2021

Course Portfolio for CIVE 378 Materials of Construction, Spring 2021

Congrui Grace Jin

Course Portfolio for CIVE 378 Materials of Construction, Spring 2021

Instructor: Congrui Grace Jin, Ph.D.

Assistant Professor

Department of Civil and Environmental Engineering

University of Nebraska–Lincoln

362Q Whittier, 2200 Vine St., Lincoln, NE 68583-0851

Office Phone: (402) 472-7825

Cell Phone: (402) 783-1583

Email: cjin5@unl.edu

Website: http://engineering.unl.edu/cee/faculty/congrui-grace-jin/

Abstract: CIVE 378 Materials of Construction is a required three-credit course for junior students at the Department of Civil and Environmental Engineering at University of Nebraska-Lincoln, which is taught every spring semester. Every spring about seventy undergraduate students register CIVE 378, most of whom are junior students and sophomore students majoring in civil engineering. Teaching quality of this course is very important for students' learning of the fundamentals of construction materials. The aim of this course portfolio is threefold: (1) to demonstrate the intellectual work of teaching taking place inside and outside of the classroom of CIVE 378; (2) to evaluate the effectiveness of the intellectual work, such as the developed open educational resource (OER) materials and the instructional videos, by systematically investigating, analyzing, and documenting her students' learning activities; and (3) to communicate this intellectual work to campus or disciplinary conversations. The instructor has totally developed twenty OER learning modules, including "lattice structure of metallic materials", "tension and torsion of steel", "aggregate", "ordinary Portland cement", "Portland cement concrete", "admixtures", "wood", "asphalt", "concrete mix design", "3D printed construction materials" and "using data science to study construction materials". Each OER learning module is a concise yet self-sufficient teaching unit, and it takes the learn-by-example approach. Each module covers the relevant basic concepts, instructional videos on how to perform a specific experiment, and related practice problems. In particular, for each experiment taught in the laboratory sessions of CIVE 378, step-by-step laboratory protocols and instructional videos are created. The effectiveness of the developed OER materials and instructional videos are evaluated by an in-depth anonymous course survey, students' feedback to the instructor, and students' performance.

Keywords: Open Educational Resource, Textbooks, Online Teaching, Instructional Videos, Documenting Teaching Innovations, Assessing Teaching Practices.

Table of Contents

1. Objectives of Course Portfolio

CIVE 378 Materials of Construction is a required three-credit course for junior students at the Department of Civil and Environmental Engineering at University of Nebraska-Lincoln. Teaching quality of this course is very important for students' learning of the fundamentals of construction materials. The aim of this course portfolio is threefold: (1) to demonstrate the intellectual work of teaching taking place inside and outside of the classroom of CIVE 378; (2) to evaluate the effectiveness of the intellectual work, such as the developed open educational resource (OER) materials and the instructional videos, by systematically investigating, analyzing, and documenting her students' learning activities; and (3) to communicate this intellectual work to campus or disciplinary conversations. The instructor has totally developed twenty OER learning modules, including "lattice structure of metallic materials", "tension and torsion of steel", "aggregate", "ordinary Portland cement", "Portland cement concrete", "admixtures", "wood", "asphalt", "concrete mix design", "3D printed construction materials" and "using data science to study construction materials". Each OER learning module is a concise yet self-sufficient teaching unit, and it takes the learn-by-example approach. Each module covers the relevant basic concepts, instructional videos on how to perform a specific experiment, and related practice problems. In particular, for each experiment taught in the laboratory sessions of CIVE 378, step-by-step laboratory protocols and instructional videos are created. The effectiveness of the developed OER materials and instructional videos are evaluated by an in-depth anonymous course survey, students' feedback to the instructor, and students' performance.

2. Benchmark Memo 1: Course Description, Course Goals, and Portfolio Goals

2.1 Course Description

CIVE 378 Materials of Construction is a required three-credit course for junior students at the Department of Civil and Environmental Engineering at University of Nebraska-Lincoln, which is taught every spring semester. Every spring about seventy undergraduate students register CIVE 378, most of whom are junior students and sophomore students majoring in civil engineering.

This course will introduce students to various types of construction materials including aggregates, cement, concrete, asphalt, steel, aluminum, wood, masonry, and composites commonly used in the construction industry. Their mechanical and physical properties, working characteristics, testing methods, and processes used to manufacture and assemble these materials are studied. The prerequisite for this course is EMEC 3250 Mechanics of Elastic Bodies, but this course does not serve as prerequisite for other courses, as shown in Figure 1.

For each student, there are two one-hour lectures and one two-hour laboratory session each week. Laboratory activities are used to reinforce lecture materials and give students hands-on experience of mechanical testing of construction materials. The book entitled "Materials for Civil and Construction Engineers (4th Edition)" by M. S. Mamlouk and J. P. Zaniewski has been used as the textbook for both lectures and laboratory sessions in the past decade.

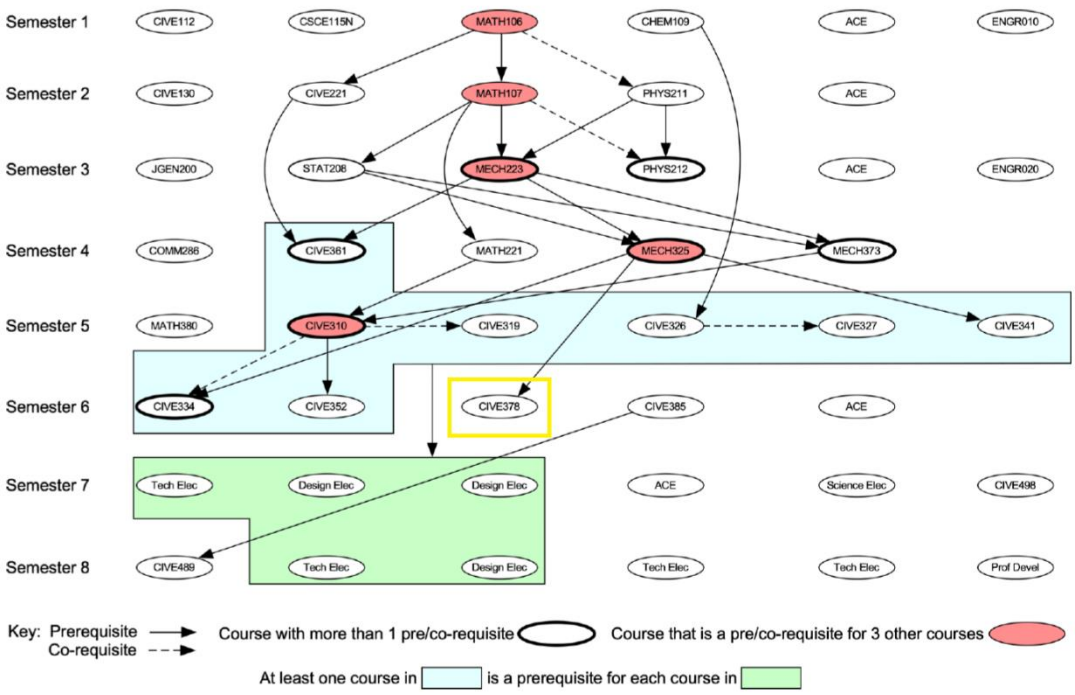


Figure 1. Position of CIVE 378 (highlighted in yellow box) in the undergraduate curriculum.

2.2 Course Goals

A basic function of civil and construction engineering is to provide and maintain the infrastructure needs of society. The infrastructure includes buildings, water treatment and distribution systems, wastewater removal and processing, dams, and highway and airport bridges and pavements. Although some civil and construction engineers are involved in the planning process, most are concerned with the design, construction, and maintenance of facilities. The common denominator among these responsibilities is the need to understand the behavior and performance of materials. Although not all civil and construction engineers need to be material specialists, a basic understanding of the material selection process, and the behavior of materials, is a fundamental requirement for all civil and construction engineers performing design, construction, and maintenance. The subject of construction materials has advanced greatly in the past few decades. As a result, many of the conventional materials have either been replaced by more efficient materials or modified to improve their performance. Students majoring in civil engineering have to be aware of these advances and be able to select the most cost-effective material or use the appropriate modifier for a specific application.

Upon successful completion of this course, the students are expected to be able to do the following.

(1) Understand the fundamentals of materials engineering, which includes the basic mechanistic properties of materials, environmental influences, and basic material classes. One of the responsibilities of civil and construction engineers is the inspection and quality control of

materials in the construction process. This requires an understanding of material variability and testing procedures. In addition, they need to know the atomic structure of materials and how to relate the atomic and molecular structure to the materials' behavior and engineering response.

(2) Understand the basic characteristics of materials used in civil and construction engineering, which includes the characteristics of the primary material types used in civil and construction engineering: steel, aluminum, concrete, masonry, asphalt, wood, and composites.

(3) Conduct experiments independently for the evaluation of materials, which includes tension test of steel and aluminum, torsion test of steel and aluminum, sieve analysis of aggregates, specific gravity and absorption of coarse and fine aggregate, slump of freshly mixed Portland cement concrete, making and curing concrete cylinders and beams, and compressive strength of cylindrical concrete specimens.

2.3 Rationale for Course Selection

Prof. Yong-Rak Kim taught CIVE 378 in the past five years. He moved to Texas A&M University at the end of 2019. Prof. Congrui Grace Jin joined the department as an assistant professor in Spring 2020 and she started teaching this course since then. She has spent a significant amount of time and effort in improving the teaching materials for this course. Specifically, she applied two internal grants, and both got awarded as listed below.

