

**BSCI 6466**

**Spring 2017**

**Planning and Decision Making in Construction (3 Credit Hrs)**

**Instructor:** Salman Azhar, Ph.D., Associate Professor

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**Office Hours:** 2:00 – 4:00 PM (Tuesday - Thursday) or by appointment

**Text Book:** No text book required. All course material will be posted on Canvas.

**Reading Books:** (1) **Thinking, Fast and Slow** by Daniel Kahneman; (2) **The Flaw of Averages** by Sam. L. Savage

**Recommended References:**

- **Risk and Decision Analysis in Projects**, John Schuyler, Project Management Institute
- **Quantitative Techniques for Decision Making in Construction**, Tang, Ahmad, Ahmed and Lu, Hong Kong University Press
- **Making Hard Decisions with Decision Tools**, Clemen and Reilly, Cengage Learning
- **Managing Risk in Construction Projects**, Smith, Merna and Jobling, Wiley Blackwell
- **Risk Management for Design and Construction**, Cretu, Stewart and Berends, Wiley
- **Economic Feasibility of Projects**, Tang, The Chinese University Press, Hong Kong

**Course Description:**

Applications of quantitative methods in various phases of project life cycle to assist project stakeholders in making effective planning and informed decision making.

**Student Learning Outcomes (SLOs):**

Upon course completion, student should be able to:

1. Apply the critical planning and decision-making process in construction projects.
2. Apply quantitative methods in problem solving and decision making throughout the project life cycle.
3. Evaluate quantitative and qualitative methods of decision making and choose the best approach to solve a given problem.
4. Analyze project data using decision making software and spreadsheets.
5. Evaluate results of data analysis and apply them in the complex decision making scenarios.
6. Create solutions of complex decision making problems.
7. Present results orally and in writing.
8. Write a scientific paper appropriate for a peer-reviewed conference proceedings or journal publication.

**Course Topics:** The following represents the major topics we expect to cover:

1. Introduction to quantitative approaches to decision making
2. Economic feasibility analysis for construction projects
3. Decision making under uncertainty
4. Single criteria decision making
5. Multi criteria decision making
6. Decision support software applications
7. Dealing uncertainties in cost estimation and scheduling
8. System simulation and simulation software applications
9. Optimization and forecasting problems
10. Risk analysis and management

**Course Requirements/Evaluation:**

Grades will be calculated using the following breakdown. The instructor has the discretion to change this breakdown.

SCALE:		BREAKDOWN:	
90-100	A	Response Paper (SLO 1, 7)	15%
80 – 89.99	B	Assignments (SLO 2-6)	35%
70 – 79.99	C	Tests (3, 10% each) (SLO 1-6)	30%
60 – 69.99	D	Final Project (SLO 7, 8)	20%
<60	F	TOTAL	100%

**Note:**

Grades may be curved on a uniform basis such as normal distribution curve at the professor's discretion at the end of the semester. There may be opportunities during the semester for extra credit on homework assignments. These will be announced in the class.

**Course Policy Statements:**

**Class Procedure:** This is an online class. WebEx will be used to deliver lectures, and Canvas will be used to provide course materials. Class sessions will consist of lecture, demonstration, and discussion. Students are expected to arrive/join on time and stay for the entire period.

**Participation:** Participation in this class is essential to learning. Attendance is an important part of participation. You are expected to attend all class periods and participate actively and constructively for the full class duration. Students may take up to 2 excused absences by informing the instructor in advance via e-mail or phone. Student will receive a one-half point cumulative score reduction for each additional absence.

**Communication:** E-mail is recognized as an official means of communication by the University. You are responsible for any class requirements and schedules that are altered in a timely manner using e-mail. This is a Canvas site supported course, grades and other pertinent information will be posted on the site.

**Homework:** Homework assignments will be assigned and collected approximately weekly. Solutions must be submitted on CANVAS.

**Make-up Tests:** Upon missing a test and turning in your written excuse (within 2 class periods), it is your responsibility to contact Dr. Azhar in order to arrange a time to make-up the test. All make-up tests must be completed within one week of the last day covered by the excuse.

**Academic Standards Policy:** The McWhorter School of Building Science has an academic standards policy that states that any student making below a 'C' will be reviewed by an academic standards committee. The student may then be asked to leave the program or repeat the course or any other action deemed appropriate by the committee may be taken.

