Subject Description Form

Subject Code	ABCT4765
Subject Title	ECONOMIC ANALYSIS FOR PROCESS TECHNOLOGY
Credit Value	3
Level	4
Pre-requisite	Introduction to Chemical & Bioprocess Technology or Elements of Food Engineering, or equivalent
Co-requisite	Nil
Exclusion	Nil
Objectives	The objective of this subject is to provide students with the fundamental knowledge of the economic aspects of process technology, and the concepts and skills in analysis of the profitability of an investment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate a thorough understanding of the fundamental knowledge of economic analysis for process plant b. make meaningful estimates on various economic aspects such as capital investment, manufacturing cost, financing cost, depreciation and product cost c. evaluate the profitability of a new or existing chemical project d. integrate methods and skills to make the best choice from several alternative investments
Subject Synopsis/ Indicative Syllabus	Economic Aspects of the Process Plant: Cost and income; fixed and variable costs, profits; cash flow and cash position. Capital Investment and Product Cost: Capital investment and total product cost; equipment cost and cost index; methods for estimating capital investment and total product costs. Interest and Loan Payments: Simple and compound interest; present worth and discount; discrete and continuous cash flow; compounding and discounting factors; methods for calculating loan repayments. Depreciation and Income Tax: Depreciation and income tax; current value and recovery period; methods for calculating depreciation. Profitability, Alternative Investments and Replacements: Profitability standards, rate of return, profitability evaluation alternative investment and replacements; break-even chart for production schedule. Process Optimization: Introduction; programming optimization problems; optimization solution methodology and optimization applications.

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<tr><td></td><td></td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Lectures will provide students with general concepts of economic analysis and guidance on further reading. Examples will be used to illustrate the use of different economic evaluation methods. Students are encouraged to raise real-life questions and present their answers in the lecture and tutorial sessions. Integration of methods and skills to deal with multiple alternatives will also be demonstrated.

Students will be assessed by assignments, tests as well as a written final examination.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. assignments#</td><td>15</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>2. tests</td><td>35</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>3. final examination</td><td>50</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
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Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
Assignments, test and final exam are used to assess all the outcomes.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>33 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>6 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Assignment</td><td>20 Hrs.</td></tr>
<tr><td>▪ Self-study</td><td>48 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>107 Hrs.</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>Textbook: Peter, M.S. Timmerhaus, K.D. & West, R.E. Plant Design and Economics for Chemical Engineers, 5th ed. McGraw-Hill 2003

References: Turton, R., Bailie, R.C., Whiting, W.B. & Shaeivitz, J.A. Analysis, Synthesis, and Design of Chemical Processes, 2nd edition, Prentice Hall PTR 2003</td></tr>
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