School of Engineering
Department of Industrial Engineering

Semester: Summer 2014

IENG300 – Engineering Project Management Midterm

Instructors: Dr. K. Chahine, Mr. I. Serhan and Dr. B. Hussein.

Date: Tuesday, August 5th, 2014 **Time:** 14:00 – 15:15 (75 minutes)

Student Name: ______________________ **Student ID:** ________________ **Section:** ____

There are **5 questions** in the booklet; each has several parts. Please answer all parts of the questions to the best of your ability.

Marking Scheme

Questions	Weight	Mark
Question 1	**10 points**	
Question 2	**30 points**	
Question 3	**15 points**	
Question 4	**25 points**	
Question 5	**20 points**	
Total	**100 points**	

1. **This booklet contains 10 pages including this one. Make sure all these pages are attached.**
2. **Closed book examination. Formulas are provided as needed.**
3. **Do not take the staple out. The exam booklet must remain intact.**
4. **Cheating penalty will be an "F" grade on the exam.**
5. **Non-programmable calculators are allowed.**
6. **Mobile phones/devices are to be turned off and stowed away.**
7. **Students must sign out prior to leaving the exam room.**

Good luck

<u>Question 1 (10 points)</u>:

In the table below, mark the following statements as either TRUE (T) or FALSE (F). If you change your answer, scratch previous one and clearly re-write the new one. Questions with a confusing answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 1 point.

1. Since a construction company builds many buildings, the projects after the first building do not fit the definition of a project.
2. Multi-weighted scoring models include only quantitative criteria, not qualitative.
3. Probably the most important function of organization culture is to clarify and reinforce standards of behavior within the organization.
4. The three forms of matrix project management are weak, mixed, and strong.
5. Project scope describes what you expect to deliver to your customers when the project is complete.
6. A typical responsibility matrix will include not only those responsible for a specific task but also those who supply support and assistance.
7. The process of forecasting or approximating the time and cost of completing project deliverables is called predicting.
8. The ideal approach to estimating project time and cost is to always use a top-down approach.
9. Gantt charts are popular because they represent an easy-to-understand, clear picture on a time-scaled horizon.
10. An uncertain event or condition that, if it occurs, has a positive or negative effect on project objectives is referred to as bad luck.

Question	1	2	3	4	5	6	7	8	9	10
Answer										

Question 2 (30 points)

Choose the correct answer. Only one answer may be marked. Questions with more than one answer will automatically get a zero mark. Wrong answers do not penalize correct ones. The weight for each question is 2 points.

1. Which of the following is not considered to be a characteristic of a project?
    a. Only for internal use within the organization.
    b. An established objective.
    c. Clear start and end.
    d. Introduction of a new product, service or result.

2. A series of coordinated, related, multiple projects that continue over extended time intended to achieve a common goal is known as a:
    a. Venture.
    b. Project.
    c. Program.
    d. Portfolio.

3. Which of the following is not one of the commonly heard comments of project managers?
    a. Where did this project come from?
    b. Why this project is so strongly linked to the strategic plan?
    c. Why are we doing this project?
    d. Where are we going to get the resources to do this project?

4. Projects may be classified as:
    a. Operational.
    b. Compliance.
    c. Strategic.
    d. All of the above.

5. Rafik is working on a project involving the upgrading of a management computer information system. The project is being managed by the information systems department with coordination with other departments happening through normal channels. He is working in a:
    a. Strong matrix structure.
    b. Balanced matrix structure.
    c. Weak matrix structure.
    d. Functional structure.

6. Who is responsible for determining how tasks will be done in a matrix project management structure?
    a. The project manager.
    b. The functional manager.
    c. Both the project manager and the functional manager.
    d. Neither the project manager nor the functional manager.

7. Maya is looking at a document that outlines the specific tasks and subtasks required to complete the writing of a technical support manual. The method that was probably used to develop the document is most likely:
    a. Responsibility matrix.
    b. Priority matrix.
    c. Work packages.
    d. Work breakdown structure (WBS).

8. As a PM, the first step in creating the necessary information to manage a project is to:
    a. Define the project scope.
    b. Develop a project plan.
    c. Assign team members to work on the project.
    d. Determine the required completion date.

