Course Title: Economic Analysis and Technical Applications
Course Prefix: CHEG **Course No.: 2003** **Section No.: P 01**

Department of | Chemical Engineering | College of | Engineering

"Reading is a Brain Feeding"

© Safwat H. Shakir

"Drive Slowely on The Highways and Drive Fast in The Classrooms"

© Safwat H. Shakir

Words of Cautions

"***Please Drive Reasonably and Follow-up the Driving Rules on the Highways. However, I Hope Everyone Drives Fast in the classroom (i.e. Earning High grades 90 and above) as You Drive Fast on the Highways"***

"Always Brain Train is The Best Method to Grasp and Remember the Knowledeg

© Safwat H. Shakir

Instructor Name:	***Dr. Safwat H. Shakir***
Office Location:	**C.L. Wilson 200 B**
Office Phone:	***936-261-9879***
Fax:	***936-261-9419***
Email Address:	***shshakir@pvamu.edu***
U.S. Postal Service Address:	Prairie View A&M University P.O. Box | 519 Mail Stop | **2505** Prairie View, TX 77446-0519

Office Hours: | T&TH 3:00 PM-5:30 PM or By appointment
Virtual Office Hours: | None

Course Location: | C.L. Wilson 103
Class Meeting Days & Times: | **TR 9:30 A.M-11:00 A.M. Sam R Collins Engr Tech Bldg** 331 **and Lab time is in 5:30-6:20 PM in C L Wilson Engineering Complex 103**
Gilchrist Engineering Building 109 Laboratory

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.

er

Prerequisites: **Co-requisites:**	Prerequisites or co-requisites: MATH 1124
Required Text:	**"Engineering Economic Analysis By Donald G.Newn Jrome P Lavelle and Ted G. Eschenbach 2017**
Recommended Text/Readings:	**1. Basics of Engineering Economy" By Leland Blank and Anthony Tarquin. 2014. McGraw-Hill Higher Education. ISBN 978-0-07-340129-4Sullivan, 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** **3. "Fundamentals of Engineering Economic Analysis" by John A. White; Kellie S. Grasman, Kenneth E. Case, Kim LaScola Needy and David B. Partt. First Edition-Wiley, 2013 ISBN 978-1-118-41470-5**
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) The course provides the students with core aspects of critical thinking, to develop a quantitatively skills, expand students' knowledge of the human condition and human cultures to economics, and social behavioral aspects in the society in addition to strengthen the students ability of presenting judgment about the economic aspects of engineering projects they are going to deal with in real life.
6) To provide the students with the 10 principles of engineering economic analysis as 1)Money has a time value; 2)make the investments that are economically justified; 3) Chose the mutually exclusive investment alternative that maximizes economic worth; 4) compare between investments of two alternatives or more; 5) Study the marginal revenue that must exceed marginal costs; 6) Continue to invest as long as each additional increment of investment yields a return that is greater than the investor's Time Value of Money; 7)Consider only difference in cash flows among investment alternatives; 8)Compare investment alternatives over a common period of time; 9)Risk and returns tends to be positively correlated; and 10)Past costs are irrelevant in engineering economic analyses, unless impact future costs.

er

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	Understanding 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.

Course Objectives/Accrediting Body (NCATE, ABET, NAAB, etc…) Standards Met:

Core Curriculum Objectives		ABET Outcomes Based Assessment Criteria	
1	**Critical Thinking**: Creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information	**4**	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	**4**	An ability to function on multi-disciplinary Teams
3	**Empirical and Quantitative Skills**: Manipulation and analysis of numerical data or observable facts resulting in informed conclusions	**5**	The broad education Necessary the impact of engineering Solution in Global and Societal Context.
4	**Social Responsibility**: Intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities	**5**	Ability to understand the impact of technology solutions in a global and societal context. (this is for ABET and Core Curriculum)

