

**CENTRAL TEXAS COLLEGE
SYLLABUS FOR ENGR 1201
INTRODUCTION TO ENGINEERING**

Semester Hours Credit: 2

INSTRUCTOR: Dr. Word

I. INTRODUCTION

- A. Introduction to engineering as a profession includes instruction in the applications of mathematical and scientific principles to the solution of practical problems for the benefit of society. ENGR 1201 is a two semester hour course.
- B. This course satisfies the introduction to engineering course for students considering engineering as a profession. Please check with your chosen schools of engineering to verify transferability.
- C. This course is occupationally related and serves as preparation for careers in engineering.
- D. Prerequisites: MATH 1314 or equivalent

II. Learning Outcomes

Upon successful completion of this course, the student will be able to:

- A. Discuss the history of engineering.
- B. Define engineering
- C. Discuss engineering fields of specialization.
- D. Discuss career paths and initial career profiles for engineers.
- E. Discuss engineering as a profession.
- F. Discuss learning and creative thought as they relate to engineering.
- G. Discuss the nature of engineering design.
- H. Discuss the engineering method.
- I. Discuss the three methods of engineering communications: written, graphical, and oral.
- J. Discuss and apply engineering calculations.
- K. Discuss and work problems illustrating problems from the branches of mathematics related to engineering.
- L. Discuss case studies in engineering.

III. INSTRUCTIONAL MATERIALS

- A. Required Text: Wright, Paul H., Introduction to Engineering, 3rd edition; Hoboken, NJ; John Wiley & Sons Inc. 2002.
- B. Other Materials: A graphing calculator is required.

IV. COURSE REQUIREMENTS

- A. Assignments will be made daily. All assignments are to be completed by the following class meeting. Assignments may be collected and examined at any time.
- B. Students are expected to attend every class and to arrive at each class on time and remain in class for the entire class period. Students who are absent from class 12.5% of the number of class meetings for any reason will be dropped from the class with a grade of "F". Instructors may choose to lower a student's grades because of tardiness.
- C. The instructor will post office hours after the semester commences. Consult the instructor during office hours. If your visit may tend to be lengthy, make an appointment with the instructor so that he may set aside some time for you.

V. EXAMINATIONS

- A. Examinations will be given to assess knowledge and understanding of each unit. A final exam will be given and students must take the final exam in order to pass the course. The final exam date is announced about two weeks prior to the examination week.
- B. Students who miss an exam should discuss with the instructor the circumstances surrounding the absence. The instructor will determine whether a make-up exam is to be given. Make-up examinations are given by appointment only.

VI. SEMESTER GRADE COMPUTATIONS

- A. Your point total is determined by adding the points earned on each unit examination. Your letter grade for the course is then determined by the following formula:

$$\frac{\text{Your Point Total}}{\text{Total Points Possible}} \times 100$$

If the result is between	90	and 100	your grade is	A
	80		89	B
	70		79	C
	60		69	D
	0		59	F

**** NOTE:** Grade Computation is determined by instructor. Please see your instructor for how your grade will be determined. This is just an example.

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

- A. Withdrawal from Course: It is the student's responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or an Application for Refund. The withdrawal form must be signed by the student.

Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is as follows.

Friday of 3rd week for 5-week courses
Friday of 4th week for 6-week courses
Friday of 6th week for 8-week courses
Friday of 7th week for 10-week courses
Friday of 9th week for 12-week courses
Friday of 12th week for 16-week courses

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of "W", provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of "F" or "FN" for nonattendance.

- B. An Administrative Withdrawal: An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on the Administrative Withdrawal Form for submission to the registrar.
- C. An Incomplete Grade: The College catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course..." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely

fails to show for the final examination will receive a zero for the final and an "F" for the course.

- D. Cellular Phones and Beeper: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.
- E. Americans With Disabilities Act (ADA): Students requiring accommodations for disabilities are responsible for notifying the instructor. Reasonable accommodations will be granted in full compliance with federal and state law and Central Texas College policy.
- F. Instructor Discretion: The instructor reserves the right of final decision in course requirements.
- G. Civility: Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.
- H. The Math Department operates an Advanced Mathematics Lab in Building 152, Room 145. All courses offered by the Math Department are supported in the lab with appropriate tutorial software. Walk-in tutoring is also available in Building 152, Room 236. Calculators and Graphlink are available for student use in the lab. Students are encouraged to take advantage of these opportunities. See posted hours for the Walk-in tutoring and Math Lab.