**Cheating:** The policy regarding cheating is as follows: Auburn University expects students to pursue their academic work with honesty and integrity. Violations of this principle, which are enumerated in the Tiger Cub include: (1) Any communication between students during an examination; and (2) Plagiarism (submission of work that is not one's own without proper acknowledgment).

**Students with Disabilities:** Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible, (but no later than January 16th) if accommodations are needed immediately. If you have a conflict with your instructors' office hours, an alternate time can be arranged. To set up this meeting, please contact your instructor by E-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with The Program for Students with Disabilities, 1244 Haley Center, 844-2096 (V/TT).

**Response Paper**

You will choose one of the two reading books listed on page 1 of the syllabus. Thoroughly read selected chapters of the chosen book throughout the semester and write a 2000 words response paper which will be due on April 26. Details and response paper format are posted on Canvas.

**Assignments**

Homework assignments will be related to different topics that will be discussed in this course. You will be required to complete all tasks using instructions/videos provided and submit your solution via Canvas.

**Tests**

Tests will include conceptual, numerical and descriptive questions. Some questions will require you to use the software learned in the class to complete the given tasks. More instructions will be provided a week before the test date.

**Final Project**

Students will work on a group Final Project which will be presented on 4/25. Details about the final project will be provided in late January.

## BSCI 6466: Planning and Decision Making in Construction

Class contact hours: 45

- Residency week: 15.5 hours
- Online lectures: 20 hours
- Course videos: 9.5 hours

### Tentative Class Schedule

#### Residency Week (Room 307)

Class #	Date	Time	Topic	Remarks
1	1/4	1:00-5:30 PM	Course Introduction, Quantitative approaches to decision making, Introduction to Risk Analysis and Management  Economic feasibility analysis for construction projects, Class Exercises	<b>Assignment #1 given</b>
2	1/5	1:00-5:30 PM	Decision-Making under certainty, Decision tree analysis using EMV criteria, Class Exercises	<b>Assignment #2 given</b>
3	1/6	1:00-5:30 PM	Decision tree analysis using Precision Tree, Decision tree analysis using EUV criteria, Class Exercises	<b>Assignment #3 given</b>
4	1/7	9:30-11:30 AM	Course Review, Risk Assessment Exercise	

#### Post-Residency Weeks (Webex)

Class #	Date	Time	Topic	Remarks
5	1/10	7 - 8 PM	Residency week review, Discussion for Test 1	
<b>6</b>	<b>1/17</b>	<b>7 PM</b>	<b>Test 1</b> (Based on classes 1-4)	
7	1/24	6 - 8 PM	Multi criteria decision making (2 hours class)	<b>Assignment 4 given</b>
8*	1/31	7 - 8 PM	No class (Prof. Holley will teach 2 hours class)	
9*	2/7	7 - 8 PM	Bidding – Go/No-Go decisions (No class, reading exercise will be given)	<b>Assignment 5 given</b>
10	2/14	7 - 8 PM	Monte-Carlo Simulation	<b>Assignment 6 given</b>
11	2/21	7 - 8 PM	Dealing uncertainties in cost estimation-1	<b>Assignment 7 given</b>
12	2/28	7 - 8 PM	Dealing uncertainties in cost estimation-2	
<b>13</b>	<b>3/7</b>	<b>7 PM</b>	<b>Test 2</b> (Based on classes 7-10)	
<b>14</b>	<b>3/14</b>	<b>7 PM</b>	<b>Spring Break – No Class</b>	
15	3/21	7 - 8 PM	Dealing uncertainties in scheduling	<b>Assignment 8 given</b>
16	3/28	7 - 8 PM	Risk Analysis and Management-1	<b>Assignment 9 given</b>
17	4/4	7 - 8 PM	Risk Analysis and Management-2	
<b>18</b>	<b>4/11</b>	<b>7 PM</b>	<b>Test 3</b> (based on classes 11-17)	
19*	4/18	7 - 8 PM	<b>Final Project</b> (No Class)	
<b>20</b>	<b>4/25</b>	<b>6 - 8 PM</b>	<b>Final Project Presentations (2 hours class)</b>	<b>Final Project Report Due, Response Paper Due</b>

**Note:** Nine and a half hours of course contents will be delivered via pre-recorded videos. You are required to watch these videos along with the class lectures. The video links will be provided on Canvas.