- Project Title: Converting Textbooks to More Up-to-Date and Flexible OER Materials
  PI: Congrui Jin
  Sponsor: Open Educational Resource (OER) Kelly Grant
  Award Amount: $4,000
  Award Period: 05/01/2020 – 06/30/2021

- Project Title: Converting Face-to-Face Course CIVE 378 to Online Format
  PI: Congrui Jin
  Sponsor: Course Continuity Funds
  Award Amount: $5,000
  Award Period: 03/01/2020 – 05/30/2021

The first project is "Converting Textbooks to More Up-to-Date and Flexible OER Materials". The goal of this project is to convert the textbooks for CIVE 378 into OER learning modules, which can significantly decrease the costs for students and make the course materials more flexible and up-to-date. The textbook for CIVE 378 entitled "Materials for Civil and Construction Engineers (4th Edition)" costs $159.99. As a result of the proposed project, every student taking CIVE 378 can save $159.99.

Using this grant, totally twenty OER learning modules will be developed, including "lattice structure of metallic materials", "tension and torsion of steel", "aggregate", "ordinary Portland cement", "Portland cement concrete", "admixtures", "wood", "asphalt", "concrete mix design", "3D printed construction materials" and "using data science to study construction materials". Each OER learning module is a concise yet self-sufficient teaching unit, and it takes the learn-by-

example approach. Each module covers the relevant basic concepts, instructional videos on how to perform a specific experiment, and related practice problems.

This fast-changing world is demanding different skillsets than the ones that were expected just a decade ago. 3D printing of construction materials, such as concrete and mortar, is a hot topic in the construction industry right now, and many industries prefer their job applicants to have knowledge of 3D printing. Data science is another hot topic, which is now frequently used as a problem-solving tool to tackle various problems in civil engineering, such as structure failure prediction and structure optimization, and this, in turn, has made data science a part of required skillset an employer expected of a new engineering graduate. To meet this industrial demand, using the OER grant, two new modules will be developed for CIVE 378: one is "3D printed construction materials" and the other is "using data science to study construction materials".

The second project is "Converting Face-to-Face Course CIVE 378 to Online Format". Using this grant, the instructor has developed this course from face-to-face format into an online format, so that students can take it when face-to-face format is not possible during the COVID-19 pandemic. In particular, for each experiment taught in the laboratory sessions of CIVE 378, step-by-step laboratory protocols and instructional videos are created. These materials will become very valuable resources, because our current laboratory facilities at the department are very old and lack of maintenance, and as a result, only one or two technicians know how to operate them or fix specific problems. Currently, if the one or two technicians are out on vacation or on sick leave, no one can do the demonstration experiments for the students during the laboratory sessions of the CIVE 378 course.

To evaluate the effectiveness of the developed OER materials and instructional videos, all the undergraduate students taking CIVE 378 are invited to complete an in-depth anonymous survey and some of the students are interviewed.

2.4 Key Goals of Completing the Course Portfolio

As the instructor values and supports excellence in teaching and have spent a lot of time and effort in improving her courses, she does have difficulties in capturing her intellectual work and innovative ideas. Although student evaluations are useful for understanding what occurred during a course, many aspects related to the intellectual work of teaching are not always as visible to students. That is the reason she joined the Peer Review of Teaching Program (PRTP) to learn how to document, assess, and make public her teaching innovations and practices.

By completing this course portfolio, the instructor wants (1) to demonstrate the intellectual work of teaching taking place inside and outside of the classroom of CIVE 378; (2) to evaluate the effectiveness of the intellectual work, such as the developed OER materials and the instructional videos, by systematically investigating, analyzing, and documenting her students' learning activities; and (3) to communicate this intellectual work to campus or disciplinary conversations.

3. Benchmark Memo 2: Teaching Methods and Course Activities

This section focuses on teaching methods and course activities. The course syllabus and course schedule are presented as Appendix A and Appendix B, respectively. The developed course modules and associated instructional videos are presented as Appendix C.

3.1 Primary Teaching Practices Used During the Class

The teaching practices in the classroom include lectures and quizzes, whose weights are shown below:

Lecture Attendance and Discussion	0% (but used to manage borderline grades)
Quizzes	19%

Due to the COVID-19 pandemic, the lectures are delivered by the instructor via Zoom with students taking their own handwritten or typed notes. The lectures are designed with short breaks incorporated approximately every 20 minutes to give students a chance to reset their minds before continuing the lecture. The breaks also provide an opportunity for both the students and the instructor to reflect on what is just covered in the lecture and to address any questions that come up as a result of that reflection. In addition to breaks, the instructor frequently sends students into breakout rooms to discuss lecture materials. The instructor jumps among breakout rooms to provide feedback and answer questions. Students are encouraged to ask interesting questions and participate in discussion during the lectures. Their classroom performance and participation will be used to manage borderline grades.

At the end of each lecture, each student takes a quiz. The students are given ten minutes to complete and upload the quiz solution to Canvas for the instructor to grade. If a student has to miss a lecture, he/she must email the instructor before the lecture starts, and then the quiz will be made optional for the student. A doctor's note is needed if the student claims to be sick. Submission of quizzes provides a way for the instructor to evaluate students' performance on a particular subject as well as check students' lecture attendance.

3.2 Primary Teaching Practices Used During the Lab Sessions

For all the lab sessions, students are divided into groups. Each group has four students. At least two students from each group need to attend the lab sessions in-person. It can be two different students from each group every time. All the lab activates will be recorded and uploaded to Canvas afterwards. Students will do most of their experiments as a member of a team where they will be expected to combine and compare data. The instructor believes that students learn better, develop interpersonal skills, and enjoy the lab sessions more when they work in a group-learning environment. A well-functioning group has interdependent team members who effectively communicate ideas, interact around questions, analyze data, and solve problems together. The instructor will help students learn how to work in a team and how to overcome difficulties together.

3.3 Materials and Methods Used Outside the Classroom

All the course materials are uploaded to "Modules" on Canvas, including lecture notes, quiz problems, quiz solutions, lecture videos, YouTube videos, exam questions, exam solutions, lab videos, and sample lab reports, etc. The instructor will judiciously choose related YouTube videos to help students engage more deeply with the subject matter. Based on the instructor's prior experience, a lot of students these days expect information to be presented in a flashy, entertaining way, so YouTube videos can help draw them in. In fact, in late 2011, YouTube for Schools was introduced, an opt-in program that allows students to access thousands of educational videos from YouTube channels such as PBS, TED, and Khan Academy in a safe and controlled environment. Many of these valuable videos assist further learning.

3.4 Assignments and Exams Used to Evaluate Student Learning

The assignments include homework questions and lab reports. Their weights are shown below:

Homework Assignment	0%
Lab Reports	19%

The course has two midterm exams and a cumulative final exam, whose weights are:

Test One	19%
Test Two	19%
Final Exam	24%

The assignment is an important component to evaluate students' performance, which includes homework problems and lab reports. The rationale behind the homework problems is that they are intended to reinforce the learning objectives outside of the classroom; however, the currently used homework problems come from a previous instructor and do not align exactly with the learning objectives of the course. Therefore, for the homework assignments, there is no need for the students to turn in homework, but they are aware of the fact that they need to work on the homework questions if they want to perform well in the exams. Homework solution is posted on Canvas afterwards. For the lab reports, each group turns in one report. All group members will receive the same score. The lab reports are designed to help the students grow their interpersonal skills by working together to complete the reports. This teamwork also provides opportunities for students to explain their work and help teach each other, which helps build a strong bond that will, hopefully, extend beyond the classroom.

The course consists of two formal midterm exams and a cumulative final exam held during the scheduled slot in final exam week. The exams are broken up such that they each cover some thematic units of the course and increase in difficulty as the course progresses. The first midterm is designed to cover everything taught on Materials Engineering Concepts, Nature of Materials, and Steel; the second midterm covers everything taught on Aggregates, Portland Cement, and Portland Cement Concrete; and the final exam addresses the entire content of the course. Each exam is accompanied with a practice exam that is provided to the students and discussed two days before the exam. All exams are held in-person and closed book except for one page of handwritten notes. These exams were held during class time or the scheduled final exam time and students

were not allowed to work together in any capacity during the exams. The rationale for the examinations is to measure and evaluate student learning in a formal setting without external aids. The rationale for allowing limited notes is that by creating useful and condensed sets of notes, the students will spend time reviewing the course materials.

4. Benchmark Memo 3: Analysis of Student Learning

This section focuses on evaluating the effectiveness of the instructor's intellectual work, such as the developed OER materials and the instructional videos, by systematically investigating, analyzing, and documenting her students' learning activities. The results of the anonymous course survey are presented as Appendix D.

4.1 Students Performance

Compared with last year when the instructor was teaching the same course but not using the OER materials or the instructional videos, the students' attendance and performance are both better. The exam questions used this year are not the same with any of the questions used last year, but the level of difficulty is approximately equal. A comparison of the students' scores in Test 1, Test 2, and the final exam are presented in Table 1, Table 2, and Table 3, respectively. In addition, the students this year are also more engaged in classroom discussions throughout the semester.

Table 1. A comparison of the students' scores in Test 1. Plusses and minuses are included to indicate that increases or decreases in performance.

Semester	Minimum [%]	Maximum [%]	Median [%]	Mean [%]
Spring 2020	69	98	88	87
Spring 2021	70	100	96	94
Difference	+1	+2	+8	+7

Table 2. A comparison of the students' scores in Test 2. Plusses and minuses are included to indicate that increases or decreases in performance.

Semester	Minimum [%]	Maximum [%]	Median [%]	Mean [%]
Spring 2020	70	100	84	86
Spring 2021	72	100	92	90
Difference	+2	0	+8	+4

Table 3. A comparison of the students' scores in the final exam. Plusses and minuses are included to indicate that increases or decreases in performance.

