



# *The University of Western Ontario*

## **ENGSCI 9510 Engineering Planning & Project Management**

### **Assignment # 2**

- ✓ **Start Date:** All sections June 2 at midnight in the Sakai Owl assignment area
- ✓ **Due Date:** All sections June 15 at midnight in Sakai Owl drop box.
- ✓ **Question 1 value = 1.5; Question 2 value = 1.5; Question 3 value= 2**
- ✓ **This assignment mainly deals with information from lesson 2 and lesson 7**

#### **Question 1 - Net Present Value**

Your construction company is trying to decide whether or not to invest in a new project opportunity, the purchase of a new cement mixer, based on the following information. The initial cash outlay will total \$250,000 over 2 years. The firm expects to invest \$200,000 immediately and the final \$50,000 in one year's time. The company projects that the project will generate a stream of earnings of \$50,000, \$100,000, \$200,000, and \$75,000 per year, respectively, starting in year 2. The required rate of return is 12%, and the expected rate of inflation over the life of the project is forecast to remain steady at 3%. Should you invest in this project?

#### **Question 2 - Internal Rate of Return**

Suppose that a project required an initial cash investment of \$24,000 and was expected to generate inflows of \$10,000, \$10,000, and \$10,000 for the next 3 years. The project is the installation of a swing gate parking system at a local major arena including island pouring, integration with security, and supply of all relative M & E parts and accessories such as sensors and pedestals. The deal is the construction company gets a percentage of the revenue the swing gate generates over the next three years. Further, assume that your company's required rate of return for new projects is 12%. Inflation will be 4% in each year.

- Is this project worth funding? Show your work.
- Is it still a good investment when the company's required rate of return is 15%? Show your work.

### Question 3 – Earned Value and the Learning Curve

Learning Curve coefficients and Multipliers								
	70%		75%		80%		85%	
Unit Rate	Unit Time	Total Time	Unit Time	Total Time	Unit Time	Total time	Unit Time	Total Time
5	0.437	3.195	0.513	3.459	0.596	3.738	0.686	4.031
10	0.306	4.932	0.385	5.589	0.477	6.315	0.583	7.116
15	0.248	6.274	0.325	7.319	0.418	8.511	0.53	9.861
20	0.214	7.407	0.288	8.828	0.381	10.485	0.495	12.402
25	0.191	8.404	0.263	10.191	0.355	12.309	0.47	14.801
30	0.174	9.305	0.244	11.446	0.335	14.02	0.45	17.091
35	0.16	10.133	0.229	12.618	0.318	15.643	0.434	19.294
40	0.15	10.902	0.216	13.723	0.305	17.193	0.421	21.425

It took Mega Tech Inc. 100,000 labor-hours to produce the first of several oil drilling rigs for Arctic exploration. Your company, Natural Resources Inc., has agreed to purchase the 5<sup>th</sup> oil drilling rig from Mega Tech's manufacturing yard. Assume that Mega Tech experiences a learning rate of 80%.

- At a labor rate of \$35 per hour, what should you, as the purchasing agent, expect to pay for the fifth unit? Hint: Remember the simplified formula for calculating learning rate time is given as:

$$T_n = T_1 * C \text{ Where....}$$

$T_n$  = time needed to produce the  $n^{\text{th}}$  unit

$T_1$  = time needed to produce the first unit

$C$  = Learning Curve coefficient

- How long should all 5 oil drilling rigs take to produce?