

A comprehensive introduction to the
Engineering Profession.

EGG 100- Introduction to Engineering

Arapahoe Community College

Introduction to Engineering

EGG 100



Welcome to the introduction to the incredibly satisfying and challenging career of Engineering. A brief look around at your surroundings will allow you to appreciate just how much applied technology has made our lives more comfortable

A brief word about my background follows. I have a BS. Elec. Eng. from Auburn Univ.; an MS in Astrophysics from the University of Houston, Clear Lake and an HRRS-Happily Retired Rocket Scientist from the Aerospace Industry.

I began my career on the Apollo Moon Landing program, and went on to support the initial build and test of the Space Shuttle. I joined Martin Marietta following the initial flight of the Shuttle where I served as Project Engineer for the MX Peacekeeper ICBM.

I retired from what is now Lockheed Martin following my support of the maiden flight of the Atlas V, America's next generation launch vehicle that is powered by the Russian built RD 180 engine.

In conjunction with teaching in the Community College System, I am an independent consultant to the Aerospace industry teaching the psychology and practice of error management and prevention.

I live with my wife and Four Cocker Spaniels in the beautiful Rocky Mountains of Colorado near Conifer, CO. Here the deer and elk view the tulips as popsicles.

Please call me Jess in any exchanges.....Jess :>)

EGG 100-Introduction to Engineering

Catalogue Synopsis: ***Introduction to Engineering*** will allow the student to gain insight into the principles and practices of a number of various engineering disciplines.

1 Credit

Introduces the math and science required in a variety of engineering disciplines. The particular engineering disciplines examined are: Civil Engineering, Mechanical Engineering, Electrical Engineering, Industrial Engineering, and Computer Science. For each discipline the course will examine certification requirements, program of study, types of work and tasks in each discipline and compensation ranges. Tours and speakers will be arranged.

PREREQUISITE: [MAT 090](#) with a grade of "C" or better or ACCUPLACER elementary algebra score of 61 or higher

Text: **Studying Engineering:** Raymond B. Landis

Meets every Monday and Wednesday for 5 weeks: 5:00-6:15 pm, Room AM 4970

Support services are available to students with disabilities who have a documentable need for accommodation in accordance with the Americans with Disabilities Act and the Rehabilitation Act of 1973, Section 504. To access services contact Disability Services in M1840 or call (303) 797-5937.

Instructor: Jess Huguley

E-mail: jess.huguley@arapahoe.edu

Grading will be based on a number of small research projects and a formal term paper (details provided at first session). ***The term paper will account for 50% of the final grade. 30% will be allocated to "System Engineering projects" and the final 20% will be allocated to "classroom discussion". Attendance at all class meetings is expected and required and will form the basis for the classroom discussion points.***

Grading Scale	90-100%	A
	80-89%	B
	70-79%	C
	60-69%	D
	less than 60%	F

Please refer to the ACC Student Handbook for college-wide policy regarding appropriate student conduct as well as rights and responsibilities. The handbook is available from the Student Life Office.

Cell Phone and other Electronic Device Usage in this Classroom

The use of any electronic devices in the class room such as an IPOD, CD Players, Cell Phones etc... for any purpose- Conversation, Text Messaging, Games or any other use is strictly prohibited. Such devices are to be stored in your personal belongings upon entering the class room. They are not to remain on the desktop. A first violation will result in your being directed to leave the class room. A second violation will result in your expulsion from the course.

Please see the Student Handbook for the code of student behavior if you have any questions or see me personally

This course is designed to introduce the student to the field of engineering in a descriptive as well as an analytical manner.

We will present an introduction to the Engineering Profession by examining in a single case study:

The Design Process:
Data and Information Collection
Development of Alternative Designs
Selection of the Optimal Design
Build of the Qualification Model
Test and Evaluation

We will present the self-discipline required to meet the challenges of achieving success in the rigorous academics that are part of the Engineer's formal training.

We will research engineering schools across the country to determine:

Entrance Requirements

Class standing entrance requirements
High School GPA
SAT or equivalent preparation scores

Fees

Basic Tuition, Room and Board
Part Time Employment
Scholarships and Stipends

Curriculum

Course requirements
Required Preparation

We will look in detail at ethics and how the engineer is responsible and "duty bound" to maintain the highest standards.

We will look at the general applications of academic learning to various disciplines. Of great importance is recognition of the Graduate Record Exam and how it can influence the later periods of your career.

We will investigate the importance of obtaining a professional engineer's license and the process required to complete the registration.

This class just may be the turning point either way for you to decide what you "wanna be when you grow up". The reality is that very few engineers ever grow up. They simply continue to imagine and apply their ideas. You may have heard the anecdote of Alan Shepard, Commander of Apollo 14 carrying a golf club and two golf balls to the moon and teeing off on the lunar surface. Such was his playground and state of mind while being the 5th person to have set foot on another celestial body.