9. Adam is forecasting how much money his department needs to support a new project. He estimates that two people and $25,000 in expenses will cover his needs. Because management typically insists on reducing forecasts by 20 percent, Adam increases his estimates to allow for that reduction. Which of the following factors is illustrated in this situation:
    a. Planning horizon.
    b. Padding estimates.
    c. Organization culture.
    d. Project structure.

10. Sarah is forecasting the time and cost of developing a customized software program by looking at the number of inputs, outputs, inquires, files, and interfaces. Which of the following methods is she using?
    a. Template.
    b. Apportion.
    c. Ratio.
    d. Function point.

11. The backward pass in project network calculations determines the:
    a. Shortest path through the network.
    b. Latest times activities can start.
    c. Network path using the most resources.
    d. Network path with the most difficult activities.

12. Using a special color copy machine for a tradeshow publication illustrates the concept of:
    a. Laddering.
    b. Concurrent engineering.
    c. Hammock activities.
    d. Forward pass.

13. The attempt to recognize and manage potential and unforeseen trouble spots that may occur when a project is implemented is known as:
    a. Risk forecasting.
    b. Contingency planning.
    c. Risk management.
    d. Disaster avoidance.

14. The risk assessment form contains all of the following <u>except</u>:
    a. Who will detect the occurrence of the risk event?
    b. Potential impact of the risk event.
    c. Likelihood of the risk event occurring.
    d. When the risk event may occur.

15. Change management systems are designed to accomplish all of the following except:
    a. Track all changes that are to be implemented.
    b. Review, evaluate, and approve/disapprove proposed changes formally.
    c. Identify expected effects of proposed changes on schedule and budget.
    d. All of the above.

Question 3 (15 points):

As the head of the project selection team at ENERTECH Company, a leading manufacturer of high technology energy and sustainable heating products, you have to choose between two similar projects. ENERTECH expects at least a rate of return of 20%. Your financial advisors predict inflation to vary from year to year.

Given the following information for each project, use the net present value method to determine which project to fund.

Project 1: PROJECT SOLAR

Year	Inflow	Outflow	Inflation Rate
Y0	$0	$250,000	0%
Y1	$0	$100,000	3%
Y2	$150,000	$30,000	2%
Y3	$200,000	$15,000	1.5%
Y4	$210,000	$0	0%
Y5	$205,000	$0	2%
Y6	$195,000	$0	3%
Y7	$80,000	$0	4%
Total	**$1,040,000**	**$395,000**	

Project 2: PROJECT GEOTHERMAL

Year	Inflow	Outflow	Inflation Rate
Y0	$0	$275,000	0%
Y1	$0	$150,000	3%
Y2	$170,000	$0	2%
Y3	$280,000	$25,000	1.5%
Y4	$260,000	$0	0%
Y5	$210,000	$10,000	2%
Y6	$200,000	$0	3%
Y7	$150,000	$0	4%
Total	**$1,270,000**	**$460,000**	

Question 3 Solution

Question 4 (25 points):

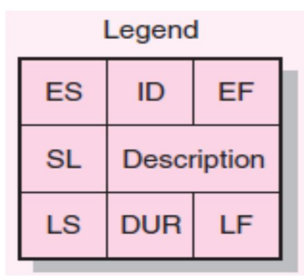
The project office (**PO**) of your company is asking you to:

a. Draw the Activity on Node (AoN) network. **(5 points)**
b. Calculate the early start (ES), early finish (EF), late start (LS), late finish (LF) and slack (SL). **(10 points)**
c. Identify the critical path (CP). **(3 points)**
d. How soon can the project be finished? **(2 points)**
e. Suppose that activities D and E can be shortened **to** a minimum duration of 50 time units. Which activity or activities would you shorten to reduce the project duration **by** 5 time units? Why? **(5 points)**

The activities time estimates and their dependencies are summarized in the following table:

ID	Predecessor	Duration
A	None	8
B	A	2
C	A	3
D	A	60
E	B	60
F	C	2
G	D	2
H	E, F	20
I	G	10
J	H, I	10
K	J	12
L	K	3

Use the following legend to represent the node:



Question 4 Solution

a. Draw the Activity on Node (AoN) network. **(5 points)**
b. Calculate the early start (ES), early finish (EF), late start (LS), late finish (LF) and slack. **(10 points)**

c. Identify the critical path (CP). **(3 points)**

d. How soon can the project be finished? **(2 points)**

e. Suppose that activities D and E can be shortened **to** a minimum duration of 50 time units. Which activity or activities would you shorten to reduce the project duration **by** 5 time units? Why? **(5 points)**

<u>Question 5 (20 points)</u>

Leb Construction Company:

You are the owner of Leb Construction Company, (LCC), which specializes in building high-quality customized buildings in Lebanon and Middle Eastern areas.