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

Exams or Quizzes – written tests designed to measure knowledge of presented course material
Exercises or **Homework** – written assignments designed to supplement and reinforce course material
Projects or Assignments – designed to measure ability to apply presented course material
Class Participation – daily attendance and participation in class discussions

er

(instruments will vary slightly depending on the course)

Grading Matrix

Instrument	Value (points or percentages)	Total
Exams or popup questions &Quizzes	2 Exams and popup quizzes in the lab	15% each with a total 30%
Mid Term Exam	Mandatory	20%
Homework or projects*	Between 4 to 6 homework	
Attendance, participation and presentation and solving problems in groups in the lab is Mandatory from 5:30-6:30 PM)	**Very important**	15%
Final Exam	Mandatory	35%
Total:		**100%**
Discount for lack of participation	**Very important**	**-20%**

**** Homework assignments are for helping you to understand the materials in the class. You are responsible for all presented materials in the class.***

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.**

er

Course Regulations in Addition to University Rules and Procedures

- Students will conduct themselves in a manner that is respectful to their fellow classmates and the instructor at all times.
- **Cell phones, ipads and smart phones or similar electronic devices MUST** be turned off and stowed away during class time. Students are **NOT** allowed to leave class to answer cell phones or use these devices.
- Students caught using ipads and smart phones or similar electronic devices during exams will receive **ZERO** for the exam and be subject to sanctions as stipulated under **Academic Misconduct**.
- Students should be prepared to stay in the classroom for the duration of the exam. Students who have any condition that may require them to leave the exam room should make prior arrangements with the Instructor. Students who decide to leave the exam room for any other reason must handover their exam paper and consider the exam over for them.
- Programmable calculators are **NOT** allowed in class.
- Students are **NOT** allowed to wear caps/hats in class.
- Arrive to class prepared to discuss lesson; always bring essential tools: Textbook, paper, calculator.
- **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.**
- ***Special attention must be taken in case of unexpected circumstances in case of not attending the Mid-term or final exam.*** **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.**
- ***Curve the grade is not allowed, however it may be can be monitored within 5% of the average grades.*** **If curving the grade applied, it will be applied to all the students in the class.**

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

er

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.

5. **Cheating in any form will result for the student grade will be "F".**

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.

Technical Considerations for Online and Web-Assist Courses

Minimum Hardware and Software Requirements:
-Pentium with Windows 7 or PowerMac with OS 9
-56K modem or network access

er

-Internet provider with SLIP or PPP
-8X or greater CD-ROM
-64MB RAM
-Hard drive with 40MB available space
-15" monitor, 800x600, color or 16 bit
-Sound card w/speakers
-Microphone and recording software
-Keyboard & mouse
-Netscape Communicator ver. 4.61 or Microsoft Internet Explorer ver. 5.0 /plug-ins
-Participants should have a basic proficiency of the following computer skills:
- ·Sending and receiving email
- ·A working knowledge of the Internet
- ·Proficiency in Microsoft Word
- ·Proficiency in the Acrobat PDF Reader
- ·Basic knowledge of Windows or Mac O.S.

Netiquette (online etiquette): students are expected to participate in all discussions and virtual classroom chats when directed to do so. Students are to be respectful and courteous to others in the discussions. Foul or abusive language will not be tolerated. When referring to information from books, websites or articles, please use APA standards to reference sources.

Technical Support: Students should call the Prairie View A&M University Helpdesk at 936-261-2525 for technical issues with accessing your online course. The helpdesk is available 24 hours a day/7 days a week. For other technical questions regarding your online course, call the Office of Distance Learning at 936-261-3290 or 936-261-3282

Communication Expectations and Standards:
All emails or discussion postings will receive a response from the instructor within 48 hours.

You can send email anytime that is convenient to you, but I check my email messages continuously during the day throughout the work-week (Monday through Friday). I will respond to email messages during the work-week by the close of business (5:00 pm) on the day following ***my receipt*** of them. Emails that I receive on Friday will be responded to by the close of business on the following Monday.

