excuse for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university’s Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

• Committee on Academic Misconduct web page (go.osu.edu/coam)
• Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)
• Eight Cardinal Rules of Academic Integrity (go.osu.edu/cardinal-rules)

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.
Statement on Title IX

All students and employees at Ohio State have the right to work and learn in an environment free from harassment and discrimination based on sex or gender, and the university can arrange interim measures, provide support resources, and explain investigation options, including referral to confidential resources.

If you or someone you know has been harassered or discriminated against based on your sex or gender, including sexual harassment, sexual assault, relationship violence, stalking, or sexual exploitation, you may find information about your rights and options at titleix.osu.edu or by contacting the Ohio State Title IX Coordinator at titleix@osu.edu. Title IX is part of the Office of Institutional Equity (OIE) at Ohio State, which responds to all bias-motivated incidents of harassment and discrimination, such as race, religion, national origin and disability. For more information on OIE, visit equity.osu.edu or email equity@osu.edu.

Commitment to a diverse and inclusive learning environment

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Your mental health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University’s Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-demand resources are available at go.osu.edu/ccsondemand. You can reach an on-call counselor when CCS is closed at 614-292-5766, and 24-hour emergency help is also available through the 24/7 National Prevention Hotline at 1-800-273-TALK or at suicidepreventionlifeline.org. The Ohio State Wellness app is also a great resource available at go.osu.edu/wellnessapp.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To
establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** slds@osu.edu; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue.

**Accessibility of course technology**

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility ([go.osu.edu/canvas-accessibility](go.osu.edu/canvas-accessibility))
- Streaming audio and video
- CarmenZoom accessibility ([go.osu.edu/zoom-accessibility](go.osu.edu/zoom-accessibility))
- Collaborative course tools