Semester	Minimum [%]	Maximum [%]	Median [%]	Mean [%]
Spring 2020	55	100	80	84
Spring 2021	51	100	84	85
Difference	-4	0	+4	+1

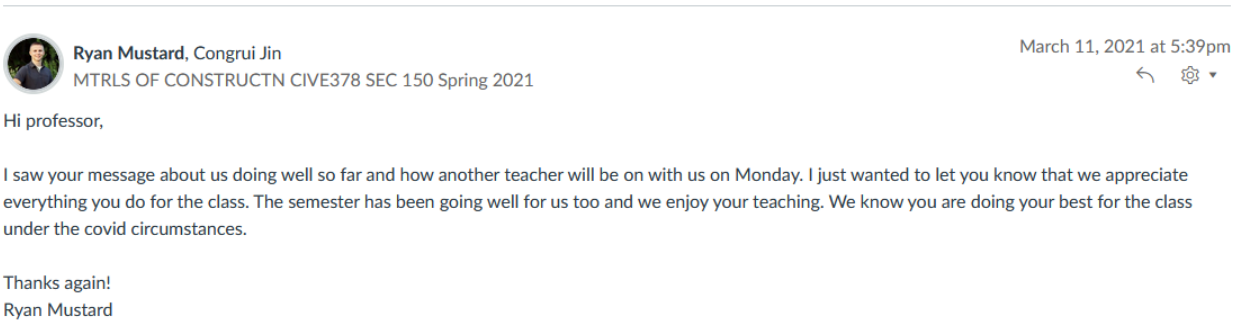
4.2 Students Feedback

The anonymous end-of-the-semester course survey is used to probe the feelings and thoughts of the students regarding the effectiveness of the instructor's teaching approach. The results are shown in Appendix D. Compared with last year when the instructor was teaching the same course but not using the OER materials or the instructional videos, the students' feedback becomes better. A comparison of the students' feedback to the most related questions are presented in Table 4.

Table 4. A comparison of the students' feedback to the most related questions based on the anonymous end-of-the-semester course survey. Plusses and minuses are included to indicate that increases or decreases in performance.

The learning tools (e.g. course texts, notes, slides, videos, exams, projects, etc.) support my learning.	Response Rate	Mean	Standard Deviation	Median
Spring 2020	58/63 (92.06%)	4.22	0.92	4.00
Spring 2021	49/54 (90.74%)	4.69	0.55	5.00
Difference	-1.32%	+0.47	-0.37	+1.00
I understand course expectations and how my performance is evaluated.				
Spring 2020	58/63 (92.06%)	4.39	0.70	4.00
Spring 2021	49/54 (90.74%)	4.59	0.73	5.00
Difference	-1.32%	+0.20	+0.03	+1.00
Course activities effectively promote my learning and interest in the subject.				
Spring 2020	58/63 (92.06%)	4.19	0.78	4.00
Spring 2021	49/54 (90.74%)	4.69	0.55	5.00
Difference	-1.32%	+0.50	-0.23	+1.00
I feel challenged to learn a lot in this course.				
Spring 2020	58/63 (92.06%)	4.20	0.80	4.00
Spring 2021	49/54 (90.74%)	4.39	0.86	5.00
Difference	-1.32%	+0.19	+0.06	+1.00
I find communication with the instructor (e.g. office hours, email, Canvas, etc.) effectively supports my learning.				
Spring 2020	59/63 (93.65%)	4.20	0.71	4.00
Spring 2021	48/54 (88.89%)	4.65	0.64	5.00
Difference	-4.76%	+0.45	-0.07	+1.00

In addition, many students expressed their satisfaction with the teaching materials via email at some point during the semester, and one example is shown in Figure 2.



Ryan Mustard, Congrui Jin
MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

March 11, 2021 at 5:39pm

Hi professor,

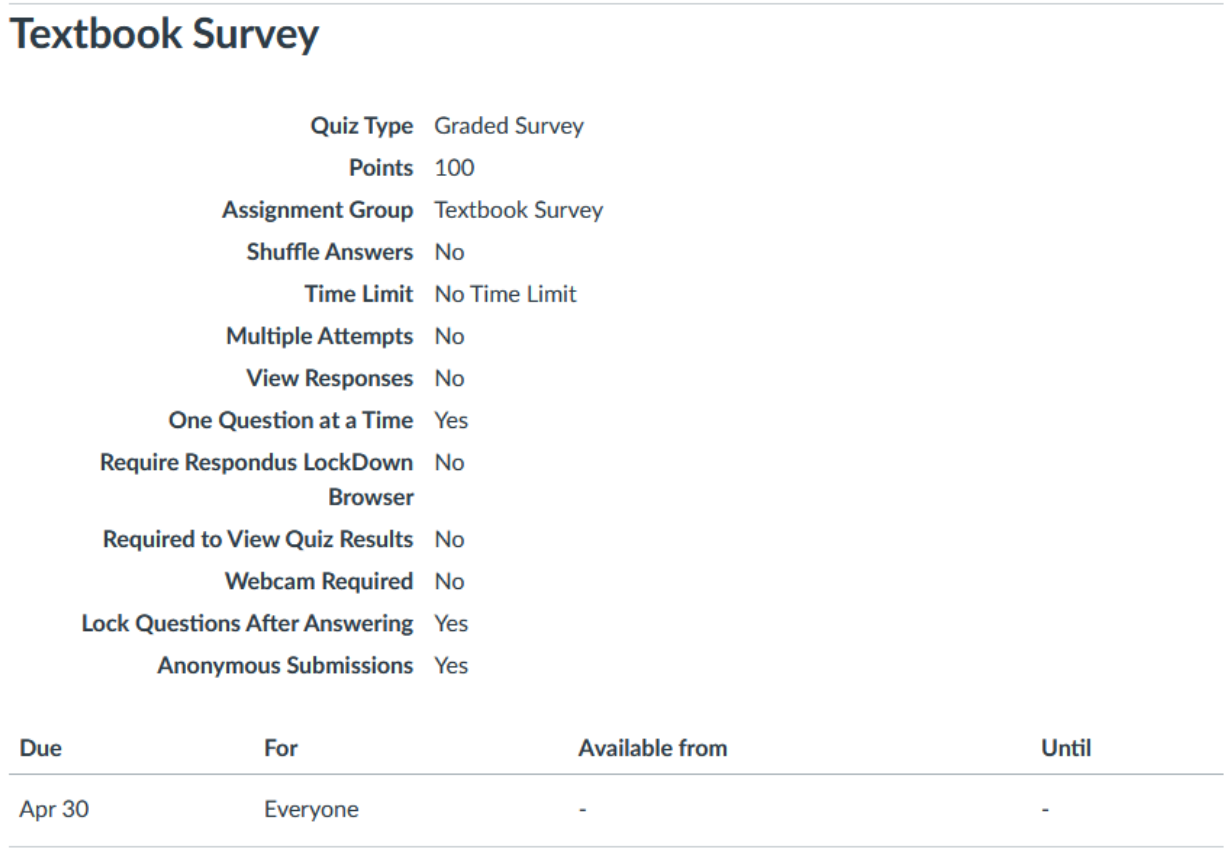
I saw your message about us doing well so far and how another teacher will be on with us on Monday. I just wanted to let you know that we appreciate everything you do for the class. The semester has been going well for us too and we enjoy your teaching. We know you are doing your best for the class under the covid circumstances.

Thanks again!
Ryan Mustard

Figure 2. Email communication with a student.

4.3. Effect of Open Educational Resource Materials

The anonymous end-of-the-semester course survey does not include OER related questions, so the instructor created a separate anonymous survey on Canvas. The setup and the result of the survey are shown in Figure 3 and Figure 4, respectively. The results indicate that the OER materials do help the instructor achieve the learning objectives of this course and thus the instructor is planning to continue using the OER materials in the future.



Textbook Survey

Quiz Type	Graded Survey
Points	100
Assignment Group	Textbook Survey
Shuffle Answers	No
Time Limit	No Time Limit
Multiple Attempts	No
View Responses	No
One Question at a Time	Yes
Require Respondus LockDown Browser	No
Required to View Quiz Results	No
Webcam Required	No
Lock Questions After Answering	Yes
Anonymous Submissions	Yes

Due	For	Available from	Until
Apr 30	Everyone	-	-

Figure 3. The setup of the anonymous survey related to OER on Canvas.

