

Course Policy, Procedures, and Syllabus

BC 4610 – Value Engineering & Building Economics

School of Building Construction, Georgia Institute of Technology

COURSE SUMMARY

Course Title	Value Engineering & Building Economics
Course No	BC 4610
Catalog Description	First part is an introduction to <i>principles and methodology</i> . Second part is an introduction to <i>economic principles and theories</i> and how to apply the concepts and methods of <u>building economics</u> . 3.000 Credit Hours 3.000 Lecture hours
Prerequisites	Per course catalog
Semester/Year	Spring 2011
Instructor	Baabak Ashuri
Office	Room 111, College of Architecture Annex
Office Phone	(404) 385 7608
Email Address	baabak.ashuri@coa.gatech.edu
Office Hours	Wed. 3-4pm or by appointment
Teaching Assistant	Arash Bozorgmehr aarash@gatech.edu
TA Office Hours	Tuesday 2-3pm; Room 117 (BC Grad Lab) Friday 4-5pm; Room 117 (BC Grad Lab)
Class Schedule	4:05-4:55pm MWF ES&T L1125 Note: Friday classes will be used for makeup classes, guest lectures, or TA review sessions. An announcement for Friday classes will be posted on T-square ahead of the session. Attendance in Friday sessions is mandatory.
Required Textbook	<u>"Engineering Economic Analysis" by Donald G. Newnan, Ted G. Eschenbach, and Jerome P. Lavelle, Oxford University Press, USA: 10th Edition (February 29, 2008).</u>

ISBN-10: 0195335414

ISBN-13: 978-0195335415

Value Management for Integrated Construction Services by Saeid Sadri, Building Construction Program, Georgia Institute of Technology (will be posted on T-square)

Computer Software

Microsoft Excel 2007

**Course Description,
Goal, and Objectives**

The first part of this course is *Engineering Economic Analysis*. In this part we present the tools to properly analyze and solve the economic problems that are commonly faced by project managers and engineers in the construction industry. The purpose of engineering economic analysis is to develop a systematic tool for comparing alternatives by their economic merits. It is most suitable for problems with importance that require organized analysis of the economic aspects. It can also apply to Product/Process Design, Purchase of Capital Equipment, Selection of Projects, Investment, and many other decision-making processes.

Value Engineering is the topic of the second part of this course. Value Engineering is "an organized effort at analyzing the *functions* of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with required performance, reliability, quality, and safety."

Course Evaluation

The final grade is an aggregate of grades in exams, assignments, and term project. Grades may be curved to provide a balance of intellectual challenge and academic reward. Course grading is as follows:

A	B	C	D	F
90% and above	80%-89%	70%-79%	60%-69%	<60%

Grade Distribution

The following table summarizes the distribution of the grade for this course. Group projects will be graded for the entire group, and evaluation of individual team members will become part of the final grade. Make-up exams are not allowed for any reason. No late assignment will be accepted. Class participation is necessary; it will affect your assignments portion of the grade. Pop-up Quizzes may be used to assess learning processes. The final exam is comprehensive. You are welcome to discuss your grade with the teaching assistant and then, instructor. However, your entire assignment, project, or exam will be regarded before you. Any complaints about any

grades must be communicated with the teaching assistant and then, instructor within at most one week after the grade is posted on T-square.

Item	Percent
Assignments, Class Participation, and Pop-up Quizzes	25%
Two Midterm Exams	25%
Comprehensive Final Exam	25%
Value Engineering Term Project (Report & Presentation)	25%
Total	100%

COURSE OUTLINE

The course outline provides a general plan for the course. While reasonable efforts will be made to adhere to the outline, deviations may be necessary.

1. Making Economic Decisions
 - The role of engineering economic analysis
 - The decision making process
 - Ethics
2. Engineering costs and cost estimating
 - Engineering costs
 - Cost estimating
 - Cash flow diagrams
3. Interest and equivalence
 - Computing cash flows
 - Time value of money
 - Equivalence
 - Single compound interest formulas
4. More interest formulas
 - Compound interest formulas
 - Relationships between compound interest factors
 - Nominal and effective interest
 - Continuous compounding

- Uniform series
 - Arithmetic gradients
 - Geometric gradient
5. Present worth analysis
- Assumptions in solving economic analysis problems
 - Economic criteria
 - Applying present worth techniques
6. Annual cash flow analysis
- Annual cash flow calculations
 - Annual cash flow analysis
 - Analysis period
7. Rate of return analysis
- Internal rate of return
 - Calculating rate of return
 - Loans and investments
 - Incremental analysis
8. Choosing the best alternative
- Graphical solutions
 - Elements in comparing mutually exclusive alternatives
9. Other analysis techniques
- Future worth analysis
 - Benefit cost ratio analysis
 - Payback period
 - Sensitivity and breakeven analysis
 - What-if analysis
10. Depreciation
- Deterioration and obsolescence
 - Historical depreciation methods
 - Straight-line depreciation
 - Sum-of-years-digits depreciation

- Declining balance depreciation
- Modified Accelerated Cost Recovery System (MACRS)
- 11. Replacement analysis
 - Replacement Analysis Decision Map
- 12. Selection of a minimum attractive rate of return (MARR)
 - Sources of capital
 - Cost of funds
 - Investment opportunities
 - Capital budgeting or selecting the best projects
- 13. Accounting and Engineering Economy
 - Balance Sheet
 - Income Statement
 - Traditional Cost Accounting
- 14. Value Engineering
 - Policy and program
 - Value engineering processes and procedures
 - Function analysis
 - Creativity and brainstorming
 - Criteria weighting and idea analysis
 - Life cycle cost analysis

COURSE POLICIES

In the following policies, 'you/your' indicates the 'student' and 'instructor' means 'faculty' or 'professor.'

