

**IE2111 ISE Principles & Practice II****Assignment #6****Due: 25 March 2025, 5 pm****Read these Instructions**

You may use Excel or any computing tools to generate the required TC and EPC tables and copy them to your final submission. But you must show how you compute the final optimal EPC and EUAC values. Submit your completed assignment into the Drop Box outside the ISEM Department Office at E1A-06-25, or to the professor/tutor at the end of the lecture/tutorial.

A company purchased a machine 3 years ago for \$88,000. This machine (defender) has a current market value of \$57,000. Although it has a remaining useful life of 4 more years, it can be replaced with a more environmentally friendly machine (challenger) which will cost \$95,000 and has a useful life of 4 years. The estimated market values (*MV*) and operating & maintenance (*O&M*) costs in dollars of both machines for the next 4 years of service are given in the table below.

Year	Defender		Challenger	
	Market Value	O&M Cost	Market Value	O&M Cost
1	45,000	13,500	75,000	10,000
2	30,000	16,500	65,000	12,000
3	18,000	22,500	51,000	13,000
4	6,000	25,500	33,000	16,500

The company's MARR is 12%. Income tax do not need to be considered.

- (a) What is the economic service life of the challenger and optimal EUAC? What does this "economic service life" of the challenger mean? (5 marks)
- (b) If the study period is infinity determine the optimal replacement plan and EUAC in real cash flow terms. Explain your answers and state the major assumptions made. (5 marks)
- (c) If the study period is 2 years, determine the optimal replacement plan and EUAC in real cash flow terms. Explain your answers and state the major assumptions made. (4 marks)
- (d) If the study period is 4 years and only up to 2 replacements allowed, determine the optimal replacement plan and EUAC in real cash flow terms. (6 marks)