After being working on so many projects outside Lebanon for more than five years, LCC is selected for a local Lebanese project. The project is to build a new LIU sports center on a newly purchased land in Beirut. The new sports center is to be completed by the end of 2014.

You have promised LIU that the final costs will range from $500,000 to $600,000 and that it will take at most 3 months to complete the sports center once the contract is signed. To save money, your cost and time estimations were exactly similar to the ones from some previous projects that you have done 10 years ago by a professional dedicated team. In addition, unlike previous projects, you have decided to avoid using dedicated teams in order to reduce costs. You are using a hybrid management approach where you give the functional manager a strong role and authority.

Questions

a. List three project deliverables and two project milestones. **(5 points)**
b. Identify three bad project management practices for this project and propose solutions for them. **(5 points)**
c. Identify three risk events that might impact the scope, cost, time, or quality of your project. **(5 points)**
d. Using the provided Risk Severity Matrix below, place each identified risk in its appropriate location. **(5 points)**

<u>Question 5 Solution</u>

a. List three project deliverables and two project milestones. **(5 points)**

Deliverable 1	
Deliverable 2	
Deliverable 3	

Milestone 1	
Milestone 2	

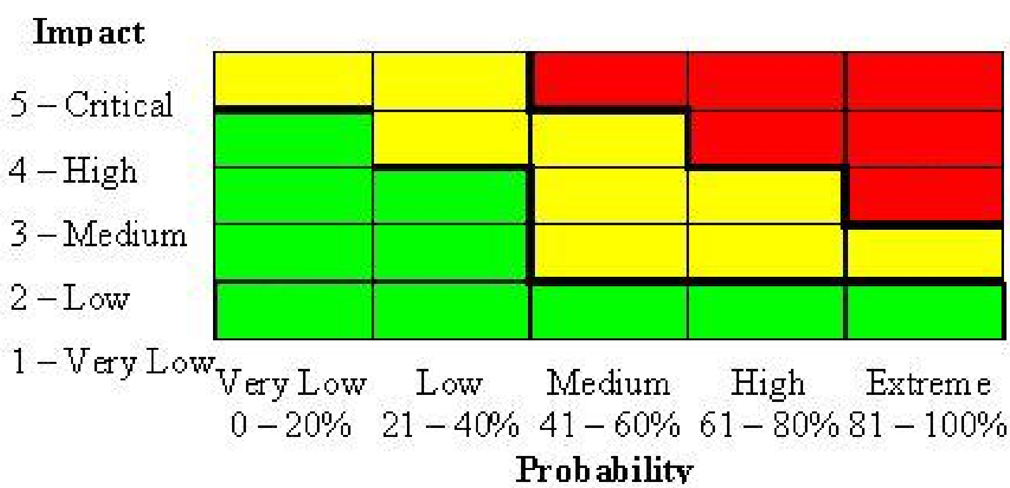
b. Identify three bad project management practices for this project and propose solutions for them. **(5 points)**

Bad Project Management Practice	Solution

c. Identify three risk events that might impact the scope, cost, time, or quality of this project. **(5 points)**

Risk 1	
Risk 2	
Risk 3	

d. Using the provided Risk Severity Matrix below, place each identified risk in its appropriate location. **(5 points)**



FORMULAS

The Payback Formula:

Payback period (yrs) = Estimated Project Cost/Annual Savings

The Net Present Value (NPV) Formula:

$$\text{Project NPV} = I_0 + \sum_{t=1}^{n} \frac{F_t}{(1+k)^t} \quad \text{where}$$

I_0 = Initial investment (since it is an outflow, the number will be negative)
F_t = Net cash inflow for period t
k = Required rate of return

AoN Calculations Formulas:

- **Forward Pass Computations:**
  - EF = ES + Duration

    Where EF is Early Finish & ES is Early Start

- **Slack Computations:**
  - LS = LF – Duration

    Where LS is Late Start & LF is Late Finish

- **Backward Pass Computations:**
  - SL = LS – ES
  - SL = LF – EF

    Where SL is Slack