

CSM 1500 – Construction Problem Solving and Critical Thinking

Course Outline and Requirements

Section 001 – Tuesday and Thursday – 8:00AM – 9:15AM, Lee 1-100

Section 002 – Tuesday and Thursday – 12:30PM – 1:45PM, Lee 1-172

Spring Semester 2017

Course Instructor: Jason D. Lucas, PhD – Assistant Professor

Office Hours: 2-136 Lee Hall
MWF: 9-10, TTh: 9:30-10 and 1:45-2:45
Other times by **Appointment**

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Prerequisite: CSM 1000, Construction Science and Management major or consent of department chair.

Course Description: Fundamentals and application of formal problem solving, critical thinking and ethics.

Critical Thinking Integration

This course is part of the Clemson University Thinks2 (CT2) program that is aimed at improving student critical thinking skills. Memorizing facts and being able to repeat definitions and/or procedures are not in themselves a sufficient skill set to address the complex problems facing the construction industry today. You need to develop the ability to *reason, evaluate and decide* if you are to be successful in your career.

Critical thinking happens when we are able to objectively analyze and evaluate an issue in order to form an informed judgement and take informed action. This involves analyzing claims for accuracy, sources of those claims for authority, and review of a situation from different points of view.

Course Objectives: Upon completion of the course, students should be able to:

CT2 Objectives:

1. Analyze and describe in writing the differences between critical and noncritical thinking including presenting the essential components of effective critical thinking within a given scenario. Including analysis and interpretation of different viewpoints, the claims within those viewpoints, the validity of those claims, and explanations of your final decision and point of view.
2. Analyze a situation to identify and separate relevant from irrelevant facts within a situation to solve a problem. Include justification as to why the information should be classified this way, your and other's potential interpretation of the information, and potential alternative solutions while being able to defend your conclusions.
3. Identify flaws and inconsistencies in possible positions and claims within a given situation through the evaluation of influencing information, the source and completeness of that information, and how the information may bias ones thinking to come up with the inconsistent or flawed claim.
4. Identify and explain in writing where critical thinking fundamentals play a role in formal problem solving and the evaluation of ethical dilemmas.

General Course Objectives:

1. Utilize the formal problem solving process to identify possible root causes for a given problem and evaluate them based on relevance of information. Determine and evaluate possible solutions to the specific problem.
2. Analyze and dissect a given scenario for ethical implications and how basic ethical principles can be applied while presenting different possible positions utilizing the tools from the Ethical Toolbox based on facts provided within the scenario.
3. Demonstrate an understanding of the formal research process by analyzing complex problems through the completion of a team-based formal research project with findings presented in written and oral format
4. Establish an electronic internship portfolio to document internship experiences.

Course Text: None Required

Tentative Schedule and Topical Outline: the following course schedule is subject to change as the situation demands. Any changes will be announced at least one-week in advance unless changes are required due to weather cancelations and or other unforeseen circumstances.

Week	Date Start	ACTIVITY (*CT2 = <i>Critical Thinking Activity or Assignment</i>)
1	January 12	Course Introduction Syllabus Available and Pre-CCTST Instrument Administration
2	January 16	Introduction to Critical Thinking (CT) “Desert Survival Situation” *CT2 Critical Thinking Definition Critical Thinking Fundamentals <i>Written Assignment: Reflection on Desert Survival Situation</i> *CT2
3	January 23	Critical Thinking Exercises Fallacies and Heuristics, Analyzing Claims Exploring both sides of an argument – identifying with the other POV <i>Written Assignment: Reflection on Arguments and Claims</i> *CT2
4	January 30	The Formal Problem Solving Process The 8-step Process, An Introduction <i>In-class Example: “Wasted Material” Scenario</i>
5	February 6	Formal Problem Solving Applications <i>In-class Exercise: “Dealing with Personnel Issues” Scenario</i> *CT2 <i>Written Assignment: Where do we apply CT to PS?</i> *CT2 Creative Thinking PPT – Creative Thinking: How to Inspire Creativity <i>In-class Exhibits: “Shifting Your Paradigm</i>
6	February 13	Exam #1 – Problem Solving, Creating and Critical Thinking The Internship Portfolio
7	February 20	Morality, Ethics, and the Law/Ethics in Construction Applications of Ethical Principles <i>In-class Exercise: Socratic Discussion of Scenarios</i> *CT2
8	February 27	Application of CT to more effective problem solving & ethical issues <i>In-class Exercise: Role Play Construction Ethics Case Studies</i> *CT2 <i>Written Assignment: Ethical Case Analysis</i> *CT2
9	March 6	Exam #2 – Ethics and Critical Thinking Team Building and Working in Teams
10	March 13	Applied Formal Research PPT – Applied Formal Research
11	March 20	Spring Break – No Classes
12	March 27	Semester Research Project Team Project Requirements – Discussion Working in Teams, Dos and Don’ts
13	April 3	Preliminary Submittal Evaluating Resources for Authenticity, Authority, and Bias *CT2
14	April 10	Analyzing Data and Creating good arguments in your research *CT2 Post-CCTST Instrument in Class
15	April 17	Formulating Conclusions Written Reports Due
16	April 24	Class Project Oral Presentations (in place of final exam) Final Reflections Due *CT2

Critical Thinking Methods of Teaching

All critical thinking methods of course instruction require class participation and interaction of the students. In these discussions you can expect to have your claims challenged and questioned. This is to get you to think deeper about the origins of those beliefs and question their accuracy. This is also to get you to think about your own thought process. This can be uncomfortable at times and is not meant to be a critique on anyone's personal belief system.

Course Requirements

1. Pre and Post Course Assessment - Take the California Critical Thinking Skills Test (CCTST) at the beginning and end of the semester on the scheduled date to evaluate and monitor your growth in critical thinking.
2. Assignments - Complete assignments and submit on assigned dates. Most assignments will be individually completed and include demonstrating the ability to differentiate facts from assumptions, evaluate various possible solutions and be able to effectively communicate in writing not only your answer(s) but also details on how you obtained them. Mastery of content and critical thinking skills and knowledge will be part of the evaluation of most weekly assignments. The basis of all assessments of all assignments will be provided as part of each assignment. Assignments are graded with a rubric and at times require professional judgement on how well concepts are grasped and skills are demonstrated. Any contentions of grades need to be submitted in writing within one week of the assignment being returned with clear detail on where you feel inadequate points were received and why. Once this is received the entire assignment will be reevaluated by the instructor.
3. Class Participation – Active involvement is critical in this class. It is expected that you not only attend class but also contribute to yours and your fellow students' learning through class and small group discussions and by questioning the material being presented including the assumptions made by the faculty and other students. In addition you should be able to recognize flaws and/or inconsistencies in material presented and evaluate information and data for consistency with established facts and/or methods. Finally, you should be able to provide a professional assessment of the material presented for the purpose of improving the teaching/learning process.
4. Quizzes and Exams – There will be unannounced quizzes over the material presented in class. The quizzes will not only seek to discover if you know the correct possible answers but also the correct process of achieving them. There will also be two scheduled exams.
5. Course Project – All students will participate in the completion of a team project and be responsible for making a written and oral presentation associated with it. The project will consist of selecting specific materials and/or systems for a given portion of a facility. And in the selection process to establish a framework of attributes used to make the final selection along with presenting a decision-making (logic) diagram that leads to selecting the most effective and efficient materials/systems for the assigned portion of the facility. In the exploration stage of the project, you will be required to present any assumptions that you made and how they related to your selection, identify the resources being utilized to acquire needed information to make informed decisions and identify any possible inconsistencies and/or flaws in the data and/or information gathered to reach your final selection of the designated material/system. In the written portion of the project you will be required to present the process you utilized in arriving at your decisions including how your decision is based solely on the facts acquired. In the oral portion of the project you will be required to respond to challenges and/or questions as to how and why you reached the decisions you did in a constructive manner. You will be provided as part of the project assignment the rubric(s) that will be used to evaluate your performance.
6. Internship Portfolio – All CSM majors are required to document their required 800 hour construction experience in an electronic portfolio in accordance with department guidelines. All students will be required to establish the main and designated associated pages for the internship in this course and it must be approved by the designated department representative.
7. Outside of class participation – Each student is required to attend at least 3 extra-curricular educational/service events as sponsored by the Constructor's Guild or one of the associated student chapter groups. These may include Field Trips, Invited Speaker Presentations, and Service Projects. Strictly social events or company recruitment nights do not count. Documentation of participation in a minimum of 3 events is required to receive credit for this course requirement. No partial credit.