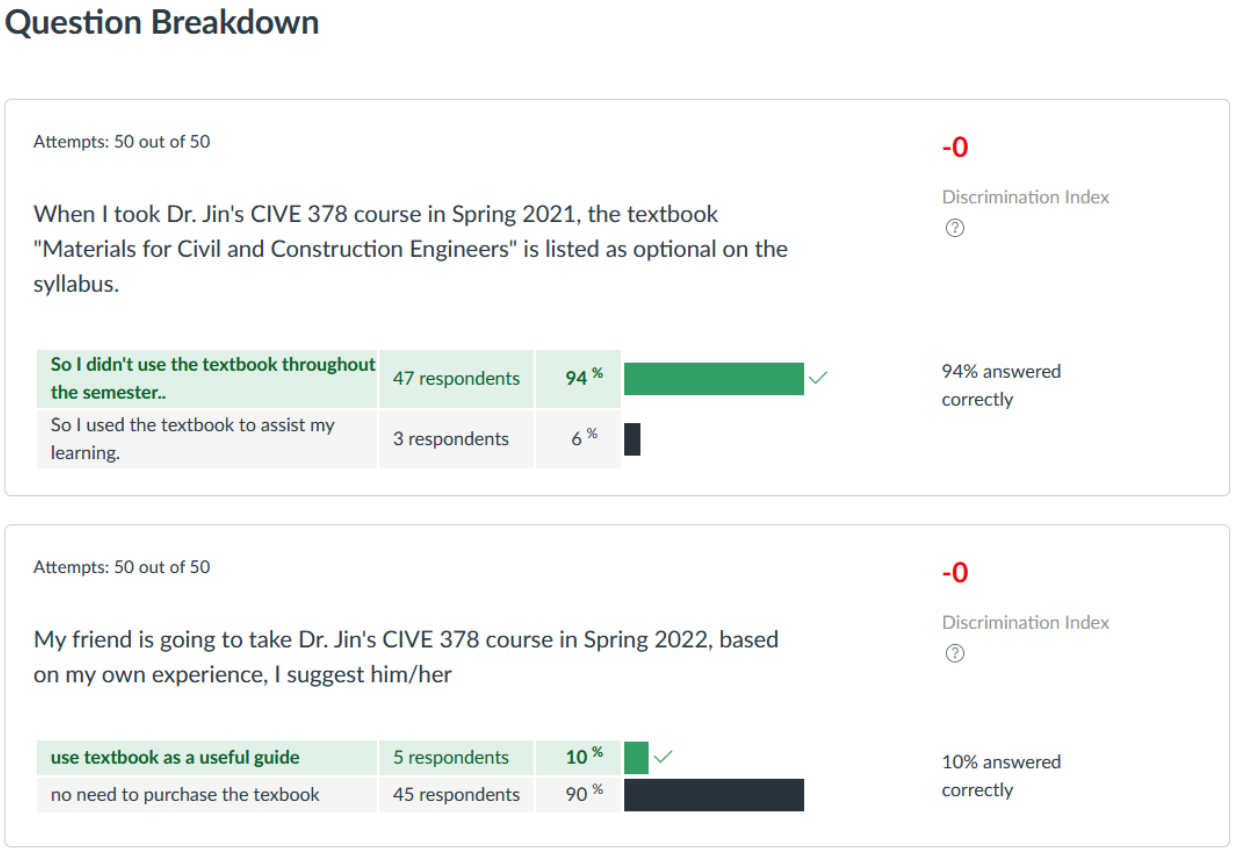


Figure 4. The result of the anonymous survey related to OER.

4.4. Effect of Online Teaching and Instructional Videos

The anonymous end-of-the-semester course survey includes many questions related to online teaching and instructional videos, so there is no need to create a separate survey on Canvas. The results of the related questions are summarized in Table 5. The results indicate that the online materials do assist achieving the learning objectives of this course and thus the instructor is planning to continue using the online materials in the future. But the students also pointed out a lot of issues associated with the instructional videos or online teaching. The instructor will keep that in mind and address those issues in the future.

Table 5. Students' feedback to the questions related to online teaching and instructional videos based on the anonymous end-of-the-semester course survey.

Question: Given your primary mode of participation, what is hindering your learning?
Student Response: 1. None, the learning over video was just as good as learning in the classroom. 2. Lectures can feel a little scattered sometimes with the changes between videos, notes, and slides. Overall it works out, but it can be hard to keep up with when taking notes. 3. Shows lots of videos that don't always play the best over zoom. 4. I think the lack of in-person classes hinders building a stronger relationship with the professor throughout the semester. 5. My internet isn't always very consistent so the audio isn't always clear.

5. Summary and Reflection

CIVE 378 Materials of Construction is a required three-credit course for junior students at the Department of Civil and Environmental Engineering. Teaching quality of this course is very important for students' learning of the fundamentals of construction materials. This course portfolio serves to document the instructor's approach to teaching while also providing the means for the instructor to reflect on to improve her approach. In addition, this portfolio also evaluates the effectiveness of OER materials and online teaching using instructional videos. The results indicate that the OER materials and the instructional videos are very effective in helping achieve the learning objectives of this course and thus the instructor is planning to continue using them in the future. But the students also pointed out a lot of issues associated with the instructional videos or online teaching. The instructor will keep that in mind and address those issues in the future.

Appendices

A. Course Syllabus

CIVE 378 Materials of Construction, Spring 2021

Department of Civil and Environmental Engineering
University of Nebraska – Lincoln

Jan 25 - April 28 (the first class on Jan 25 and the last class on April 28)
Lectures: M. W. 9:30-10:20 at BEAD-E103 CITY
Labs: Wednesday 12:30-14:30, Wednesday 14:30-16:30, Thursday 13:30-15:30 at SEC-139

Instructor: **Dr. Congrui Grace Jin**
Assistant Professor
Department of Civil and Environmental Engineering
University of Nebraska–Lincoln
362Q Whittier, 2200 Vine St., Lincoln, NE 68583-0851
Phone: (402) 472-7825
Email: cjin5@unl.edu
Website: http://engineering.unl.edu/cee/faculty/congrui-grace-jin/

Teaching Assistant: Mr. Hanjie Liang (hliang6@huskers.unl.edu)
Mr. Pramodit Adhikari (adhikaripramodit@huskers.unl.edu)

Office Hours: Dr. Jin Every Friday (2:00 pm to 3:00 pm) via Zoom
Use the following link:
https://unl.zoom.us/j/7660291635
Meeting ID: 766 029 1635

Textbook (Optional): **Materials for Civil and Construction Engineers**, 4th Edition, M. S. Mamlouk and J. P. Zaniewski, Pearson Prentice Hall, 2017.

Prerequisites: MECH 325: Mechanics of Elastic Bodies (with a grade of a "C" or better)

Credit Hrs.: 3 hours

Course Objectives:

- Introduction to the behavior, testing, and understanding of various construction materials such as steel, aggregates, cementitious materials, Portland cement concrete, asphaltic materials, wood, polymers, and composites.
- Experiments covering the concepts of stress and strain under axial, torsional, shear and flexural loading conditions.
- Common ASTM and AASHTO laboratory test methods and specifications.

Course Topics:

- Mechanical Responses of Materials
- Elastic or Inelastic Material Behavior
- Characteristics of Bonding in Materials
- Structural States of Solid Materials
- Physical and Mechanical Properties of Steel
- Corrosion and Oxidation of Steel
- Aggregates
- Portland Cement and Alternative Cementitious Materials
- Concrete Proportioning and Construction
- Mechanical Behavior of Portland Cement Concrete
- Asphalt Cement and Superpave Binder Grading System
- Asphalt Concrete Mix Design
- Mechanical Behavior of Asphaltic Materials
- Structure and Mechanical Properties of Polymers
- Structure and Mechanical Behavior of Wood
- Composite Materials

Grading:

Item	Weight
Class Quizzes	19%
Lab Reports	19%
Test One	19%
Test Two	19%

Final Exam	24%
Total	100%

Letter Grades:	95-100 A+	83-86 B+	73-76 C+	63-66 D+	0-56 F
	90-94 A	80-82 B	70-72 C	60-62 D	
	87-89 A-	77-79 B-	67-69 C-	57-59 D-	

Notes:

- For all the lectures, students attend via Zoom.
  Use the following link:
  https://unl.zoom.us/j/7660291635
  Meeting ID: 766 029 1635

- For all the lab sessions, students are divided into groups. Each group has 4 students. At least 2 students from each group need to attend the lab sessions in-person. It can be 2 different students from each group every time. Lab activates will be recorded and uploaded to Canvas afterwards. For the lab reports, each group turns in one report. All group members will receive the same score.

- All the exams are in-person testing at BEAD-E103 CITY.

1. At the end of every lecture, there will be a quiz. All the quizzes are submitted on Canvas.
2. Since students can discuss with each other, you need to write down the derivation process to prove that you really understand the quiz problem.
3. Always bring a scientific calculator to the labs and the lectures.
4. Check the Canvas website regularly for class notes, quiz solutions, and special announcements.
5. All the course materials are uploaded to "Modules" on Canvas.
6. If you have to miss a lecture/lab, email the TA and the instructor before the lecture/lab starts. Then the quiz or the lab activities will made optional for you. A doctor's note is needed if you are sick.
7. No lowest quizzes will be dropped. All the quizzes will be included when calculating final grade.
8. All the lab reports must be submitted on Canvas.
9. Quizzes and lab reports must be submitted before deadline. Late submission gets 15 points reduced.
10. Wear proper eye protection and close-toed shoes, put long hair in a bun, and follow all safety rules in the lab sessions.
11. Exams are scheduled in advance. If you miss test one or test two, there is no make-up exam, and the weights will be carried over to the final exam.
12. Every test is accumulative and covers both lectures and labs. The final exam covers everything taught this semester, from the first lecture/lab to the last lecture/lab.
13. Two-sided hand-written cheating sheet (no computer print-outs) is allowed for each test, 8.5"x11" large (size A4).
14. The letter equivalents are meant to be approximate. Students are encouraged to ask interesting questions and participate in discussion during the lectures and the lab sessions. Your participation will be used to manage borderline grades.

Additional Important Course Policies:

1. **Academic Honesty Policy**
   Academic integrity is of the utmost importance at Nebraska. Be sure you understand expectations of you and your academic work. View the complete list of academic dishonesty violations in the Student Code of Conduct, specifically Article III: Proscribed Conduct, Section B. Conduct – Rules and Regulations, 1. Acts of Academic Dishonesty. For more information, please visit https://studentconduct.unl.edu/.