EGG 100
Introduction to Engineering
Term Paper Requirements

Objective

To have the student gain insight into the application of engineering, social and economic principles in a discipline of their choice to products that impact our present quality of life.

(1) Requirements:

To successfully complete the course, each student will be required to submit a term paper on one of the attached subjects that represent either success or failure of an Engineering Project. (Additional topics are permissible upon agreement with Instructor). The paper should be a minimum of 10 double spaced "Microsoft Word" pages. This does not include the standard title page format presented here. Font size must be 12 Helvetica, Arial or Times-no "fancy scripts." Photocopied and downloaded images with annotations supplementing the theme cannot be more than 15 % of the entire package. A photocopy requiring a full page is acceptable. A maximum of 3 such pages is allowed.

Use of the WEB is highly encouraged as a reference source. **However, all material drawn from it must be acknowledged as to its source. Use of footnoting to direct the reader to the reference source is required.**

One hardcopy of the paper must be submitted. Submission of softcopy backup on Disc/CD is permissible and encouraged.



(2) Grading

Grading will be as follows:

Technical content	50%
Grammar construction	50%

(3) Schedule:

Paper will be due on the last class day. **No late papers will be accepted.**

(4) Minimum content objectives:

Product Success topics:

- What was the motivation for the development of the product?
- Was new technology developed?
- Was new science discovered?
- What cardinal mistakes were made?
- Did “spin off technology” result as a by-product?
- Where is the product in its life cycle today?
- How did the product improve the quality of life for the user?

Product Failure Topics:

- What was the motivation for the development of the product?
- What basic engineering principles were not followed?
- Were the errors the result of cost driven decisions?
- Were the errors due to a lack of state of the art knowledge?
- Were the errors due to basic incompetence?
- What Codes and Regulations (if any) were violated?
- What did the profession learn from the failure?



Topics:

Mechanical Engineering-Product Success:

Development of the Automotive Air Bag
Development of the Da Vinci Surgical Robot
Development of the dry copy (“Xerox”) machine
Development of the DVD player/Recorder

Mechanical Engineering-Product Failure

Failure of the British DeHavilland **Comet** Jetliner design
Failure of the Space Shuttle **Challenger or Columbia**
Failure of the **Baggage System** at Denver International Airport
Failure of the Composite Fuel Tanks on the NASA **X33 Prototype**

Electrical/Electronic Engineering-Product Success

Development of the Microwave Oven
Development of the “Smart Phone”
Development of the Magnetic Credit Card Reader/Terminal
Development of the Intel Pentium Chip
Development of the Commercial GPS Navigation aids
Development of the Magnetic Resonance Imaging (MRI) machine

Electrical/Electronic Engineering-Product Failure

Failure of the Motorola “Iridium” Cellular Phone network
Failure of the Texas Instruments Personal Computer
Failure to mass market Battery Powered Automobiles
Failure to mass market Solar Powered Automobiles



Industrial Engineering-Product Success

Production of the Boeing 787 **Dreamliner**-what problems is it now facing?
Production of the C-6 (1997) Corvette-what has it evolved to?
Production of the Intel Pentium Processor
Production of the **NIKE** Footwear products

Industrial Engineering-Product Failure

Production of the Firestone “Wilderness” Tire
Production of the Ford “**Pinto**”-How were they able to continue selling it?
Production of the Convair 880/990 Jetliner-Largest corporate loss in history at the time!
Phase out of the Concorde Super Sonic Jet Liner-What caused its demise?

Computer Science-Product Success

Development of Windows and Macintosh Operating Systems
Development of the present Internet
Development of the Personal Computer
Development and Integration of Local Area Networks (LAN)
Evolution of the the CD
Development of the Social Networking Service-**Facebook**-How has it changed daily life World Wide
Development of the Ipad, Kindle, Galaxy etc....

Computer Science-Product Failure

Demise of the DOS Operating System
Relegation of Main Frame Systems to “Dinosaur” status



Civil Engineering-Product Success

Construction of the Verrazano Narrows Bridge
Construction of the Interstate Defense Highway System
Construction of the St. Louis, MO “Archway to the West”
Construction of the Tunnel under the English Channel (Chunnel)

Civil Engineering –Product Failure

Kansas City Hyatt-Regency Hotel balcony collapse (1981)
Collapse of the Tacoma Narrows Bridge (1940)
Chernobyl Nuclear Power Plant Disaster
Three Mile Island Nuclear Power Plant Emergency
Bophal, India Union Carbide Chemical Plant Disaster

Additional Areas: (Consult with Instructor for “success or failure” topics).

Chemical Engineering
Biological Engineering
Aerospace/Aeronautical Engineering
Systems Analysis and Integration

(Cover Page Format)

Introduction to Engineering
EGG 100
Fall Semester, 2013

Application of Industrial Engineering Methods
To the Production of the Boeing 777 Jetliner

John Henry
School of Engineering
Arapahoe Community College

Fall 2013