CT2 Assessment

In addition to the pre and post-test evaluation, the CT2 initiatives success is also gauged through the submission of individual student created CT2 artifacts for review. The artifacts that will be submitted by the professor for this course is a sampling of the written “Ethical Case Analysis”. This assignment was selected because it is designed for students to critically analyze a construction related situation, identify the ethical problem or problems that are involved, and discuss the case while taking appropriate viewpoints into consideration when developing a stance on the identified issue. Artifacts that are submitted are a random sampling to show evidence of students’ critical thinking ability and are not assessed outside of this class for grade.

Method of Course Evaluation: the final grade for the course will be based on the following points:

50 - Pre and Post CCTST Instruments (need to take both to get credit) - an incomplete attempt (e.g. did not answer all the questions or did not spend appropriate length of time on the test) will receive no credit. The instructor receives a report of how long each student was logged into the test and how many questions they answered.

300-400 – Assignments and Homework

200-250 - Quizzes/Tests/Exams

400 - Research Project (oral presentation and written report)

150 - Class Participation / Attendance (positive influence in discussion)

50 - Extra Curricular Outside of Class Participation

50 - Internship e-portfolio setup (complete by date for credit – no partial credit)

Total 1200 – 1350 Points

Grading Scale: Less than 60%.....**F**; Over 60.00%.... **D**; Over 70.00%**C**; Over 80.00% **B**; Over 90.00%**A** *There is no rounding of grades*

Academic Integrity

As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a “high seminary of learning.” Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

Instances of academic dishonesty will be handled in accordance with Clemson University’s *Undergraduate Announcements* and *Faculty Manual*.

Class Cancellations Due to Campus Closing

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor.

Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

Disability Access Statement

Students with disabilities requesting accommodations should make an appointment with Dr. Margaret Camp (656-6848), Director of Disability Services, to discuss specific needs within the first month of classes. Students should present a Faculty Accommodation Letter from Student Disability Services when they meet with instructors. Accommodations are not retroactive and new Faculty Accommodation Letters must be presented each semester.

Department Student Expectations

The department unexcused absence policy is contained on the Student Behavior Expectation document attached to this outline. But specifically:

Absences -- Excused absences are only of the following types: (1) documented personal emergency beyond the student's control; (2) pre-approved and documented university, college, or department activities. All excused absences must be documented and submitted within one week of the missed class, otherwise the absence will be considered unexcused. Only students with excused absences will be allowed to make up missed work. All documentation should be typed or photocopied and be attached to a business memorandum. Only hard-copies will be accepted—e-mail is NOT an acceptable form of documentation.

NOTE: Any student with 4 or more unexcused absences will receive an "F" for the course!

Late Attendance – A student not present at the beginning of class will be considered tardy. **Two** times late for the class will count as one unexcused absence.

Please wait 15 minutes should an instructor or substitute to show if they are delayed. Once 15 minutes has passed you can leave without receiving an absence. You can generally expect to be notified if a class has to be canceled because of emergency.

Last day to drop a class or withdraw without a "W" is: January 25, 2017

The last day to drop a class or withdraw without final grades is: March 17, 2017

Clemson University Title IX (Sexual Harassment)

Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Mr. Jerry Knighton is the Clemson University Title IX Coordinator. He also is the Director of Access and Equity. His office is located at 111 Holtendorff Hall, 864.656 .3181 (voice) or 864.565 .0899 (TDD).

Emergency Guidelines from Clemson University Police Department

All students and employees should be familiar with the following guidelines. For additional information about safety see <http://www.clemson.edu/cusafety/preparedness/>.