2. **Accommodations for Students with Disabilities Policy**

   It is my goal that this class be an accessible and welcoming experience for all students. Reasonable accommodations are provided for students who are registered with the Accessibility Services Center and make their requests sufficiently in advance. For more information, contact:
   Services for Students with Disabilities

B. Course Schedule

Week 1

Jan 25 Lecture: Class Cancelled

Jan 27 Lecture: Materials Engineering Concepts (1)

Lab: Lab Tour

Week 2

Feb 01 Lecture: Materials Engineering Concepts (2)

Feb 03 Lecture: Materials Engineering Concepts (3)

Lab: Measuring Device: Load Cells

Week 3

Feb 08 Lecture: Materials Engineering Concepts (4)

Feb 10 Lecture: Nature of Materials (1)

Lab: Measuring Device: Extensometer

Week 4

Feb 15 Lecture: Nature of Materials (2)

Feb 17 Lecture: Steel (1)

Lab: Measuring Device: Calipers

Week 5

Feb 22 Lecture: Steel (2)

Feb 24 Lecture: Steel (3)

Lab: Tensile Testing of Metals

Week 6

Mar 01 Lecture: Test One

Mar 03 Lecture: Aggregates (1)

Lab: Torsional Testing of Metals

Week 7

Mar 08 Lecture: Aggregates (2)

Mar 10 Lecture: Aggregates (3)

Lab: Aggregate Specific Gravity and Absorption

Week 8

Mar 15 Lecture: Aggregates (4)

Mar 17 Lecture: Portland Cement, Mixing Water, and Admixtures (1)

Lab: Aggregate Sieving Analysis

Week 9

Mar 22 Lecture: Portland Cement, Mixing Water, and Admixtures (2)

Mar 24 Lecture: Portland Cement Concrete (1)

Lab: Slump Test and Unit Weight

Week 10

Mar 29 Lecture: Portland Cement Concrete (2)

Mar 31 Lecture: Portland Cement Concrete (3)

Lab: Making and Curing Concrete Specimens

Week 11

Apr 05 Lecture: Test Two

Apr 07 Lecture: Portland Cement Concrete (4)

Lab: 7-Day Concrete Mechanical Properties

Week 12

Apr 12 Lecture: Portland Cement Concrete (5)

Apr 14 Lecture: Portland Cement Concrete (6)

Lab: 14-Day Concrete Mechanical Properties

Week 13

Apr 19 Lecture: Sustainability & Resiliency (1)

Apr 21 Lecture: Sustainability & Resiliency (2)
Lab: 28-Day Concrete Mechanical Properties

Week 14
Apr 26 Lecture: Sustainability & Resiliency (3)
Apr 28 Lecture: Review for Final Exam
Lab: Lab Review

Final Exam: 10:00 a.m. to 12:00 p.m. Monday, May 3

Lab Report Due Dates

1. Lab Report 1 on Tensile and Torsional Testing of Metals
Due at 5:00 pm on Mar 10
2. Lab Report 2 on Aggregate Specific Gravity, Absorption, and Sieving Analysis
Due at 5:00 pm on Mar 24
3. Lab Report 3 on Slump Test, Unit Weight Measurement, and Making Concrete Specimens
Due at 5:00 pm on April 07
4. Lab Report 4 on 7-Day & 28-Day Concrete Mechanical Properties
Due at 5:00 pm on April 28

C. Course Modules and Instructional Videos

Collapse All | View Progress | + Module

Module 1: Syllabus and Prerequisites

- Syllabus
- Quiz 1
- Quiz 1 Solution

Module 2: Elastic Behavior

- Lecture Note on Feb 01 (Elastic Behavior)
- Lecture Slides for Elastic Behavior
- Quiz 2
- Quiz 2 Solution

Module 3: Elastoplastic Behavior

- Lecture Note on Feb 03 (Elastoplastic Behavior)
- Lecture Note on Feb 08 (Elastoplastic Behavior)

- Lecture Slides for Elastoplastic Behavior
- Quiz 3
- Quiz 3 Solution
- Quiz 4
- Quiz 4 Solution

Module 4: Lattice Structure of Metallic Materials

Module 5: Tension and Torsion of Steel

- Lecture Slides for Tension Test
- Lecture Slides for Torsion Test
- Lecture Note on Feb 22 (Torsion Test)
- Youtube Video on Tension Test (https://www.youtube.com/watch?v=D8U4G5kcpcM)
- Youtube Video on Torsion Test (https://www.youtube.com/watch?v=qPlug2sewFA)
- Quiz 7
- Quiz 7 Solution

- Quiz 8
- Quiz 8 Solution

Module 6: Laboratory Report 1

- Safety Rules for CIVE 378
- Laboratory Report Format
- Laboratory Report Grading Policy
- Framework for Laboratory Report 1
- Lecture Slides for Laboratory Report 1
- Youtube Video on Vernier Caliper (https://www.youtube.com/watch?v=vkPlzmalvN4)
- Lab Video on Tension Test (Part 1) (https://youtu.be/A0q6ROOGzX0)
- Lab Video on Tension Test (Part 2) (https://youtu.be/bKpoUEYCdtY)
- Youtube Video on Torsion Test (https://www.youtube.com/watch?v=94Bu1DiHOoM&t)
- Raw Data for Tension Test
- Raw Data for Torsion Test
- Pictures of fractured samples after torsion tests

Module 7: Test One and Test One Solution

- Test One Questions
- Test One Solution

Module 8: Aggregate

- Lecture Slides on Aggregate Absorption
- Lecture Note on Mar 03 (Aggregate Absorption)
- Youtube Video on Aggregate Processing (https://www.youtube.com/watch?v=cTwidiB15l8)
- Quiz 9
- Quiz 9 Solution
- Lecture Slides on Aggregate Specific Gravity
- Lecture Note on Mar 08 (Aggregate Specific Gravity)
- How taking a bath led to Archimedes' principle (https://www.youtube.com/watch?v=ijj58xD5fDI)
- Quiz 10
- Quiz 10 Solution

- Lecture Slides on Fineness Modulus
- Lecture Note on Mar 10 (Aggregate Gradation)
- Quiz 11
- Quiz 11 Solution

Module 9: Laboratory Report 2

- Framework for Laboratory Report 2
- Lecture Slides on Aggregate Gradation Plot
- How to Plot
- Youtube Video on Coarse Aggregate Specific Gravity and Absorption (https://www.youtube.com/watch?v=B3GEtVn0nz8)
- Lab Video on Coarse Aggregate Specific Gravity and Absorption (https://youtu.be/37tfAaQ2j2Y)
- Youtube Video on Sieve Analysis of Fine and Coarse Aggregates (https://www.youtube.com/watch?v=3Xqq1cxhD-s)
- Lab Video on Sieve Analysis of Fine and Coarse Aggregates (https://youtu.be/zxHW1V1Si_0)

Module 10: Ordinary Portland Cement

- Lecture Slides on Ordinary Portland Cement
- Lecture Note on Mar 15 (Ordinary Portland Cement)
- Cement, how it is made. (https://www.youtube.com/watch?v=n-Pr1KTVSXo)
- Quiz 12
- Quiz 12 Solution

Module 11: Admixtures

- Lecture Slides on Admixtures
- Lecture Note on Mar 22 (Admixture)
- Youtube Video on Slump Test (https://www.youtube.com/watch?v=jDUQO-bn8pU)
- Quiz 13
- Quiz 13 Solution

Module 12: Portland Cement Concrete

- Lecture Slides on Hardened Concrete Properties
- Lecture Note on Mar 24 (Hardened Concrete Properties)

Quiz 14

Quiz 14 Solution

Module 13: Laboratory Report 3

Framework for Laboratory Report 3

Lecture Slides on Laboratory Report 3

Good Example of Laboratory Report 3

Youtube Video on Slump Test (https://www.youtube.com/watch?v=yzpWGrh9j6Y)

Youtube Video on Unit Weight Measurement (http://www.youtube.com/watch?v=1mLgdtgRxY8)

Lab Video on Slump Test and Unit Weight Measurement (https://youtu.be/5Fw3WlcXvtM)

Youtube Video on Making Concrete Specimens (https://www.youtube.com/watch?v=YvMWCSVIzVI)

Lab Video on Making Concrete Cylinders (https://youtu.be/bmF7uk45JZ4)

Youtube Video on Concrete Specimen Demolding (https://www.youtube.com/watch?v=ZHq9wFj1OpA)

Lab Video on Concrete Specimen Demolding (https://www.youtube.com/watch?v=M2lCPPaYtdw)

Module 14: Concrete Mix Design

- Lecture Slides on Concrete Mix Design -- Step 1
- Lecture Note on Mar 29 (Concrete Mix Design Step 1)
- Youtube Video on Concrete Mix Design -- Step 1 (https://www.youtube.com/watch?v=XbJTzlvzlpQ)
- Quiz 15
- Quiz 15 Solution
- Lecture Slides on Concrete Mix Design -- Step 2 & Step 3
- Youtube Video on Concrete Mix Design -- Step 2 (https://www.youtube.com/watch?v=PC5LCKR1gY4)
- Youtube Video on Concrete Mix Design -- Step 3 (https://www.youtube.com/watch?v=1Qk2oMgc25Y)
- Quiz 16
- Quiz 16 Solution
- Lecture Slides on Concrete Mix Design -- Step 4 to Step 9
- Youtube Video on Concrete Mix Design -- Step 4 & Step 5 (https://www.youtube.com/watch?v=38CY0ZkFdpw)
- Youtube Video on Concrete Mix Design -- Step 6 & Step 7 & Step 8 (https://www.youtube.com/watch?v=z6u-fsVy7jM)

- Quiz 17
- Quiz 17 Solution
- Lecture Slides on Concrete Mix Design -- Step 10
- Youtube Video on Concrete Mix Design -- Step 9 & Step 10 (https://www.youtube.com/watch?v=Q8lAfkfgt0U)
- Quiz 18
- Quiz 18 Solution

Module 15: Compression Test and Split-Tension Test

- Framework for Laboratory Report 4
- Lecture Slides on Laboratory Report 4
- Lecture Video on Compression Test (https://www.youtube.com/watch?v=ungkHHvWPwY)
- Youtube Video on Compression Test (https://www.youtube.com/watch?v=6ferJ1OncnQ)
- Lab Video on Compression Test (https://youtu.be/u0Qe1BV6WXQ)
- Lecture Video on Split-Tension Test (https://www.youtube.com/watch?v=gXULWlWiyoM)
- Youtube Video on Split-Tension Test (https://www.youtube.com/watch?v=m__bAeHLwvQ)

