CSM 1500 Construction Problem Solving
Course Outline
(3 credit hours – 3 lecture hours per week)

Prerequisite: CSM 100, 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 do the following four things:

1. Try to discover the assumptions that influence the way we think and act.
2. To check out whether those assumptions are as accurate as we think they are.
3. To try and see our assumptions and resulting actions from multiple and different viewpoints.
4. Take informed action.

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

1. Describe in writing the differences between critical and noncritical thinking including presenting the essential components of effective critical thinking using a specific example.
2. Explain the formal problem solving process and assess its advantages and disadvantages compared to intuitive problem solving.
3. Explain how the formal problem solving process is similar to and different from critical thinking.
4. Identify possible causes for a given problem and evaluate each including explaining the relevance of the information used in the assessment process and the appropriateness of procedures for investigating the causes.
5. Determine and evaluate possible solutions to specific problems consistent with identified facts utilizing the formal problem solving process.
6. Explain the basic principles of ethics.
7. Present three possible positions you could take for a specific situation utilizing the tools from the Ethical Toolbox based on the facts provided.
8. Identify flaws and inconsistencies in one or more possible positions that can be taken to a given situation.
9. Conduct a formal research project within a team environment.
10. Present the results of the research study in written and oral format.
11. Establish an electronic internship portfolio.

Course Requirements:

1. Pre and Post Course Assessment - Take the Critical Thinking Assessment (CAT) at the beginning and end of the semester on the scheduled date to evaluate and monitor your growth in critical thinking.
2. Weekly Assignments - Complete weekly 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 weekly assignments will be provided as part of each assignment.

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. Weekly Quizzes – There will be weekly unannounced quizzes over the material presented in class. The weekly quizzes will not only seek to discover if you know the correct possible answers but also the correct process of achieving them.

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.

**Topical Outline (with approximate durations):**

- **0.5 week:** Introduction to course and topic
- **1.5 weeks:** Critical thinking fundamentals and applications
- **2.0 weeks:** Formal problem solving process and applications
- **2.0 weeks:** Ethical principles and applications
- **0.5 week:** Development of electronic internship portfolio
- **2.0 weeks:** Application of critical thinking skills to more effective problem solving and ethical considerations
- **4.0 weeks:** Conduct team projects with periodic reports and discussion
- **2.5 weeks:** Team oral presentations, discussion and assessment
Course Evaluation:

Take the CAT Pre and Post Tests – 5%
Weekly Class Assignments – 15%
Weekly Quizzes – 15%
Oral Project Presentation – 20%
Written Project Presentation – 30%
Class Participation – 15%

Total – 100%