Course Title: Economic Analysis and Technical Applications
Course Prefix: CHEG **Course No.: 2003** **Section No.: P 02**

Department of | Chemical Engineering | **College of | Engineering**

Instructor Name:	***Dr. Safwat H. Shakir***
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Office Hours: | T&TH 2:00 PM-3:30 PM or By appointment
Virtual Office Hours: | None

Course Location: | *S.R. Collins Room 313*
Class Meeting Days & Times: | TR 11:00 A.M-12:20 P.M.

Catalog Description: **CHEG 2003. Economic Analysis and Technical Applications.** (3-0) Credit 3 semester hours. Fundamental concepts of economic principles. Evaluation of technical alternatives, economic significance of technical proposals; interest, description, analysis, and forecasting.

Prerequisites: Prerequisites or co-requisites: MATH 1124
Co-requisites:

Required Text: **"Basics of Engineering Economy" By Leland Blank and Anthony Tarquin. 2008. McGraw-Hill Higher Education. ISBN 978-0-07-340129-4**

Recommended Text/Readings:
1. Sullivan, W.G., Wicks and Koelling, J.A. Engineering Economy, 14th Edition, 2009, Prentice-Hall. ISBN -10-0136142974
2. C. S. Park, Contemporary Engineering Economics, 4th Ed. 2007, Prentice-Hall. ISBN- 0-13-187628

Access to Learning Resources:
PVAMU Library:
phone: (936) 261-1500;
web: http://www.tamu.edu/pvamu/library/
University Bookstore:
phone: (936) 261-1990;
web: https://www.bkstr.com/Home/10001-10734-1?demoKey=d

Course Goals or Overview:

1) To provide students with the principles of economics and their applications in Engineering.
2) Projects alternatives play a crucial role in the areas of production, processing, fabrication and manufacturing of all man-made products.
3) The profitability or cost of the project is a necessary condition for giving the project the green light for funding and execution.
4) The course provides the students with technical and engineering aspects of assessing different projects either in their professional career or in private life.
5) Additionally the course provides the students with information related social and global issues from the economic point of view.

Further the course will provide students with the general goals of Engineering Curriculum that

Critical thinking is an essential skill for any serious economics students. Economic data cannot be analyzed without some understanding of logic and human behavior, so critical thinking is an essential part of understanding the principles of economics. The principles of economics fall into three broad categories: how people make decisions, how people interact and how the economy as a whole behaves. The critical thinking skills that apply to economics, therefore, are those that relate to human and organizational behaviors

Course Outcomes/Objectives
At the end of this course, the student will have achieved and demonstrated the following outcomes.

1	Understand the economic principals, and economic terms
2	Understand the economic and mathematical equations used in the economic analysis.
3	Understand the economic costs, methodologies of assessing the costs, cost estimation and cost concepts.
4	Understand the time value and project cash flow in engineering and economy.
5	Understand the comparison of alternatives for different projects.
6	Understand Break Even Analysis, income tax, risk analysis and depreciation.
7	Understand of Capital investment in the engineering projects
8	Understand of global and societal impacts
9	Communicate effectively

Course Objectives/Accrediting Body Met:
At the end of this course, the student will demonstrate

Core Curriculum Objectives		ABET Outcomes Based Assessment Criteria	
1	**Critical Thinking**: Creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information	**A, E**	Ability to apply knowledge of math, science and engineering; ability to identify and formulate solutions to technical problems
2	**Communication**: Effective development, interpretation and expression of ideas through written, oral and visual communication	**G**	Ability to communicate effectively
3	**Empirical and Quantitative Skills**: Manipulation and analysis of numerical data or observable facts resulting in informed conclusions	**E**	Ability to identify, formulate, and solve problems related to technology applications
4	**Social Responsibility**: Intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities	**H**	Ability to understand the impact of technology solutions in a global and societal context

Course Requirements & Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

Exams or Quizzes – written tests designed to measure critical thinking and quantitative skills as demonstrated by their ability to apply knowledge of economic principles to solve problems relevant to engineering and other technical subject areas.
Exercises or **Homework** – written assignments designed to develop quantitative skills and critical thinking by use of a problem solving strategy, relevant formulae and tables, plus recitation and practice for reinforcement.
Projects or Assignments – designed to develop and demonstrate critical thinking and quantitative skills on a problem with large scope to require teaming that is set in a context promoting awareness of social responsibility on a local through global level, with oral and written reporting required to develop and demonstrate communication skills.
Class Participation – daily attendance and participation in class discussions

(instruments will vary slightly depending on the course)