- Lab Video on Split-Tension Test (https://youtu.be/do1mfZuJrgs)
- Raw Data for 7-Day Compression Test
- Raw Data for 14-Day Split-Tension Test
- Raw Data for 28-Day Compression Test

Module 16: Test Two and Test Two Solution

- Test Two Question
- Test Two Solution

Module 17: Asphalt and Wood

- Asphalt Binders and Asphalt Mixtures (1) (https://www.youtube.com/watch?v=vrNiYeEzWRc)
- Asphalt Binders and Asphalt Mixtures (2) (https://www.youtube.com/watch?v=TuiQiCsjuV4)
- Asphalt Binders and Asphalt Mixtures (3) (https://www.youtube.com/watch?v=snoJ1lPi1Pw)
- Asphalt Binders and Asphalt Mixtures: Sample Problem (https://www.youtube.com/watch?v=qxfg998GHFY)
- Rolling Thin Film Oven and Pressure Aging Vessel (https://www.youtube.com/watch?v=M5vuNuWsFyg)

- Flash Point Test (https://www.youtube.com/watch?v=G_Qmom3bMv4)
- Rotational Viscometer Test (https://www.youtube.com/watch?v=NdffolMwcLs)
- Dynamic Shear Rheometer Test (https://www.youtube.com/watch?v=JTtfKORhZEU)
- Bending Beam Rheometer Test (https://www.youtube.com/watch?v=D2YdpvCFG48)
- Direct Tension Test (https://www.youtube.com/watch?v=mgBUqh3xG34)
- Performance Graded Asphalt Binder Specifications (https://www.youtube.com/watch?v=UQwbfTzABY8)
- Wood as Construction Material (https://www.youtube.com/watch?v=1q4-sirS_vg)
- Orthotropic Nature of Wood (https://www.youtube.com/watch?v=plPXJ1dOYto)
- Moisture Content of Wood (https://www.youtube.com/watch?v=a4V9jHlQy6U)
- Sample Problem on Wood Moisture Content (https://www.youtube.com/watch?v=S46JwU6lOOs)

Module 18: Self-Healing Construction Materials

- Slides: Self-Healing Construction Materials
- Video: Hendrik Marius Jonkers - Self-healing concrete containing bacteria (https://www.youtube.com/watch?v=OXkW1q9HpFA)

Video: What if cracks in concrete could fix themselves? (http://www.ted.com/talks/congrui_jin_what_if_cracks_in_concrete_could_fix_themselves?language=en)

Video: Turning dunes into architecture (https://www.ted.com/talks/magnus_larsson_turning_dunes_into_architecture)

Module 19: Construction Materials for Acoustic Energy Harvesting

Slides: Acoustic Energy Harvesting

Lecture Notes: Acoustic Energy Harvesting

Video: Björk - Visual patterns in music (https://www.youtube.com/watch?v=TDgLAjtO9FQ)

Video: CYMATICS: Science Vs. Music (https://www.youtube.com/watch?v=Q3oltpVa9fs)

Video: Tacoma Bridge (http://www.youtube.com/watch?v=3mclp9QmCGs)

Quiz Question

Quiz Solution

Module 20: Construction Materials for Thermal Energy Storage

Slides: Thermal Energy Storage

Video: A warm embrace that saves lives (https://www.ted.com/talks/jane_chen_a_warm_embrace_that_saves_lives#t-128941)

Video: PureTemp (https://www.youtube.com/watch?v=YP6CPUXSh5Q)

Video: Concentrated Solar Thermal Power plus Molten Salt Storage (https://www.youtube.com/watch?v=LMWIgwvbrcM&feature=youtu.be)

Quiz Question

Quiz Solution

Module 21: Final Exam and Final Exam Solution

Slides on Final Exam

Final Exam Questions

Final Exam Solution

D. Course Survey Results

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

1 - I understand that my response will be anonymous and will not include any identifying information.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Yes	(1)	49	100.00%		1.00

0 25 50 100 Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	1.00	0.00	1.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I feel welcome and respected.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	38	77.55%		4.67
Agree	(4)	9	18.37%		
Neither Agree nor Disagree	(3)	0	0.00%		
Disagree	(2)	1	2.04%		
Strongly Disagree	(1)	1	2.04%		

0 25 50 100 Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.67	0.77	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I understand course expectations and how my performance is evaluated.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	33	67.35%		4.59
Agree	(4)	14	28.57%		
Neither Agree nor Disagree	(3)	1	2.04%		
Disagree	(2)	0	0.00%		
Strongly Disagree	(1)	1	2.04%		

0 25 50 100 Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.59	0.73	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I feel challenged to learn a lot in this course.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	27	55.10%		4.39
Agree	(4)	17	34.69%		
Neither Agree nor Disagree	(3)	3	6.12%		
Disagree	(2)	1	2.04%		
Strongly Disagree	(1)	1	2.04%		

0 25 50 100 Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.39	0.86	5.00

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

Course activities effectively promote my learning and interest in the subject.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	32	65.31%		4.47
Agree	(4)	11	22.45%		
Neither Agree nor Disagree	(3)	3	6.12%		
Disagree	(2)	3	6.12%		
Strongly Disagree	(1)	0	0.00%		
				0 25 50 100	Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.47	0.87	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

The learning tools (e.g. course texts, notes, slides, videos, exams, projects, etc.) support my learning.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	36	73.47%		4.69
Agree	(4)	11	22.45%		
Neither Agree nor Disagree	(3)	2	4.08%		
Disagree	(2)	0	0.00%		
Strongly Disagree	(1)	0	0.00%		
				0 25 50 100	Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.69	0.55	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I am invited to be an active participant in my learning (either face to face or online).

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	26	53.06%		4.33
Agree	(4)	15	30.61%		
Neither Agree nor Disagree	(3)	6	12.24%		
Disagree	(2)	2	4.08%		
Strongly Disagree	(1)	0	0.00%		
				0 25 50 100	Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.33	0.85	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I have opportunities to learn with and from other students in this course.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	37	75.51%		4.71
Agree	(4)	10	20.41%		
Neither Agree nor Disagree	(3)	2	4.08%		
Disagree	(2)	0	0.00%		
Strongly Disagree	(1)	0	0.00%		
				0 25 50 100	Question

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.71	0.54	5.00

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

The feedback I receive on my work is useful to me for making changes and improvements.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	32	65.31%		4.43
Agree	(4)	9	18.37%		
Neither Agree nor Disagree	(3)	5	10.20%		
Disagree	(2)	3	6.12%		
Strongly Disagree	(1)	0	0.00%		

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.43	0.91	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I know where to go for help in this course if, and when, I need it.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	35	71.43%		4.65
Agree	(4)	12	24.49%		
Neither Agree nor Disagree	(3)	1	2.04%		
Disagree	(2)	1	2.04%		
Strongly Disagree	(1)	0	0.00%		

Response Rate	Mean	STD	Median
49/54 (90.74%)	4.65	0.63	5.00

2 - Educational research has identified the elements in the below statements as being important to student learning. For each statement, please select your level of agreement regarding your learning experiences in this course:

I find communication with the instructor (e.g. office hours, email, Canvas, etc.) effectively supports my learning.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Strongly Agree	(5)	35	72.92%		4.65
Agree	(4)	9	18.75%		
Neither Agree nor Disagree	(3)	4	8.33%		
Disagree	(2)	0	0.00%		
Strongly Disagree	(1)	0	0.00%		

Response Rate	Mean	STD	Median
48/54 (88.89%)	4.65	0.64	5.00

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

3 - What has been beneficial to your learning? From the following list of teaching elements, what is the one thing that has been the most beneficial for your learning in this course so far? After your selection, please provide written comments about the element.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Inclusiveness	(1)	1	2.13%		
Course Performance Expectations	(2)	2	4.26%		
Course Challenge	(3)	0	0.00%		
Engagement in Assignments or Projects	(4)	4	8.51%		
Course Learning Materials and Tools	(5)	15	31.91%		
Active Learning Opportunities	(6)	8	17.02%		
Quality Interactions with Students	(7)	5	10.64%		
Timely and Useful Feedback for Improvement	(8)	5	10.64%		
Support	(9)	1	2.13%		
Instructor Communication	(10)	4	8.51%		
Other	(11)	0	0.00%		
Not Applicable	(0)	2	4.26%		
				0 25 50 100	

Response Rate
47/54 (87.04%)

4 - You selected 'Inclusiveness'. Please provide written comments on your choice.

Congrui Jin

Response Rate	1/54 (1.85%)

- The option to converse with other students during quizzes to help get other perspectives to it.

5 - You selected 'Course Performance Expectations'. Please provide written comments on your choice.

Congrui Jin

Response Rate	2/54 (3.7%)

- The quizzes and tests directly assessed the content taught in class.
- I really loved having the quizzes after each class, a good check in to go over material right away. Also nice to work with other students in a breakout room to complete

6 - You selected 'Course Challenge'. Please provide written comments on your choice.

Congrui Jin

Response Rate	0/54 (0%)

7 - You selected 'Engagement in Assignments or Projects'. Please provide written comments on your choice.

Congrui Jin

Response Rate	4/54 (7.41%)

- Group quizzes helped a lot to grasp material
- Group quizzes are very supplemental to course
- Easy to find interest in the subject when we get to do things with other students
- Working with lab groups help me engage in the material.

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

8 - You selected 'Course Learning Materials and Tools'. Please provide written comments on your choice.

Congrui Jin

Response Rate	11/54 (20.37%)

• The in-class quizzes were way better than having homework due. It was a motivator to attend class everyday and took off a lot of pressure that homework adds. It also was a good tool to reinforce the material from that days class and a good tool to help integrate the previous material with what we currently learned. I feel like I learned the most from this class of all my classes this semester and it was the most fun to attend.

• I like the quizzes after every lecture to help test my knowledge on each of the specific lectures I have just learned.

