

## Ekonomi Teknik

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### Course Brief Description:

Engineering Economy deals with methods for systematic evaluation of economic feasibility of engineering projects or investment based on costs and revenue estimations. Topics and concepts that will be covered in this course include decision making, costs, benefits, and cash flow, interest and time value of money, uses and formulation of interest factors, present worth analysis, uniform annual cash flow analysis, benefit-cost ratio analysis, and internal rate of return. Other topics that will be covered include incremental analysis for multiple alternatives, breakeven point analysis, payback period analysis, depreciation costs), and replacement analysis.

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### Course Learning Objectives:

After completion of this course, students are expected to be able to:

- Apply methods and techniques for estimating costs and benefits of engineering projects and analyze cash flow of each alternative.
  - Compute equivalent value of money using simple interest model, compound interest model, and general interest model.
  - Understand the derivation of interest factors for single payment, Uniform Series Payment, arithmetic gradient, and Geometric gradient.
  - Perform feasibility analysis using net present value, annual cash flow, benefit-cost ratio, and internal rate of return.
  - Perform incremental analysis for determining the best alternative.
  - Perform sensitivity analysis using breakeven point analysis method.
  - Perform analysis for replacement of equipment.
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### Related Expected Learning Outcomes (ELOs):

- ELO 4: Able to use quantitative analysis, information technology and critical thinking in agricultural engineering profession
  - CPL 6: Able to manage and utilize agricultural resources effectively, efficiently, and sustainably
  - CPL 8: Able to demonstrate capacity in operating agricultural engineering related business either as producer or service provide.
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### Teaching Method

- Lecture and discussion to build active participations of students and develop their communication skill.
  - Assignments (individual and group assignments).
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### Grading Policy

- Individual assignment : 10%
  - Quizzes : 15
  - Exams 1 and 2 : 50%
  - Final exam : 25%
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**Reference**

- Salengke: Engineering Economy: Techniques for Project and Business Feasibility Analysis. ISBN: 978-602-8405-35-5.
- Donald G. Newman and Bruce Johnson, Engineering Economic Analysis, Engineering Press, Inc., ISBN: 0-910554-93-5.
- Leland T. Blank and Anthony J. Tarquin, Engineering Economy. ISBN: 0-07-062982-X

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**Lecturer Name**

- Prof. Dr. Ir. Salengke, M.Sc.
- Prof. Dr. Ir. Mursalim
- Dr. Diyah Yumeina, STP, M.Sc.

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**Course Outline**

Week	Topics	Sources	Learning methods
1	Class introduction and overview	Chapter 1: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture and discussion
2	Costs, Benefits, and cash flow	Chapter 2: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #1.
3	Interest and time value of money	Chapter 3: Engineering Economy: Techniques for Project and Business Feasibility Analysis.	Lecture, discussion, and assignment #2.
4	Formulation and use of interest factors (Single payments, present value, uniform value, and future value).	Chapter 4: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #3. <b>QUIZ 1:</b> Costs, benefits, cash flow, interest, and time value of money.
5	Formulation and use of interest factors (Sinking fund, Arithmetic gradient, and Geometric gradient)	Chapter 4: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #4.
6	<b>FIRST EXAM</b>		
7	<i>Net Present Value Analysis</i>	Chapter 5: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #5.
8	<i>Equivalent Uniform annual worth analysis)</i>	Chapter 6: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #6.

9	<i>Internal Rate of Return Analysis</i>	Chapter 7: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #7.
10	<i>Internal Rate of Return Analysis</i> (feasibility analysis using IRR, evaluation of alternative using incremental analysis, and potential problems in IRR analysis)	Chapter 7: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #8.  <b>Quiz 2: NPV, EUAW, and IRR Analysis</b>
11	<b>EXAMS 2</b>		
12	Benefit-Cost Ratio Analysis	Chapter 8: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #9.
13	<i>Breakeven Point and Payback Period Analysis</i>	Chapter 9: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #10.
14	<i>Depreciation and Capital recovery</i>	Chapter 10: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #11.
15	<i>Replacement Analysis</i>	Chapter 10: Engineering Economy: Techniques for Project and Business Feasibility Analysis	Lecture, discussion, and assignment #12.  <b>QUIZ 3: BCR, breakeven, payback period, and depreciation.</b>
16	<b>FINAL EXAM</b>		