Project Management
ORI 390Q.1

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PREREQUISITES:	Graduate standing and ME 335 (Engineering Statistics), or equivalent.
TEXTS Required:	A. Shtub, J.F. Bard, S. Globerson, Project Management: Processes, Methodologies, and Economics, 2nd Edition, Prentice Hall, Upper Saddle River, NJ, 2005.
SOFTWARE:	Jensen.lib Excel add-ins downloadable from http://www.me.utexas.edu/~jensen/ORMM/excel/
OBJECTIVE:	The project is the framework in which virtually all new products and systems are designed, developed, tested, and implemented. For complex systems, the challenge is to organize, coordinate, and control vastly different types of resources so that risk and conflict are minimized, and budgets and schedules are maintained. Projects may involve dozens of firms and thousands of people who need to be managed. They need to know what has to be done, who is to do it, when it should be done, how it will be done, and what resources will be used. Proper planning is the first step in communicating these intentions. The purpose of this course is to convey the methods and tools that have been developed over the last few decades to carry out these functions. In so doing, we will consider the evaluation of competing alternatives, the organization of a project, the scheduling of tasks and resources, and the role of management over time.

GRADING:		
	Homework	10%
	Project	25%
	Midterm Exam	25%
	Final Exam	40%

General Course Policies

HOMEWORK:	Dates will be posted to indicate when the homework is due. Grades on the homeworks may be used to evaluate borderline students.
SOLUTIONS:	All solutions to the homework assignments and exams will be posted on Canvas.
EXAMS:	All exams are open book and open notes. The only electronic devises allowed are calculators; i.e., no cell phones, MP3 players or other such items. All students must take the exams when scheduled, including the final — **no exceptions** (the date of the midterm exam may be rescheduled ± a few days). There will be **NO** make-up exams and there will be **NO** incompletes in the course; every student will get a grade. If you would like to review your final exam, please do so no later than one week after the next semester begins (fall, spring, or summer). After that time, all exams and other uncollected class material will be discarded.
GRADING:	Arithmetic errors on exams and homework are usually penalized a few points. Conceptual errors or errors in logic are more severely penalized. On exams, always

show the computations or logic that led to your solution, label the solution, and cross out any work that you do not want graded. If your exam contains erroneous information or computations, even if you have the correct solution, you will not receive full credit.

RE-GRADING: If you feel that you weren't graded fairly on an exam question, **first** look at the solution, **then** write a note to me explaining how your answer compares to the posted solution and why you think that you deserve more credit. Hand in your note and exam to me no later than 2 weeks after the exam is returned.

EXTRA CREDIT: There will be **NO** extra assignments for those wishing to try to improve their overall grade.

DISHONESTY: All University of Texas procedures regarding academic dishonesty will be followed exactly as prescribed. Cheating on exams or homework can lead to a failure in the course.

DISABILITIES: The University of Texas provides upon request academic adjustments for students with documented disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4241.

Project Management Course Syllabus

Chapter	Topic	Homework exercises	HW #	Due[†]
1	Introduction Course outline Elements of PM	1.2, 1.4, 1.14, 1.16[a]	1	1/28
2	Processes Life-cycle models PMBOK	2.2[b]	2	2/4
3.1-3.6	Engineering Economics Time value of money Comparing alternatives	 3.1, 3.5, 3.7, 3.10, 3.12[c] 3.14, 3.17, 3.18a[d], 3.19[e]	 3 4	 2/11 2/16
4	Life-cycle Costing Work breakdown structure Cost breakdown structure	 HW#2 on ME 353 website[f] HW#3 on ME 353 website[g]	 5 6	 2/23 3/1
5.1-5.6	Project Evaluation Screening and selection Decision trees	 5.1[h], 5.5, 5.9[i], 5.11 5.14, 5.16, 5.17[j]	 7 8	 3/8 3/~~24~~22
3.7	Utility theory	3.33, 3.35, 3.36, 3.38[k] 3.41	9a	3/~~31~~29
6 6.3 6.4	Multiple Criteria Decision Making Multiattribute utility theory Analytic hierarchy process[‡]	 6.1a, 6.2a, 6.7, 6.8, 6.10 6.1b, 6.2b, 6.4[l], 6.6	 9b 9c	 4/~~7~~5 ?
7	Organizational Structures OBS, WBS, Work packages	7.3, 7.5, 7.7, 7.12	10	4/14
9	Scheduling Activity duration Network techniques Uncertainty	9.6, 9.13[m], 9.16a, 9.18a[n], 9.27[o]	11	4/26
10	Resource Management			
5.4	Research & Development Projects Parallel funding Managing the R&D portfolio			
14	Project Termination			

[†]Due dates may change depending on the material covered each week.

[‡]See video at: http://youtu.be/18GWVtVAAzs

[a] Only discuss one project, not three.

[b] Do not use the Stohr and Zhao article

[c] Read Example 3-14 in text before trying to find solution; use 12% for moving cash around.