• The quizzes after class were very helpful for testing my knowledge on the information that I just learned in class.

• Professor Jin provides ample information necessary for learning the objectives for the course.

• Everything is posted on canvas in an orderly manner

• Our lectures and daily quiz problems are what really drive the learning and understanding in this course.

• I found that a lot of the power points and materials provided were very helpful when reviewing for exams where the examples and quizzes helped to get a feel for the materials learned that day and week.

• I think it's really nice to have the lecture slides and lectures written notes uploaded to canvas, it makes studying a lot easier and productive.

• Dr. Jin used quizzes each lecture which helped me stay on top of the material. Then she would post slides, notes and youtube videos to enhance understanding.

• The quizzes were really helpful to review when studying for the tests

• lecture notes posted (both the writing and slides versions) were helpful for reference

9 - You selected 'Active Learning Opportunities'. Please provide written comments on your choice.

Congrui Jin

Response Rate	8/54 (14.81%)

• Very good teacher and expects us to work with other students on quizzes through the use of breakout rooms

• Having the quizzes after each lecture and having the ability to work with other students on those quizzes really helped me learn and understand the material better. If I got an answer that was different than another student, we were able to figure out what went wrong and fix it. That was the best learning for me.

• I really liked the daily quizzes

• The opportunities to have hands on learning in lab is where I learned the most.

• I feel the quizzes, lab times, and lab reports did a good job of reiterating what was taught in the lecture.

• Professor Jin had a lot of learning opportunities. She had short quizzes right after every class which I found really helpful and beneficial. Having quizzes really helped me to focus on the class and also not having a heavy load work was also good as I was more interested in this class. The quizzes were helpful as a review for the exam. The exams weren't hard and her notes were helpful for the exams and I really enjoyed all her lectures.

• I really liked the system of doing quizzes at the end of class in place of homework. I felt like it was a helpful check of whether or not I understood the material while not being too much of a burden on my workload. I think with a lighter workload, it helped me enjoy the class more. Instead of constantly worrying about my grades, I was able to just freely learn and digest the material properly. I feel like with added pressure, students lose more motivation to learn in a class.

• I really liked the having the quizzes at the end of class especially the fact that we could work in groups on them. It really helped us get familiar with that day's topics.

10 - You selected 'Quality Interactions with Students'. Please provide written comments on your choice.

Congrui Jin

Response Rate	4/54 (7.41%)

• I think Dr. Jin's way that she set up the course is extremely useful in the fact that we are learning from each other every single class. The opportunity to have a quiz to test our knowledge over the content learned is very beneficial.

• Being able to discuss the quizzes and work through the labs with a group is beneficial to talk through issues I might be having with solving a problem.

• Being able to take quizzes with other students is very helfpul.

• For the quizzes after each class we were assigned to a breakout room with other students where we were able to discuss any problems we had with it

11 - You selected 'Timely and Useful Feedback for Improvement'. Please provide written comments on your choice.

Congrui Jin

Response Rate	5/54 (9.26%)

• Dr. Jin always managed to grade our assignments quickly and efficiently. She provided great feedback on what was incorrect and always provided a solution to the problem.

• Grading was nice and let me know how to improve or fix what I had done wrong previously.

• All assignments were graded very quickly and solutions were always posted.

• she always kept us up to date.

• Grades for quizzes and exams were done very fast and gave me plenty of time to learn from mistakes if I made them.

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021
Instructor: Congrui Jin *
Response Rate: 50/54 (92.59 %)

12 - You selected 'Support'. Please provide written comments on your choice.

Congrui Jin

Response Rate	1/54 (1.85%)

• Available for any questions

13 - You selected 'Instructor Communication'. Please provide written comments on your choice.

Congrui Jin

Response Rate	4/54 (7.41%)

• Class is enjoyable and I feel like I have learned a lot.
• Clearly communicates to the class about plans and makes accommodations for students. There are never any surprises that aren't communicated to the class.
• Dr. Jin is easy to get along with and always responds to messages quickly (even late at night). So she makes it very easy on us by being accessible for questions and concerns.
• Dr. Jin was always willing to help or explain topics further and her comments and feedback on tests and quizzes were always helpful.

14 - You selected 'Other'. Please provide written comments on your choice.

Congrui Jin

Response Rate	0/54 (0%)

15 - You selected 'Not Applicable'. Please provide written comments on why you selected your choice.

Congrui Jin

Response Rate	2/54 (3.7%)

• Not much has been beneficial to learning. The labs are interesting to go to, but the students don't actually do anything, we just stand around and watch the TA do stuff.
• N/A

16 - What could use some improvement? From the following list of teaching elements, what is the one thing that could most use some improvement to increase your learning? After your selection, please provide written comments about the element.

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Inclusiveness	(1)	0	0.00%		
Course Performance Expectations	(2)	0	0.00%		
Course Challenge	(3)	2	4.17%		
Engagement in Assignments or Projects	(4)	10	20.83%		
Course Learning Materials and Tools	(5)	5	10.42%		
Active Learning Opportunities	(6)	1	2.08%		
Quality Interactions with Students	(7)	2	4.17%		
Timely and Useful Feedback for Improvement	(8)	3	6.25%		
Support	(9)	1	2.08%		
Instructor Communication	(10)	0	0.00%		
Other	(11)	5	10.42%		
Not Applicable	(0)	19	39.58%		
				0 25 50 100	

Response Rate
48/54 (88.89%)

17 - You selected 'Inclusiveness'. Please provide written comments on your choice.

Congrui Jin

Response Rate	0/54 (0%)

18 - You selected 'Course Performance Expectations'. Please provide written comments on your choice.

Congrui Jin

Response Rate	0/54 (0%)

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

19 - You selected 'Course Challenge'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	2/54 (3.7%)

- I often felt like the information we covered in lecture was not enough for the quizzes.
- the course is not graded very hard, so i don't challenge myself in this course because I'd rather use my time an energy to improve a grade in another class. this makes it so that i'm not learning a lot or retaining a lot of information.

20 - You selected 'Engagement in Assignments or Projects'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	10/54 (18.52%)

- The lab TA was awful and I didn't learn very much from it. This is probably due to COVID
- I think it would have been better if we were able to test our own specimens etc. in labs rather than have the tech do it.
- The labs were sometimes not very engaging. I know with covid that this had an effect on this part of the class.
- I personally didn't have a problem with having no course homework. But I know some students would prefer to have assignments over post-class quizzes.
- When we have lab groups with four people, there is always going to be one or two people per group that do next to nothing on the lab.
- There are not any course assignments but that does not hinder education
- I think I wish there were homework assignments. It would be a good way to check my understanding in a longer format than the quizzes.
- There were no homeworks assigned. I kind of like homeworks because I learn from examples really well
- I enjoy courses that have a form of design project
- The breakout rooms for quizzes didn't really work because no one had cameras on and there was very little interaction.

21 - You selected 'Course Learning Materials and Tools'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	5/54 (9.26%)

- At times quizzes did not correlate heavily with what was covered that day in class.
- I think we could use more examples or maybe a supplementary book that has more reference material to use for studying and further learning about the topics presented in this course.
- The lectures did little to help me learn the knowledge.
- I feel like the lab didn't feel that helpful/interesting in applying the in-class topics. I think maybe if we had actually designed the concrete like we did in class and then made it in lab it would've been more engaging, as opposed to following the formula like we did. It felt like a lot of the labs were just watching testing occur and then writing the report. It just didn't feel that interesting or engaging.
- The course materials didn't always line up with what we were expected to know on the tests

22 - You selected 'Active Learning Opportunities'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	1/54 (1.85%)

- Sometimes the labs would be a little hard to comprehend as well as lack of organization when in groups. This can be easily improved by accounting for who will be in which sections

23 - You selected 'Quality Interactions with Students'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	1/54 (1.85%)

- Sometimes students would not communicate in our breakout rooms.

24 - You selected 'Timely and Useful Feedback for Improvement'. Please provide written comments on your choice.	
Congrui Jin	
Response Rate	3/54 (5.56%)

- Many quizzes and tests don't show us what we did wrong
- The feedback on the quizzes was scarce and did not explain much. She would provide quiz solutions though.
- One of the best parts of this class was how fast the grading was! When taking points off, it would be helpful to provide an explanation and a personalized statement of what should have happened instead. The feedback from lab reports was good, but the quiz and test feedback could have been more personalized. Although, I can see how this could slow grading which was incredibly fast this semester.

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021
Instructor: Congrui Jin *
Response Rate: 50/54 (92.59 %)

25 - You selected 'Support'. Please provide written comments on your choice.

Congrui Jin

Response Rate	1/54 (1.85%)

• She wasnt always the best at answering questions

26 - You selected 'Instructor Communication'. Please provide written comments on your choice.

Congrui Jin

Response Rate	0/54 (0%)

27 - You selected 'Other'. Please provide written comments on your choice.

Congrui Jin

Response Rate	5/54 (9.26%)

• This class is/was listed as an in person class when I signed up, yet there is no in person attendance option. I understand and am 100% behind health and safety protocols, but don't lie to students, because learning in person is so much easier.

• not much Dr. Jin did very well in the class

• I honestly can't think of anything that was bad

• The labs changes after the semester started which made things kind of confusing, also would have been easier if our lab partners were in the same lab times as us as it made data collection confusing. The lab was just a bit confusing overall, but the resources and instructor answering questions made it work

• I think labs could be improved. The most difficult part was not being able to be present for every lab. I learn best by doing, so I would have liked to do all of the labs in-person. I think the lab TA improved over the course of the semester. Sometimes I couldn't hear what he was saying, but with experience he will be more confident.

28 - You selected 'Not Applicable'. Please provide written comments on why you selected your choice.

Congrui Jin

Response Rate	12/54 (22.22%)

• Class was structured well

• The class was set up perfectly for a person like me who best learns by doing examples. The quizzes at the end of each lecture were those examples.