VIII. COURSE OUTLINE

- A. Unit One: History of Engineering
 - 1. Learning Outcomes: Upon successful completion of this unit, the student will be able to:
 - a. Discuss the history of Engineering in Early Civilizations
 - b. Discuss the Contributions to engineering by the Romans and the Greeks
 - c. Discuss what occurred in engineering during the Middle Ages
 - d. Discuss the advancements made in engineering since 1300 A.D.
 - 2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.

- b. Read pages of assigned chapter.
- c. Complete assignments given by the instructor.

3. Unit Outline:

- a. Introduction (Section 1.1)
- b. Engineering in the Early Civilizations: The Mesopotamians (Section 1.2)
- c. Engineering in the Early Civilizations: The Egyptians (Section 1.3)
- d. Contributions of the Greeks (Section 1.4)
- e. Contributions of the Romans (Section 1.5)
- f. Engineering in the Middle Ages (Section 1.6)
- g. The Advancement of Science: Circa A.D. 1300-1750 (Section 1.7)
- h. Advancements in Engineering: A.D. 1750-1900 (Section 1.8)
- i. Engineering in the Twentieth Century (Section 1.9)

B. Unit Two: Definition of Engineering

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

- a. Define Engineering
- b. Discuss the engineering fields and specializations.
- c. Discuss the career paths and career profiles of engineers.

2. Learning Activities:

- a. Listen to classroom lecture and discuss exercises.
- b. Read pages of assigned chapter.
- d. Complete assignments given by the instructor.

3. Unit Outline:

- a. Engineering (Section 2.1)
- b. Engineering Support Personnel (Section 2.2)
- c. Electrical Engineering (Section 2.3)
- d. Computer Engineering (Section 2.4)
- e. Mechanical Engineering (Section 2.5)
- f. Civil Engineering (Section 2.6)
- g. Chemical Engineering (Section 2.7)
- h. Industrial Engineering (Section 2.8)
- i. Aerospace Engineering (Section 2.9)
- j. Materials Engineering (Section 2.10)

- k. Other Branches of Engineering (Section 2.11)
- l. Functions of Engineering (Section 2.12)
- m. The Corporate Ladder (Section 2.13)
- n. The Independent Entrepreneur (Section 2.14)
- o. Employment Opportunities (Section 2.15)
- p. Engineering and Social Services Abroad (Section 2.16)
- q. The Engineering Professor (Section 2.17)
- r. Graduate Work Outside of Engineering (Section 2.18)
- s. The Multiple-Track, Variable Career (Section 2.19)
- t. Chemical Engineering Graduates (Section 2.20)
- u. Civil Engineering Graduates (Section 2.21)
- v. Electrical Engineering Graduates (Section 2.22)
- w. Mechanical Engineering Graduates (Section 2.23)
- x. Biomedical Engineering Graduates (Section 2.24)
- y. Computer Engineering Graduates (Section 2.25)
- z. Environmental Engineering Graduates (Section 2.26)
- aa. Industrial Engineering Graduates (Section 2.27)

C. **Unit Three:**

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
 - a. Discuss engineering as a profession.
 - b. Discuss engineering organizations and registration.
 - c. Discuss engineering ethics.

2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.
 - b. Read pages of assigned chapter.
 - e. Complete assignments given by the instructor.

3. Unit Outline:
 - a. Engineering as a profession (Section 3.1)
 - b. Characteristics and Responsibilities of Professional Engineers (Section 3.2)
 - c. Ideals and Obligations of Professional Engineers (Section 3.3)
 - d. Professional Registration (Section 3.4)
 - e. Professional Organizations (Section 3.5)
 - f. Engineering Ethics (Section 3.6)
 - g. Moral Foundations of Engineering Ethics (Section 3.7)
 - h. The Framework of Engineering Ethics (Section 3.8)

- i. Codes of Engineering Ethics (Section 3.9)