Policies and Expectations: This course will be an intense and sometimes frustrating educational experience; it is necessary that we all contribute to its success by following the course policies. You should not only be in class, but also strive to participate in class discussions when appropriate.

Assignment Deadlines: All assignments given are due on the date indicated. All students are expected to complete any and all assignments given. The instructor reserves the right to modify assignments as necessary. Assignments will be done as individual as well as with your lab partner. Descriptions and requirements will be distributed throughout the semester. You will not receive credit for late assignments (homework, projects, readings, and others). However, the instructor will accept and correct these assignments, in order to provide you with feedback that will be beneficial in the learning process.

Class Attendance Policies: Attendance is mandatory for all class lectures, labs, and exams, unless you are ill or officially excused by the instructor as the result of participation in a university function. There are no "free cuts" permitted and there will be a penalty (as decided by the instructor) for not attending the class. If you attend fewer than 75% of the scheduled class meetings, you will not receive credit for the course. Any student arriving late for class or leaving early from class will be counted as absent from that class period. This policy is in your best interest, since attendance is essential for understanding some of the complex reasoning processes covered in this course which is critical for doing well in this class. In the case of unavoidable absences, you are responsible for making up the work done in class. It is not the instructor's responsibility to provide the student with that information outside of class.

It is YOUR RESPONSIBILITY to obtain any missed information or handouts given in class from a classmate and you should exchange phone numbers or e-mail addresses with other students in the class to better facilitate note sharing, etc. No companions, friends, family, or pets are permitted in class.

Methods of Communicating: You can submit all written work to the instructor in class, in hard copy. DO NOT upload to T-square or email unless specifically instructed to do so. (The assignment must be received by the deadline given). You can also ask questions and ask for clarification by e-mail, in class, or by visiting the instructor or his TA during the office hours or by appointment at their offices. Students are not permitted to discuss grades with the instructor via e-mail, only in-person.

Method of Instruction: The course may consist of a combination of lectures, discussion, guest speakers, videos, presentations by industry professionals, labs, and teamwork.

Readings, Preparation and Participation: The reading assignments, problems cases, and discussion forums are an integral element of the course. Students are expected to complete readings and other assigned work *prior* to each class, in order to fully participate in the discussion. Learning is approached as a participatory process, which benefits from

student/teacher and student/student interaction. The lectures may not explicitly follow the assigned book reading, but are designed to bring together diverse information from various sources. Lecture notes will be posted on T-Square.

Laptop/Handheld Computer Use: Laptop/handheld computers may be used in class to take notes ONLY, but not for other purposes, such as e-mail, Web site searches, chat, or other personal uses. Students using computers during class for work not related to that class must leave the classroom for the remainder of the class period. Abuse of this policy will result in the prohibition of laptop use by this student.

Cell Phones: All communication devices must be turned off in the classroom. The use of cell phones, beepers, or other communication devices is disruptive, and is therefore prohibited during class. No personal listening devices or personal transportation devices are permitted.

Make-up Exams: There will be no make-up exams under any circumstances, except medical reasons. Provide your instructor with a letter from your medical doctor to schedule a make-up exam.

Food and Drink in the Classroom: Students are not allowed to bring food or drinks into classroom unless approved by the instructor.

Class Discussions: Your active and productive participation in class discussions is encouraged. Various viewpoints and opinions are encouraged and welcome. Questioning the ideas of others, including the instructor, is similarly welcome. However, the instructor will exercise his/her responsibility to manage the discussions so that ideas and argument can proceed in an orderly fashion. If your conduct during class discussions seriously disrupts the atmosphere of mutual respect, you will not be permitted to participate further.

Instructor's Absence or Tardiness: If the instructor is late in arriving to class, you must wait a full 20 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions the instructor may give you about an anticipated absence or tardiness.

Plagiarism: Students are expected to do their own work in this course. To use another writer's or speaker's ideas without giving proper credit by means of standard documentation is plagiarism. All course papers, notes, homework, and projects submitted to the instructor are subject to textual similarity review for the detection of plagiarism. All submitted papers will be

included as source documents in the reference database for the purpose of detecting plagiarism of such papers. The instructor will follow the Institute's policy for plagiarism.

Academic Misconduct/Honor Code: Students in this course are responsible for behaving in accordance with the Georgia Tech Academic Honor Code. The Institute Student Honor Code is printed in the Georgia Tech General Catalog, as well as available on the Web at: www.honor.gatech.edu.

Disabilities: Any student that may need an accommodation for any sort of disability should contact the ADAPTS Office: Assistant Dean/Coordinator for Students with Disabilities, Smithgall Students Services Building, Suite 221. The phone number is (404) 894-2564. Visit them also on the web at: <http://www.adapts.gatech.edu>.

Computer Specifications: For information on computer specifications to meet Georgia Tech standards, visit www.coa.gatech.edu/computing/comp_specs.htm. Internet access is required for this course, as is an e-mail account for communication with the instructor.

Policy Changes: Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Any conflicts (personal or otherwise) with this course should be discussed as early as possible with instructor and it will be at instructor's discretion to solve as equitably as possible. Please note: do not wait to discuss course material or problems as resolution diminishes with time.

Georgia Tech Rules & Regulations: Students are required to be familiar with Georgia Tech policy and the Code of Conduct. Students are encouraged to visit the following websites and study their contents.

Georgia Tech Rules & Regulations: <http://www.catalog.gatech.edu/rules/1.php>

Academic Honor Code: <http://www.deanofstudents.gatech.edu/Honor>

Student Bill of Academic Rights: <http://www.catalog.gatech.edu/rules/22.php>

Family Educational Rights and Privacy Act (FERPA):
<http://www.catalog.gatech.edu/genregulations/ferpa.php>