• I think that this class is one that supports effective learning, especially being in a Zoom format. Dr. Jin does a great job of teaching the material, providing real world examples, and connecting the course information to the lab portion of the class.

• N/A

• Dr. Jin's class is well put together and allows for students to learn. Nothing in regards to her class, grading methods, or teaching style needs to be altered.

• Great class!

• I thought all instruction was sufficient given the circumstances.

• I was satisfied with everything from this course.

• There is no area in which I think the class needs to improve.

• This class was really helpful and I really enjoyed Professor Jin's teaching so I do not have any further comments regarding this.

• I believe that Dr. Jin's teaching style is the one that allows students to gain the most knowledge in a concise and organized manner.

• I really enjoyed the way the class was set up so I can't think of anything to change.

29 - This course is:

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Required by my major/degree	(1)	50	100.00%		
Required by my college	(2)	0	0.00%		
A chosen elective	(3)	0	0.00%		
Don't know/choose not to answer	(4)	0	0.00%		

0 25 50 100

Response Rate

50/54 (92.59%)

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

30 - I spend the following average number of hours studying and/or preparing for this course per week:

Response Option	Weight	Frequency	Percent	Percent Responses	Means
Less than 1 hour	(1)	5	10.00%		
Between 1-4 hours	(2)	28	56.00%		
Between 4-7 hours	(3)	12	24.00%		
Between 7-10 hours	(4)	4	8.00%		
More than 10 hours	(5)	1	2.00%		
				0 25 50 100	

Response Rate
50/54 (92.59%)

31 - My attendance in this class so far:

Response Option	Weight	Frequency	Percent	Percent Responses	Means
I missed 0% of classes	(1)	37	74.00%		
I missed 1-10% of classes	(2)	13	26.00%		
I missed 11-25% of classes	(3)	0	0.00%		
I missed 26-50% of classes	(4)	0	0.00%		
I missed 51% or more of my classes	(5)	0	0.00%		
				0 25 50 100	

Response Rate
50/54 (92.59%)

32 - My anticipated grade for this class is:

Response Option	Weight	Frequency	Percent	Percent Responses	Means
A	(4)	44	88.00%		
B	(3)	6	12.00%		
C	(2)	0	0.00%		
D	(1)	0	0.00%		
F	(0)	0	0.00%		
				0 25 50 100	

Response Rate
50/54 (92.59%)

33 - Please select the one description that BEST represents your primary participation mode in this course.(If 50/50 for two of the modes, please chose one to provide feedback on.)

Response Option	Weight	Frequency	Percent	Percent Responses	Means
I attended online with the instructor present live via Zoom or other videoconferencing platform.	(1)	42	100.00%		
I attended in person in the classroom with the instructor also present in person in the classroom.	(2)	0	0.00%		
I attended in person in the classroom with the instructor present live via Zoom or other videoconferencing platform.	(3)	0	0.00%		
I worked through course materials online (by watching recorded videos and/or working through other posted content) with little or no live interaction with the instructor.	(4)	0	0.00%		
				0 25 50 100	

Response Rate
42/54 (77.78%)

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

34 - Given your primary mode of participation, what is helping your learning?

Congrui Jin

Response Rate	34/54 (62.96%)

• break out video rooms with other students to do the quizzes. We could discuss the problem and work through it as a group.

• That every class is posted so i can go back and review it.

• Dr. Jin's willingness to allow interactions between students and the instructor.

• Going over a quiz problem each day that was very relevant to what we were learning really helped my learning.

• Lecture slides and notes are available after class. Also daily quizzes keep students on top of topics.

• Quizzes are very supplemental to course

• The daily quizzes have helped my learning. With no weekly "busy work" style of homework, I was able to learn the content more effectively and remember what was taught. The daily quizzes provided a quick determination of where I stood with the material taught that day.

• I would say the zoom classes specifically tied in with the quizzes that were provided.

• The lecture slides and written notes uploaded to canvas.

• Quizzes were helpful to learn content.

• Breakout rooms for quizzes

• Availability to ask questions

• The ability to see what she's writing on the whiteboard on the computer and being able to discuss problems in the breakout rooms.

• Being able to be at home undistracted and undisturbed from outside influences.

• The quizzes give me an opportunity to talk to classmates and hear multiple perspectives on the course material immediately after learning it. I think that it helps reinforce my understanding of the daily material unlike other classes where I leave lecture and forget some stuff before doing the homework.

• The shared screen option.

• Zoom meetings with other students.

• Zoom is engaging and fast paces

• Professor was very good at presenting the material over zoom

• Going over her lecture notes a second time outside of class to fill up my notes.

• Zoom

• The slides and lecture notes were easy to understand and the quizzes were good to study for the test.

• Notes posted in multiple formats on canvas for later review

• Breakout rooms during zoom sessions help me clarify subjects learned in lecture.

• quizzes right after material was learned.

• I enjoyed the way this class was laid out. It was very helpful that the canvas was clear. I personally enjoy the hand-written notes as they make taking notes more clear. I also prefer the quizzes to homework.

• I think Zoom classes were really helpful as she had her final notes from the lecture uploaded right after the class and the quizzes right after class was also helpful and helped me to focus o the lectures.

• I think the quizzes are very helpful in gauging how well i am grasping the concepts. I was also very thankful for the quick grading. I feel like when grading takes a long time, we've already forgotten everything, so it's harder to apply the feedback. I liked that solutions were posted so we could see the correct way to solve the problems. i thought the notes were very helpful in understanding the material

• Dr. Jin knew how to use Zoom efficiently so that it was not a hinderance to learning at all. Breakout rooms made working with other students on quizzes very efficient.

• She was very responsive typically

• The daily quizzes and Dr. Jin's lecture notes and slides.

• Slides and notes are available via Canvas directly after class.

• Slides from class were posted after each class

• Like I said before the constant quizzes really helped me understand the materials.

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

35 - Given your primary mode of participation, what is hindering your learning?

Congrui Jin

Response Rate	32/54 (59.26%)

• None, the learning over video was just as good as learning in the classroom.

• That its hard to interact and ask questions online

• Focusing on class sometimes. This isn't a problem with Dr. Jin's teaching style at all though, it's just the fact that an online format is tough to stay on task with at every given moment.

• Besides from not being able to really "participate" in lab due to COVID, there was nothing that hindered my learning.

• Not having the same experience as an in person class is hard to adjust to, but considering the situation it is necessary to be online

• Nothing

• N/A

• I think the lack of in-person classes hinders building a stronger relationship with the professor throughout the semester.

• My internet isn't always very consistent so the audio isn't always clear.

• N/A

• Hard to actually participate during class

• I would rather have in person classes

• N/A

• I personally learn better with taking notes in class and interacting in person.

• Lectures can feel a little scattered sometimes with the changes between videos, notes, and slides. Overall it works out, but it can be hard to keep up with when taking notes.

• not being in person to ask questions

• NA

• Shows lots of videos that don't always play the best over zoom

• If you miss a class there is no way to get your quiz grade back

• N/A

• Zoom

• The groups for quizzes were not very helpful

• Professor does not try to interact with students at all to get to know them. Her camera isn't even on some of the time, so it's hard to stay engaged. Class is graded very easily with no homework and all quizzes being group quizzes, so students don't challenge themselves.

• NA

• The change of schedule mid-semester was tough to navigate, but worked out in the end.

• I found online classes helpful except I wish the lectures were recorded and made available to the students so they can watch the lectures before the exam.

• Sometimes when working on quizzes, there was no interaction among students. Usually this was okay because everyone knew what they were doing. When there was confusion on quizzes, we usually could work together.

• Trying to explain things better to confused students

• Lack of a variation of different problems

• The only thing is not really being able to talk to the professor after class like you can in person.

• Online learning

• I guess not being able to ask as many questions.

University of Nebraska, Lincoln
ENGR Spring 2021 Course Evaluations

Course: CIVE-378-150.1211: MTRLS OF CONSTRUCTN CIVE378 SEC 150 Spring 2021

Instructor: Congrui Jin *

Response Rate: 50/54 (92.59 %)

36 - How could this course be changed to better facilitate your learning in your primary mode of participation?Best experience, example, etc.

Congrui Jin

Response Rate	31/54 (57.41%)

- None, the learning over video was just as good as learning in the classroom.
- More questions/engagement in zoom
- n/a
- I just wish that we could have done more at in person lab.
- N/A
- Labs are not very clear in practice. May be different without covid
- Nothing needs to be changed for the primary mode of participation.
- I think just recommending some example problems that would help refer students to material that may help them if they are struggling.
- Not use Spectrum internet. I could also go somewhere for class like campus or a coffee shop.
- N/A
- Some form of participation during lecture
- In person classes are much more helpful
- N/A
- Nothing comes to mind.
- I would have liked lectures that ran a little longer so that they can address more example problems or problem types. It would expose me to a wider variety of problems since we don't have homework assignments.
- I liked how the course was structured, I just didnt like that it was through zoom.
- The quizzes could be better fitted to what was covered in class that day.
- Nothing, great job
- Have make-up quizzes
- If the TA's would provide better feedback on the quizzes.
- Homework or some sort of examples for us to do
- Maybe having fewer students in a breakout room
- Assign homework problems, make only some quizzes group oriented
- NA
- I loved how this class was ran and would not change anything
- Feedback on quizzes could have been more personalized to show what was missed and what should have been done instead. Otherwise, great class. I would take this class again.
- Using Zoom was seamless except for occasionally not having audio when we were watching a video. I don't see anything that needs to be changed.
- Not sure
- Possibly incorporate a list of optional practice problems so people can study those as well as previous quizzes
- Not being online
- I'm not sure I don't think zoom is the best way to learn but we were stuck with it and we can't change that.