Grading Matrix *

Instrument	Value (points or percentages)	Total
Exams or Pop Quizzes	2 Exams and Pop quiz	35%
Mid Term Exam	Mandatory	20%
Homework**	Between 5 to 6 homework	No Grades
Project Presentation in group presentation and discussion		10%
Final Exam		35%
Total:		**100%**
Discount for lack of participation		**-10%**

* ***Include in the project presentation, is that e****ach project group, will present their project in 10 minutes. The students in the class will be given the chance to assess each other group project and critique each group solution for better understanding the economic values of the presented project. The students will be participating in the selection of the best and economic project from the costs and revenues and its impact socially.*

***** Homework assignments are for helping you to understand the materials in the class. However homework assignments are not graded. <u>You are responsible for all presented materials in the class.</u>***

GRADING SYSTEM

The standard university grading scale is indicated below.

Grade	Meaning	Score Range	Grade Values
A	**Excellent**	**90 – 100**	**4**
B	**Good**	**80 – 89**	**3**
C	**Satisfactory**	**70 – 79**	**2**
D	**Passing**	**60 – 69**	**1**
F	**Failing**	**0 – 59**	**0**
S	**Satisfactory**	**70 – 100**	**0**
U	**Unsatisfactory**	**0 – 69**	**0**
I	**Incomplete**		**0**
W	**Withdrawal from a course**		**0**
WV	**Withdrawal from the University Voluntarily**		**0**
MW	**Military Withdrawal**		**0**

Formatting Documents:
Microsoft Word is the standard word processing tool used at PVAMU. If you're using other word processors, be sure to use the "save as" tool and save the document in either the Microsoft Word, Rich-Text, or plain text format.

Exam Policy
Exams should be taken as scheduled. No makeup examinations will be allowed except under documented emergencies (See Student Handbook).

Professional Organizations and Journals
None

References

1) **C. S. Park, Contemporary Engineering Economics, 4th Ed. 2007, Prentice-Hall. ISBN- 0-13-187628-7.**

<u>Course Regulations in Addition to University Rules and Procedures</u>

- **NO make-up exams unless there is an appropriate written excuse**
- **Failing to attend Mid-term and Final Exams will result in "F" grade in the final course grade.**
- ***<u>Special attention must be taken in case of unexpected circumstances in case of not attending the Mid-term or final exam.</u>*** **You need to get the appropriate approval,**

signature and documentation from the university. Otherwise the final grade will result in "F" Grade. With appropriate documentation and you have attended the class during semester in all class time and you have taken all previous exams and submitted the popup quizzes …etc. you will be assigned a "grade I" with appropriate approval from Head of the Department, Dean of the College, and the University Academic Affairs.

University Rules and Procedures

Disability statement (See Student Handbook):
Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:

1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.

2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.

3. Fabrication: use of invented information or falsified research.

4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

Attendance Policy:
Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to

appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Course Outline

W**EEKS**	**READING/LABORAORY ASSIGNMENT/HOMEWORK**	**Chapters/Study Guide Please look in the book**
WEEK 1	❖ **Chapter 1**: Foundations of Engineering Economy	Pages 1-25 including problems solving
WEEK 2	❖ **Chapter 2**: Factors: How Time and Interest Affect Money	Pages 27-58 including problems solving
WEEK 3	❖ **Chapter 3** Nominal and Effective Interest Rates	**Pages 61 – 79** including problems solving
WEEK 4	❖ **Chapter 4** : Present Worth Analysis	Pages 82- 106 including problems solving
WEEK 5	**QUIZ # 1**	
WEEK 6	❖ **Chapter 5**: Annual Worth Analysis	Pages 109-123 including problems solving
WEEK 7	❖ **Chapter 6**: Rate of Return Analysis	Pages 124-159 including problems solving
WEEK 8	❖ **Chapter 7**: Benefit/Cost Analysis and Public Sector Projects. ❖ Chapter 8 :Breakeven, Sensitivity, and Payback Analysis.	Pages 160 – 214 including problems solving

WEEKS 9	❖ **Chapter 9**: Replacement and Retention Decisions	**Pages 215 -236** including problems solving
WEEK 10	❖ **Chapter 10**: Effects of Inflation	**Pages 239 – 258** including problems solving
WEEK 11	❖ **Chapter 11**: Estimating Cost of Projects	**Pages 259-286** including problems solving
WEEK 12	❖ **Chapter 12**: Depreciation Methods	**Pages 287 – 311** including problems solving
WEEK 13	❖ **Chapter 13**: After-Tax Economic Analysis	**Pages 312-347** including problems solving
WEEK 14	❖ Case study	**Students provided with one or two projects to make a presentation and discuss the outcome of the students analysis and student will provide written report about their project and what are lessons learnt**
WEEK 15	**Review Materials**	
WEEK 16	**FINAL EXAMINATION**	