Submission of Assignments:
Assignments, Papers, Exercises, and Projects will distributed and submitted through your online course. Directions for accessing your online course will be provided. Additional assistance can be obtained from the Office of Distance Learning.

Discussion Requirement:
Because this is an online course, there will be no required face to face meetings on campus. However, we will participate in conversations about the readings, lectures, materials, and other aspects of the course in a true seminar fashion. We will accomplish this by use of the discussion board.

Students are required to log-on to the course website often to participate in discussion. It is strongly advised that you check the discussion area daily to keep abreast of discussions. When a topic is posted, everyone is required to participate. The exact use of discussion will be determined by the instructor.

It is strongly suggested that students type their discussion postings in a word processing application and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, it should be copied and pasted to the discussion board.

er

READING/LABORAORY ASSIGNMENT/HOMEWORK

WEEKS	READING/LABORAORY ASSIGNMENT/HOMEWORK	Chapters/Study Guide
WEEK 1	❖ **Chapter 1**: Foundations of Engineering Economy and making Economic decision, cost and benefits and Estimating Cost	
WEEK 2	❖ **Chapter 2**: Factors: How Time and Interest Affect Money, and interest equivalence	
WEEK 3	❖ **Chapter 3** Nominal and Effective Interest Rates	
WEEK 4	❖ **Chapter 4** : Present Worth Analysis	
WEEK 5	❖ **Chapter 4** : Continue Present Worth Analysis	
WEEK 6	❖ **Chapter 5**: Annual Worth Analysis	
WEEK 7	❖ **Chapter 6**: Rate of Return Analysis	
WEEK 8	❖ **Chapter 7**: Benefit/Cost Analysis and Public Sector Projects. ❖ **Chapter** 8 : Breakeven, Sensitivity, and Payback Analysis.	
WEEKS 9	❖ **Chapter 9**: Replacement and Retention Decisions	
WEEK 10	❖ **Chapter 10**: Effects of Inflation and Price Change	
WEEK 11	❖ **Chapter 11**: Minimum Attractive Rate of Return	
WEEK 12	❖ **Chapter 12**: Depreciation Methods	
WEEK 13	❖ **Chapter 13**: After-Tax Economic Analysis	
WEEK 14	❖ Case study	
WEEK 15	**Review Materials**	
WEEK 16	**FINAL EXAMINATION**	
Exams – Tests and Quizzes	**Please see the University calendar and the exams will be announced in the class. Please attend the class all the time**	

LABORAORY ACTIVITIES DURING THE SEMESTER (LAB TIME – MANDATORY ATTENDANCE

WEEKS	READING/LABORAORY ASSIGNMENT/HOMEWORK	Chapters/Study Guide
WEEK 1	❖ **Chapter 1**: Case studies and practical solving problems for Foundations of Engineering Economy	

er

WEEK 2	❖ **Chapter 2**: Case studies and practical solving problems for Factors: How Time and Interest Affect Money	
WEEK 3	❖ **Chapter 3** Case studies and practical solving problems for Nominal and Effective Interest Rates	
WEEK 4	❖ **Chapter 4** : Case studies and practical solving problems for Present Worth Analysis	
WEEK 5	❖ **Chapter 4** : Case studies and practical solving problems for Continue Present Worth Analysis	
WEEK 6	❖ **Chapter 5**: Case studies and practical solving problems for Annual Worth Analysis	
WEEK 7	❖ **Chapter 6**: Case studies and practical solving problems for Rate of Return Analysis	
WEEK 8	❖ **Chapter 7**: Case studies and practical solving problems for Benefit/Cost Analysis and Public Sector Projects. ❖ **Chapter** 8: Case studies and practical solving problems for Breakeven, Sensitivity, and Payback Analysis.	
WEEKS 9	❖ **Chapter 9**: Case studies and practical solving problems for Replacement and Retention Decisions	
WEEK 10	❖ **Chapter 10**: Case studies and practical solving problems for Effects of Inflation	
WEEK 11	❖ **Chapter 11**: Case studies and practical solving problems for Estimating Cost	
WEEK 12	❖ **Chapter 12**: Case studies and practical solving problems for Depreciation Methods	
WEEK 13	❖ **Chapter 13**: Case studies and practical solving problems for After-Tax Economic Analysis	
WEEK 14	❖ Case studies and practical solving problems in general and preparation for the final exam	
WEEK 15	Case studies and practical solving problems for **Review Materials for the final exam**	
WEEK 16	**FINAL EXAMINATION**	
Exams – Tests and Quizzes	**Please see the University calendar and the exams, tests, quizzes will be announced in the class. Please attend the class all the time**	

