

PBL-1. Individual Interest Rates**Learning Objectives:**

- a. *Demonstrate critical analysis skills and capabilities expected of practicing water resources engineers, including to identify, evaluate, and recommend alternatives.*
- b. *Describe the time value of money*
- c. *Apply engineering economic principles and methods to evaluate alternatives.*
- d. *Apply multiple criteria in project evaluation*
- e. *Gather, analyze, and synthesize data*
- f. *Coherently and concisely present engineering analysis in written form*
- g. *Apply tools to your own financial and investment decisions*

The Situation:

You are a practicing engineer employed at EngineeringEcon Pros, an engineering firm located in Logan, Utah. Your housemate/spouse/partner/friend saw an advertisement for a bank loan at 4.2% annual percentage yield and has hired your firm to research and recommend alternative investment and loan options.

- What investment opportunities does your client have and what interest rates do they offer? Consider checking, savings, money market, stocks, bonds, mutual fund, and/or other similar items your client currently holds or could easily set up.
- What loan opportunities does your client have to borrow money and at what interest rates? Consider credit card, bank loan, car loan, home mortgage, home equity line of credit, or other similar offerings that your client could easily set up.
- What is your client's preferred option(s) and interest rates to invest money? To borrow money? Why?
- How much money will your client receive in 5 years if s/he invests \$200 now at the preferred investment rate?
- How much money must your client pay back in 5 years if s/he borrows \$200 now at the preferred lending rate?
- Should your client pursue the bank loan at 4.2%? How much money will your client lose/gain over 5 years compared to his/her next preferred loan option?

You are responsible to obtain all data you need!! Your report must recommend the interest rate and investment/loan options your client should pursue.

Category (Max. Score)	No Evidence	Far Below Standard	Below Standard	Meets Standard	Exceeds Standard	Self- Score	Instructor Score
Title Page (3)	Absent 0	Evidence of two or fewer title page elements 0	Unclear title, or only 3 of 5 title page elements present. 1	Separate title page. Title, Name, Instructor, Course, Date present 2	Separate title page. Can assess main point from title alone. Name, Instructor, Course, Date, Neatly finished 3		
Introduction (7)	Absent, no evidence 0	There is no clear introduction, main topic, or description of the report's contribution. 1 - 2	Introduction states the main topic but either: 1. Does not give a full overview, or 2. Too detailed, leads to repetition later. 3 - 5	The introduction states the main topic and previews the structure of the report. 6	Introduction states the main problem, describes report contribution, and previews report structure. Overviews solution strategy. Makes reader want to continue reading. 7		
Organization and report structure (10)	No content provided. 0	Paragraphs fail to develop the main idea. No section headers or guide to help the reader understand how material is organized. 1 - 4	Organization of ideas not fully developed. Paragraphs lack supporting detail sentences. No transitions or section headers. Main report exceeds 2 page. Appendices exceed 2 pages. 5 - 6	Paragraph development present but not perfected. Each paragraph has sufficient supporting sentences. Section headers. Few transitions. 2-page main report. 7 - 8	Writer demonstrates logic and sequencing of ideas through well-developed section headers, paragraphs, and transitions. The first sentence of each paragraph is the summary sentence. Main report is 2 page or less. Appendices, if present, do not exceed 2 pages. 9 - 10		
Engineering Economic Analysis (60)	Engineering economic analysis point(s) not addressed. 3 - 42%	The writer has no clue what they are talking about. 45 - 58%	Sketchy: left out required points. Did not work on this as much as you should have, and it shows. Several important answers are incorrect. 61 - 79%	Necessary points are covered. Most answers are correct. Adequate explanation of methods. 82 - 88%	Provides what was explicitly asked for. The function of each piece is demonstrated to the reader in adequate, but not overwhelming, detail. Answers are correct and reasonable. 91 - 100%		
	a) Available investment opportunities and interest rates (10)						
	b) Available loan options and interest rates (10)						
	c) Return on \$200 investment in five years at preferred interest rate (7)						
	d) Loan repayment about in five years at preferred interest rate (7)						
	e) Gain/loss if pursue bank loan (10)						
	f) Recommended investment/loan options and interest rates client should pursue (16)						

Category (Max. Score)	No Evidence	Far Below Standard	Below Standard	Meets Standard	Exceeds Standard	Self- Score	Instructor Score
Word Usage and Format (10)	Not applicable	Numerous and distracting errors in punctuation, capitalization, spelling, sentence structure, word usage, significant figures, tables, and figures. Data vomited onto page(s). Unacceptable / unprofessional at the graduate level. <u>1 – 5</u>	Misspelled words, poor English grammar and word choice. Main body of report is either longer or significantly less than one page. Figures are too small and/or under- labeled, although they are usually of acceptable quality and focus. Tables incoherent or not cohesive. Bad font sizes. Too much or too little data in appendices. Could be improved by being more meticulous. <u>6 – 7</u>	Almost no errors in punctuation, capitalization, spelling, sentence structure, word usage, significant figures, and presentation of figures, tables, and appendices. <u>8</u>	Punctuation, capitalization, spelling, sentence structure, word usage, and significant figures all correct. Clear, consistent fonts. Good word processing skills. Figures have adequate contrast. Figure and table titles numbered and informative. Figures have appropriate axis tick spacing, labels, units, and legends. Table columns cohesive, labeled, and specify units. Equations are numbered. Appendices, if provided, are separated by topic. Each has a title, discussion, and proper formatting. <u>9 - 10</u>		
Conclusion (7)	Absent <u>0</u>	Incomplete and/or not focused. <u>1</u>	The conclusion does not adequately restate the main results. <u>2</u>	The conclusion restates the main results. <u>3</u>	The conclusion restates the main results, and is an effective summary. <u>4</u>		
References (3)	Absent <u>0</u>	Many errors, off- the-wall sources used, and/or few sources cited <u>0</u>	Some prior work, data, and sources cited. A few references formatted correctly. <u>1</u>	Most prior work, data, and sources cited. Formatting generally correct. <u>2</u>	All prior work, data, and sources cited and referenced in correct format. References section is at end of report. <u>3</u>		
Engineering Writing Center (5)	No evidence <u>0</u>			Evidence of meeting with Engineering Writing Center consultant attached to end of report <u>5</u>			
TOTAL (105)							

Additional Comments: