MGT 606
Instructions and Grading Rubrics
for
Applied Exercises

I. Scope and Objectives

Partial requirements for completing MGT 606 entails satisfactorily completing one applied exercises involving ***project management, forecasting, linear programming***, ***goal programming, waiting line theory, and (possibly) equal order quantity end-use inventory models*** (your choice of one). The exercise you submit chosen from the emboldened italicized topics will be submitted to the course instructor for grading prior to the final examination. The exercise will consist of six to seven double spaced, one inch margin pages in Times Roman 12 font or smaller. Instructions concerning the format and specific content of these exercises will be presented in Section II (Instructions and Grading Rubric). **Submission deadline: during Finals Week of Fall '06 Term.**

Quite often some students are of the opinion that aspects or even a good deal of their coursework has no bearing on what they do in the world of work or what they will do when they enter that world. A quantitative methods course such as this is certainly not exempt from such opinions and in many cases such opinions reflect reality because they become self-fulfilling prophecies. Too often it is the case that aspects of one's coursework is not applied to real world situations because the opportunities to apply it have not been sufficiently explored, or one is insecure about one's competence to apply it in the first place and so avoids doing anything with it, or one has simply refused before hand to consider doing anything with some of the aspects of one's education to which one has been exposed. The objective of this exercise is at least in part, to remedy this situation. You will be expected to determine some way one of these methodologies can be applied to *your* world of work experience or prospective entrepreneurial venture and thus, provide added support to the decision-making of its managers. If you are not currently employed, it is assumed that you at some time were or you certainly know someone who is or was. Thus, in one way or another, one has access to experiences in the world of work and will not be excused from fulfilling this partial course requirement. Engaging in these applied exercises is intended to accomplish the following.

a) The hands-on experience of figuring out how a given methodology can be adapted to real world information can lead to a more complete and practical understanding of that methodology in such a learning-by-doing environment. Identifying relevant data and variables and formulating rudimentary models in the context of an end-in-view of the desired knowledge the output is intended to impart can be most beneficial pedagogically.

b) The real world does not present its problems to one in a clear-cut fashion. One may be acutely aware of the unpleasant symptoms or outcomes of a problem but not have necessarily identified the problem adequately, let alone advance its remedy. Therefore, these exercises should by their very nature develop your problem solving skills.
c) The world of work is beset with problems. Organizations need persons capable of solving such problems effectively and efficiently. This objective is tied closely to the previous one in that regard. Thus, another objective of these exercises is to develop in you a ***marketable*** skill. It is important to me that gain from these two exercises a skill that makes you more competitive for the jobs and advancements you seek.

Caveat

I expect that your Applied Exercise Paper be well written—no sentence fragments, incomplete sentences, malapropisms, subject object disagreements, misspellings, other grammatical errors, homonyms, incoherencies, etc. You will be graded down on your paper for such errors. **FURTHERMORE:** your paper is to be clearly organized ***with headings*** into the six sections as designated for each of the following topics. You cannot earn more than half-credit for your paper should you fail to meet this requirement without having the instructor's express permission to do so. You may wish to seek assistance from the University's writing center for your paper otherwise you may commit some monstrous writing faux pas that might seen as evidence of sloth and neglectful carelessness on your part. It should be apparent to the reader that you have not failed to proofread what you have submitted.

II. Instructions and Grading Rubrics

In what follows are sets of instructions and grading rubrics for each of the topics from which you may select your applied exercises. At the risk a being a bit redundant, each set will probably appear quite similar. However, each set is tailored where necessary to conform to the nature of the topic being considered in that set.

A. Project Management

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim? What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is PERT or CPM an appropriate methodology to be applied to this problem? Remember what PERT and CPM are intended to accomplish. Which one will you use and why? **(15%)**
4. Construct a precedence list of activities with estimated duration times and costs as is appropriate and a precedence digraph. **(25%)**
5. Generate a solution from the precedence graph of the project and precedence list you created in 4.) **(15%)**
6. Explain what you intend to accomplish as a result of generating this solution. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

B. Forecasting

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim. What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is (time series) forecasting an appropriate methodology to be applied to this problem? Why might univariate time series forecasting be more attractive to dealing with this problem than some sort of causal modeling approach? Remember what forecasting is intended to accomplish. **(15%)**
4. Construct an identified representative data series that you would use. What is the data set you collected and why? What kind of data would you use—weekly, monthly, …, yearly, etc. and why? **(20%)**
5. Run some of the different forecasting techniques on the data set you constructed in 4.) and generate a most preferred forecast. Justify your preference. **(20%)**
6. Explain what you intend to accomplish as a result of generating this forecast. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

C. Linear Programming

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim. What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is Linear Programming an appropriate methodology to be applied to this problem? What kind of linear programming problem should be devised (blend, media, resource allocation, etc.)? **(15%)**
4. Select the decision variables, construct the objective function and the constraints. Provide a thorough and compelling justification for the variables selected and the mathematical forms constructed. Coefficients and RHSs values may have to be estimated but provide rationales for the estimates you use. **(20%)**
5. Run the problem. While it is most likely the case that in terms of coefficients and RHSs values, the model you have designed lacks some accuracy replicating the business problem you are depicting, you must insure that what you have designed will run and provide you a solution. Provide a copy of the output to accompany this exercise you submit. Provide a summary and interpretation of the output. **(20%)**
6. Explain what you intend to accomplish as a result of generating this solution. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

D. Goal Programming

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim. What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is Goal Programming an appropriate methodology to be applied to this problem? What kind of goal programming problem should be devised (blend, media, resource allocation, etc.)? **(15%)**
4. Establish the goals for the problem and their order of importance. Select decision variables, construct the goal constraints (system constraints if appropriate) and the objective function and. Provide a thorough and compelling justification for the variables selected and the mathematical forms constructed. Coefficients and RHSs values may have to be estimated but provide rationales for the estimates you use. **(20%)**
5. Run the problem. While it is most likely the case that in terms of coefficients and RHSs values, the model you have designed lacks some accuracy replicating the business problem you are depicting, you must insure that what you have designed will run and provide you a solution. Provide a copy of the output to accompany this exercise you submit. Provide a summary and interpretation of the output. **(20%)**
6. Explain what you intend to accomplish as a result of generating this solution. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

E. Queuing (Waiting Lines)

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim. What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is Queuing an appropriate methodology to be applied to this problem? What kind of queuing problem should be devised (simple, multi-channel, finite queue, etc.)? **(15%)**
4. Establish the values of the inputs for this problem (λ, μ, and k). Provide a thorough and compelling justification for those values. They may have to be estimated but provide rationales for the estimates you use. **(20%)**
5. Run the problem. While it is most likely the model you have designed lacks some accuracy replicating the business problem you are depicting, you must insure that what you have designed will run and provide you a solution. Provide a copy of the output to accompany this exercise you submit. Provide a summary and interpretation of the output. **(20%)**
6. Explain what you intend to accomplish as a result of generating this solution. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

F. Equal Order Quantity End-use Inventory Models

1. Provide a brief statement about the organization about which you intend to write. Someone should be able to read that statement and have a good clear and complete idea as to what the organization is in the business of doing. You would want to include a bit here on the origin and history of the organization, its size, the industry to which it belongs, etc. **(10%)**
2. State the nature of the problem. Be very clear about this. How do you know you have a problem? Be able to justify your claim. What are its symptoms? How important is it, why? What is its source? **(20%)**
3. Why is EOQ an appropriate methodology to be applied to this problem? What kind of EOQ problem should be devised (lot-size, simple, back-order, replenishment, etc.)? **(15%)**
4. Establish the values of the inputs for this problem (K, D, c, p, q, etc.). Provide a thorough and compelling justification for those values. They may have to be estimated but provide rationales for the estimates you use. **(20%)**
5. Run the problem. While it is most likely the model you have designed lacks some accuracy replicating the business problem you are depicting, you must insure that what you have designed will run and provide you a solution. Provide a copy of the output to accompany this exercise you submit. Provide a summary and interpretation of the output. **(20%)**
6. Explain what you intend to accomplish as a result of generating this solution. In other words, in what way does the output inform the kinds of decisions you would make? **(15%)**