er

Academic Calendar – Spring 2019

Jan 10 - Jan 11 Thursday through Friday	Regular Registration Period
Jan 14 Monday	First Class Day
Jan 14 Monday	Tuition payment deadline is 5:00 p.m. for all students who registered for the spring semester
Jan 14 - Jan 16 Monday through Wednesday	Late registration for the spring semester for all students who have not yet registered. To complete registration, students must pay by 5:00 p.m. on Wednesday, February 6.
Jan 14 - Jan 18 Monday through Friday	Add/Drop for all students for the spring semester. Tuition payment for all students who add/drop for spring must pay by 5:00 p.m. on Wednesday, February 6.
Jan 21 Monday	Dr. Martin Luther King Day (University Closed)
Jan 22 Tuesday	Class resumes
Jan 30 Wednesday	12th Class Day (Census Date)
Jan 30 Wednesday	Last day to drop/withdraw from course(s) without academic record. A financial record will still exist.
Jan 31 - Mar 29 Thursday through Friday	Withdrawal from course(s) with record ("W")
Feb 06 Wednesday	Tuition payment deadline is 5:00 p.m. for all students who late registered and add/drop for spring semester
Feb 11 Monday	20th class day
Feb 12 - Apr 30 Tuesday through Tuesday	Submit application for Tuition Rebate for spring graduation undergraduate candidates
Mar 07 - Mar 09	
Mar 07 - Mar 09 Thursday through Saturday	Mid-semester examination
Mar 11 - Mar 16 Monday through Saturday	Spring Break
Mar 15 Friday	Spring Break (University Closed)
Mar 18 Monday	Class resumes
Mar 19 Tuesday	60% of Term
Mar 19 Tuesday	Mid-semester grades due by 11:59 p.m.
Mar 27 Wednesday	Founders Day/Honors Convocation
Mar 27 Wednesday	Last day to apply for spring graduation (ceremony participation)
Mar 28 - Apr 30 Thursday through Tuesday	Apply for degree conferral only for spring graduation (no ceremony participation or name listed in program)
Mar 29 Friday	Last day for withdrawal from course(s) with record ("W")
Apr 08 - Apr 12 Monday through Friday	Priority registration for continuing students for summer and fall semesters Priority Registration Schedule
Apr 15 - May 24 Monday through Friday	Pre-registration for all students for the summer and fall semester

er

Apr 19 Friday	Good Friday (Student Holiday)
Apr 29 - Apr 30 Monday through Tuesday	Course Review Days (Classes must convene and instructors will prepare students for final exams)
Apr 30 Tuesday	Last day to withdraw from the university with record
Apr 30 Tuesday	Last day to apply for degree conferral only for spring graduation (no ceremony participation or name listed in program)
Apr 30 Tuesday	Last day to submit application for Tuition Rebate for spring graduation undergraduate candidates
Apr 30 Tuesday	Last Class Day
May 01 - May 07 Wednesday through Tuesday	Final Examinations
May 09 Thursday	Final grades due for graduation candidates by Noon
May 11 Saturday	Spring Commencement
May 14 Tuesday	Final grades due for all other students by 11.59 p.m.

Please look at the university website for any changes and requirements and announcements

er