Evacuation:

- When evacuating buildings, do not use elevators as they may lose power, stranding riders.
- Familiarize yourself with the locations of stairwells and exits.
- Individuals needing assistance evacuating should move to a stairwell away from the hazard, dial 911, and provide the Dispatcher with their exact location and what they need regarding evacuation.
- When evacuating follow the instructions provided by Public Safety personnel to reach a safe place.
- To seek "Tornado Safer Places," get to the lowest level of the building time allows, stay away from areas with windows and glass, and put as many walls as you can between yourself and the outside. In public buildings, bathrooms typically have an additional wall.

Active Shooter:

- Always call 911 as soon as you possibly can.
- Run away from the area, if it is safe to do so, time allows and the gunman is not nearby.
- Hide if the gunman is too close to your location. Find a safer place, lock and barricade doors, turn lights out and cell phones off or to vibrate.
- Fight. As a last resort, resolve to fight the intruder with everything you have at your disposal.

A short video prepared and presented by the Department of Homeland Security can be found at the following link: [dhs.gov/video/options-consideration-active-shooter-preparedness-video](https://www.dhs.gov/video/options-consideration-active-shooter-preparedness-video).

Clemson University Department of Construction Science and Management
Expected Student Behavior

Class Attendance - Class attendance is mandatory. Unexcused absences may affect the student's final grade at the discretion of each department faculty member as shown in the respective course syllabus. A student with two or more unexcused absences for classes that meet once a week; four or more unexcused absences for classes that meet twice a week, or six or more unexcused absences for classes that meet three times a week will, as a matter of departmental policy, be dropped from the respective course and receive an F unless the student voluntarily drops the course within the approved university time frame. Additionally, students should understand that, unless prior arrangements have been made and approved, leaving class prior to the time it has been dismissed by the faculty member is unprofessional and unacceptable, and may result in an absence being recorded.

Punctuality - Students are expected to be in class at the time it is scheduled to begin. Repeated tardiness is unacceptable. Two instances of tardiness will result in one unexcused absence. Excessive incidents of tardiness may result in a reduction of a student's grade.

Cell Phones and Laptop Computers - Cell phones are to be turned off or to vibrate during class. Not adhering to this courtesy may result in confiscation of the phone during class. Laptop computers are allowed in class for the purpose of taking notes and other faculty-designed purposes. If the computers are used for non-approved purposes during class, students will be asked to leave the class for that day.

Food and Drinks - Food and drink may be consumed in classrooms at the discretion of the respective faculty member. If allowed and you bring food and drink you are expected to clean up after yourself placing trash and recyclables in proper containers. Because of budget cuts, custodial staffs have been cut back. They are not expected to clean up food and drink containers left in classroom spaces. Note: only non-alcoholic beverages are to be consumed unless approved in advance for receptions at special events.

Academic Honesty - A student's work is expected to be his/her own. Academic dishonesty of any kind is unethical and unacceptable, and will result in dismissal from class and course failure or lowering of course grade. Consequences are at the discretion of the respective faculty member, and in accordance with policy and procedure as contained in the university Student Handbook.

Ethics- The construction industry demands the highest standards of ethical conduct. There are three types of ethics: Business or Legal, Professional or Balanced, and Situational (Blanchard, K. and Peale, N.V.). Business or Legal ethics is adhering to all legal, academic and other pertinent regulations. Professional or Balanced ethics is carrying out all activities in such a manner as to be fair to everyone concerned. Finally, Situational ethics pertains to specific activities or events that may initially appear to be a "gray area" until you ask yourself: "How will I feel about myself if my actions are published in the newspaper or if I have to justify my actions to my family, friends and colleagues? Students in the Construction Science and Management Department are expected to uphold the highest standards of Legal, Professional and Situational ethics. Failure to do so will result in the student having to meet with the department Chair for disciplinary actions including possible removal from the respective courses and/or program. Reference: The Power of Ethical Management, K. Blanchard & N.V., Peale, 1982, Fawcett, New York.