D. **Unit Four:**

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
 - a. Discuss learning and creative thought as they relate to engineering.
 - b. Discuss the learning process.
 - c. Discuss the differences on how people think.
2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.
 - b. Read pages of assigned chapter.
 - c. Complete assignments given by the instructor.
3. Unit Outline:
 - a. Introduction (Section 4.1)
 - b. The Successful Engineering Student (Section 4.2)
 - c. The Engineering Curriculum (Section 4.3)
 - d. Curriculum Planning and Management (Section 4.4)
 - e. Adapting to the College Classroom (Section 4.5)
 - f. The Nature of Learning (Section 4.6)
 - g. Information of Processing and Memory (Section 4.7)
 - h. Determinants of Efficient Learning (Section 4.8)
 - i. Practical Suggestions for Learning (Section 4.9)
 - j. The Four-Quadrant Model of Thinking (Section 4.10)
 - k. Hindrances to Problem Solving (Section 4.11)
 - l. What is Creativity (Section 4.12)
 - m. The Nature of Creativity (Section 4.13)
 - n. Characteristics of Creative People (Section 4.14)
 - o. The Creative Process (Section 4.15)
 - p. Overcoming Obstacles to Creative Thinking (Section 4.16)

E. **Unit Five:** The Engineering Approach to Problem Solving

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
 - a. Discuss the nature of engineering design.
 - b. Discuss the engineering method.

2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.
 - b. Read pages of assigned chapter.
 - c. Complete assignments given by the instructor.

3. Unit Outline:
 - a. Identification of the Problem (Section 5.1)
 - b. Gathering Needed Information (Section 5.2)
 - c. Searching for Creative Solutions (Section 5.3)
 - d. Stepping from Ideation to Preliminary Designs (Section 5.4)
 - e. Evaluation and Selection of Preferred Solution (Section 5.5)
 - f. Preparation of Reports, Plans, and Specifications (Section 5.6)
 - g. Implementation of the Design (Section 5.7)

F. **Unit Six:** Engineering Communications

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
 - a. Discuss the method of written communication as an engineer.
 - b. Discuss the method of graphical communication as an engineer.
 - c. Discuss the method of oral communication as an engineer.

2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.
 - b. Read pages of assigned chapter.
 - c. Complete assignments given by the instructor.

3. Unit Outline:
 - a. Introduction (Section 6.1)
 - b. Communications and Information Resources (Section 6.2)
 - c. Guidelines for Effective Writing. (Section 6.3)
 - d. Types of Engineering Writing (Section 6.4)
 - e. ANSI Line Conventions and Letterings (Section 6.5)
 - f. Types of Graphical Communications (Section 6.6)
 - g. Sketching (Section 6.7)
 - h. Pictorial Representations (Section 6.8)
 - i. Orthographic Representations (Section 6.9)
 - j. Section Views (Section 6.10)
 - k. Auxiliary Views (Section 6.11)

- l. Computer Tools for Creating Representations (Section 6.12)
- m. Simulation and Virtual Reality (Section 6.13)
- n. Guidelines for Effective Speaking (Section 6.14)
- o. Use of Visual Aids (Section 6.15)
- p. Technical Presentations at Professional Meetings (Section 6.16)
- q. The Engineer as a Presiding Officer (Section 6.17)

G. **Unit Seven:** Engineering Calculations

- 1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
 - a. Discuss and apply engineering calculations.
 - b. Discuss and work problems illustrating problems from the branches of mathematics related to engineering.

- 2. Learning Activities:
 - a. Listen to classroom lecture and discuss exercises.
 - b. Read pages of assigned chapter.
 - c. Complete assignments given by the instructor.

- 3. Unit Outline:
 - a. The Presentation of Engineering Calculations (Section 7.1)
 - b. Number Systems (Section 7.2)
 - c. Dimensions (Section 7.3)
 - d. Units (Section 7.4)
 - e. Significant Figures (Section 7.5)
 - f. Scientific Notation (Section 7.6)
 - g. Algebra (Section 7.7)
 - h. Geometry (Section 7.8)
 - i. Trigonometry (Section 7.9)
 - j. Calculus (Section 7.10)
 - k. Engineering Statistics (Section 7.11)
 - l. Graphical Analysis (Section 7.12)