[d] After-tax cash flow = before-tax cash flow – income tax
Income tax = (before-tax cash flow – depreciation) × tax rate

Depreciation is computed from a formula and reduces the *book value* of an asset; that is,

$$\textit{book value}\ (\text{year } n) = \textit{book value}\ (\text{year } n - 1) - \textit{depreciation}\ (\text{year } n - 1)$$

When we sell an asset at the end of a project we have to determine whether we made a profit because we must pay a capital gains tax on all such profits.

$$profit = salvage\ value - book\ value \text{ (at end of project)}$$

If profit is negative, then there are no taxes due.

[e] In this exercise and 3.21, you will have negative taxable income in some years. In such cases, you should compute the tax on the negative amount and treat it as a "benefit" or positive cash flow, which increases your income in the corresponding years rather than reduces it. For example, assume you lose $1000 in one year and that you are in the 40% tax bracket. As a result, your after-tax cash flow in that year will be $400. The underlying assumption is that the negative income will be offset by positive income elsewhere in the business (otherwise, you would not be in the 40% tax bracket). As a consequence, you must offset the $400 tax you would pay on the positive $1000 income by treating your income for the current project as $400.

[f] Read lessons 3 and 4 at http://www.me.utexas.edu/~me353/lessons/ The homework problems can be found at http://www.me.utexas.edu/~me353/contents/homework/hw2/
Download Excel template [PM HW5 (WBS-Excel form).xlsx] from class Canvas site in Assignments directory. You can email me the completed Excel file that contains your solutions.

[g] Read lessons 5 and 6 at http://www.me.utexas.edu/~me353/lessons/ The homework problems are in the Excel file "PM HW6 (Cost Estimates-Excel form).xlsx" and can be downloaded from class Canvas site. Problem 8 is optional.

[h] Proposal two or three alternatives and evaluate them using your scoring model.

[i] Use the annual worth method to take into account the time value of money, not the net present value. Compute "Benefits" from savings that result from accident reductions and shorter travel times. Start by putting all the data for the existing road and plans A, B and C into a table. Create a second table that lists the costs and benefits of the existing road and the different plans. Perform an incremental analysis rather than just the B/C ratio for each option; that is, compute the $\Delta B/\Delta C$ ratio for successive pairs of options, where Δ is the difference between benefit and cost values.

[j] The data in the table represent the conditional probability of a forecast given a state; that is, $p(f_i \mid s_j)$ for i, $j = 1, 2, 3$. For part (a) you must compute the posterior probabilities for f_3 = pessimistic forecast. For part (c) you must compute the remaining posterior probabilities for f_1 and f_2. For part (d), as part of your solution, you must compute the long-term expected value with the forecast (LTEV | forecast), where (LTEV | forecast) = $\Sigma_{\text{forecast}}\, p_{\text{forecast}}$*EV[Action | forecast)

[k] Top of page 145. Should be "… only a 1 chance in 10 that the stock price would drop below $6 per share …" There is no one "correct" cumulative probability distribution function. To determine the CE, first calculate Beverly's expected utility value (interpolation needed) and then find the dollar value that yields the expected utility.

[l] AHP Software should be used to solve Exercises 6.4 an 6.6. You may be able to download free trial copies at:
http://bpmsg.com/new-ahp-excel-template-with-multiple-inputs/
http://www.hipre.hut.fi/ (Free? online version of HIPRE 3+)
http://www.isc.senshu-u.ac.jp/~thc0456/EAHP/AHPweb.html (online calculator for one matrix)
http://www.sab.geovega.se/lattjo.html (calculate weights and consistency ratio)
www.expertchoice.com (standard commercial product)

[m] Use the Project Excel add-in to solve.

[n] Perform PERT analysis. Use Eqs. (9.1) and (9.2) to compute mean and standard deviation (variance), and Eq. (9.12) to compute the probabilities that the events will occur without delay. The phrase "find the probability that each event will occur without delay" means that each event will occur at its expected time. There are 7 events in Fig. 9.43 part (a). To answer this part of the question, you really need to do Monte Carlo simulation to account for the non-critical paths. Only the probability for event 2 has an "obvious" answer. Consider this part of the question to be optional.

[o] For parts (e) and (f), construct a table similar to Table 9.5.

TEAM PROJECT

To gain a better understanding of the concepts and techniques presented in the course, and to learn how to implement these techniques using a software package, teams of 2 -3 students will be formed to work on the *thermal transfer plant* case study included at the end of each chapter. Alternatively, a team may define its own project by the second week of class and perform a similar analysis.

As indicated in the text, not all the information required for each assignment is given. Before proceeding, it may be necessary for the group to research a particular topic and to make some logical assumptions. Accordingly, there is no "correct solution" to compare recommendations and conclusions. Each assignment should be judged with respect to the availability of information and the force of the underlying assumptions.

During the last week of class each team will make a professional looking PowerPoint presentation of their project to the class. In addition, each team will hand in a written report explaining the scope of the project, analysis, and recommendations.