III. Addendum: Topics Not Scheduled for Explicit Course Treatment*--Instructions and Grading Rubric

Objectives:

Often, a student may be privy to a decision-making problem in an organization ***to which*** he/she could ***apply*** a quantitative methodology not formally presented in the course. This section provides instructions and a grading rubric associated with the pursuit of such a possibility. Therefore, the purposes of ***this*** term paper (hereafter referred to as the "Addendum" Paper are to 1) give a student the opportunity to engage in something that is more relevant to their needs and interest than what might have otherwise been the case and 2) develop skill at independently apprehending and applying an OR/MS methodology not covered in class.

Undertaking this task effectively in lieu of the methodologies identified in Part II is somewhat more demanding. Therefore, this term paper is worth 12% of the final grade (exams therefore, constitute 88% of the final grade instead of 90%). Its guidelines must therefore, be amply more restricted to insure that the student's effort is properly focused and effectively made.

A. General Guidelines and Grading Rubric:

- You must submit to the ***instructor*** in the week before the ***Fall Break*** for ***approval*** a written proposal (**preferably by e-mail**) indicating the methodology you intend to treat in your Addendum term paper, the context and nature of the problem to which you are applying it, how you anticipate applying it, and what results you anticipate generating. *You are strongly advised to discuss with the instructor what you are considering well ahead of the deadline for your proposal to better insure approval of what you propose*.
- Your Addendum term paper should have a title page (with name affixed), one inch margins (top, bottom, left, and right), and be double spaced in 12 point (preferably, Times Roman) font. It need not be long. Eight to ten pages (not including the title page, bibliography, endnotes, etc.) should be sufficient.
- The format of the Addendum paper is simple and straight foreword. You will begin with an ***introduction*** that ***informs*** the reader of the methodology to be treated, ***cites*** the source(s) of

your information (textbooks, monographs, academic/trade journals, etc.), ***identifies*** the business organization to which you intend to apply the methodology (along with some brief background information on the business), and ***states*** the organization of the body of the paper **(1.0 pt)**. The ***body*** of your paper should contain **1)** an identification of the kind(s) of business problems the methodology you have selected is intended to address, its historical development (if possible), and its prevalence of use **(0.5 pts)**; **2)** a technical exposition of the mechanics of the methodology and its related algorithms—a simple example problem would be instructive here (**3.0 pts)**; **3)** a critique of the methodology's robustness, strengths, and limitations **(0.5 pts)**; **4)** clear and concise statements about the nature and (historical) background of the problem to which you intend to apply the methodology and justification of its application to the problem **(2.0 pts)**; **5)** a rigorous presentation of the methodology's model(s) of the problem **(2.5 pts)**; and a ***results/ summary*** section consisting of a complete presentation of the results the methodology's modeling generates, the interpretation of those results, and concluding statements of the consequent recommended decisions/solutions to the problem and appropriate caveats **(2.5)**.

- I expect that this paper to be well written—no sentence fragments, incomplete sentences, malapropisms, subject object disagreements, misspellings, other grammatical errors, homonyms, incoherencies, etc. You will be graded down on your paper for such errors. You may wish to seek assistance from the University's writing center for your paper. In any event it should be obvious to the reader that you have not failed to proofread what you have submitted. ***FURTHERMORE*****:** your paper is to be clearly organized into an introduction ***with headings*** including for the five sections of the body and results/summary section as designated immediately above in the bullet for formatting. You cannot earn more than half-credit for your paper should you fail to meet this requirement without having the instructor's express permission to do so.

*****The textbook provides treatments of many varied methodologies from which to choose. Listed below but not necessarily limited to, are suggested topics from the book and elsewhere that are acceptable topics for your Addendum term paper.

Suggested Term Paper Methodologies:

Game Theory	**Decision Trees**	**Decision Theory**
Statistical Process Control	**EOP Inventory Models**	**Linear/Integer Programming**
Non-linear Programming	**Min Cost/Max Flow Network Models**	
Markov Processes	**Dynamic Programming**	**Queuing Simulation**
EOQ Simulations	**Simulation Models**	**AHP**
MRP I, II		