

**Laboratory Quality Systems Homework # 6 – Capital Budgeting & Lab Safety**

**Due by Midnight on Monday, April 13, 2026**

Part I: Capital Budgeting (5 pts)

Background:

This homework assignment involves the purchase of a UPLC/MS/MS instrument. This instrument is used for multiple analyses including fumonisins, drugs, and aflatoxin.

Cost savings are presented in an enterprise budget format, where the cost of fumonisin analysis using HPLC and UPLC/MS/MS are presented in Table 1. For this homework, you should use the total per sample cost.

*(Note: The lecture on enterprise budgets explains how to take costs and partition their cost per sample, as seen in Table 1. An enterprise budget for fumonisin analysis is included in the Unit IV activity page and attached below for your reference)*

**Table 1. Enterprise budget for sample analysis using HPLC and UPLC/MS/MS**

HPLC			UPLC		
Category	Total Cost	Per sample	Category	Total Cost	Per sample
Supplies	\$501	\$11	Supplies	\$429	\$9
Personnel	\$580	\$13	Personnel	\$220	\$5
Lab	\$26,626	\$53	Lab	\$13,313	\$27
Utilities	\$9,259	\$19	Utilities	\$4,629	\$9
Total		\$96	Total		\$50

**Directions for completing assignment**

Please reconstruct table 2 in Excel and then explain briefly if the project (purchase of the UPLC/MS/MS) is worth more than what it costs and by how much (NPV) using sample cost savings for the new instrument. Use Table 2 as an aid to set up this capital budgeting project in Excel. Assume 1000 samples per year, a 7 year instrument life cycle and an 11% rate of return and a UPLC/MS/MS initial investment cost of \$300,000, calculate the net present value of this investment based on the fumonisin enterprise budget.

**Table 2. Example Table format for NPV (reconstruct in Excel)**

	YEAR						
	1	2	3	4	5	6	7
<b>Investment on New Instrument</b>							
<b>Total Cost Savings for 1000 samples using UPLC over HPLC</b>							
<b>Present Value (PV)</b>							
<b>Net Present Value (NPV)</b>							

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Using fumonisin cost savings alone, complete the following:

1. Reconstruct Table 2 in Excel. What is the NPV of the project described above? Is the project worth investing in – Explain. (2 pts)
2. Based on the LFFM Example presented in the following file: [LFFM Net Present Value Calculation Example](#), answer the following: Calculate the Net Present Value be if the Lab was not funded in Year 5? (1 pt)
3. Briefly describe a Capital Improvement and/or Instrument Purchase that could be evaluated using the NPV technique. (1 pt)

**Resources**

- [Enterprise Budget File Example](#)
- [Enterprise budget for fumonisin analysis](#)

**Part II: Lab Safety (5 pts.)**

Write a brief essay (500 words) addressing the following questions:

What does the phrase “culture of safety” mean within a LQS? How can management help cultivate a culture of safety? What are the keys to maintaining a safe lab environment?