

# ENGSCI 9510 Engineering Planning & Project Management

## Assignment #2 – Xinyu Yun

Q1. After the calculation of net present value in 5 years, the value is positive based on the estimated return rate and inflation rate. So the project should be invested.

E3     fx     =1/POWER((1+0.03+0.12),B3)								
	A	B	C	D	E	F	G	H
1								
2		Year	Cash outlay\$	Earing\$	Discount Factor	Discount Cash outlay	Discount Cash inflow	NPV
3		0	200000		1.00	200000.00		-200000
4		1	50000		0.87	43478.26		-243478.26
5		2		50000	0.76		37807.18	-205671.08
6		3		100000	0.66		65751.62	-139919.45
7		4		200000	0.57		114350.65	-25568.81
8		5		75000	0.50		37288.26	11719.45
9								

Q2.

- a. Net present value calculation based on the rate of return 12% and inflation rate 4%:

Year	cash investm	Infolws	Discount Factor	Discount Cash Infolws	NPV
0	24000		1.00		-24000
1		10000	0.86	8620.69	-15379.31
2		10000	0.74	7431.63	-7947.68
3		10000	0.64	6406.58	-1541.10

From the table we can see the NPV is negative after the fourth year, so the project is not worth funding.

- b. If the company adjust the rate of return to 15%:

Year	cash investm	Infolws	Discount Factor	Discount Cash Infolws	NPV
0	24000		1.00		-24000
1		10000	0.84	8403.36	-15596.64
2		10000	0.71	7061.65	-8534.99
3		10000	0.59	5934.16	-2600.83

we will see the discount factor is lower than which has the 12% return rate, so the NPV is still negative, base on that the invest of this project is not worthy.

Q3.

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

a. As shown from the learning curve table, the accordant unit time coefficient for 5<sup>th</sup> with assumed learn curve 80% is 0.596(C), the T1 (time needed to produce the 1<sup>st</sup> unit) is 100000 hours, and the labor rate(LR) is \$35/hour.

So the expected payment for 5<sup>th</sup> unit is:

$$T1 * C * LR = 100000 * 0.596 * 35 = \$2086000$$

b. The total time coefficient for 5 units with assumed learn curve 80% is 3.738(TC).

So the duration of all 5 units is  $T1 * TC = 100000 * 3.738 = 373800$  hours