Hablemos acerca del Capstone Design

Universidad Industrial de Santander

Facultad de Fisicoquímicas

Programa de Ingeniería de Petróleos

Proceso ABET

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¿Qué sabemos?

Capstone Design

Criterion 3 (Student Outcomes)

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Criterion 5

(d) a culminating major engineering design experience that 1) incorporates appropriate engineering standards and multiple constraints, and 2) is based on the knowledge and skills acquired in earlier course work.

¿Qué sabemos?

Engineering Design – Engineering design is a process of devising a system, component, or process to meet desired needs and specifications within constraints. It is an iterative, creative, decision-making process in which the basic sciences, mathematics, and engineering sciences are applied to convert resources into solutions. Engineering design involves identifying opportunities, developing requirements, performing analysis and synthesis, generating multiple solutions, evaluating solutions against requirements, considering risks, and making trade- offs, for the purpose of obtaining a high-quality solution under the given circumstances. For illustrative purposes only, examples of possible constraints include accessibility, aesthetics, codes, constructability, cost, ergonomics, extensibility, functionality, interoperability, legal considerations, maintainability, manufacturability, marketability, policy, regulations, schedule, standards, sustainability, or usability.

Not all constraints need to be considered.

TEXAS A&M UNIVERSITY
Catalogs

Texas, USA
https://catalog.tamu.edu/search/?P=PETE%20402

PETE 402 Integrated Asset Development

Credits 3. 1 Lecture Hour. 6 Lab Hours.

Capstone design encompassing previously acquired skills; project teams formed to solve practical petroleum engineering problems using current tools; technical content of the projects may include any combination of drilling and completion, formation evaluation, inflow/outflow design and analysis, and application of reservoir engineering principles.

Prerequisites: Grade of C or better in PETE 355, PETE 401, PETE 404, and PETE 410.

Texas, USA
https://catalog.utexas.edu/undergraduate/engineering/degrees-and-programs/bs-petroleum-engineering/

PGE 373L PGE 373L. Geosystems Engineering Design and Analysis. 3 Hours.

Restricted to geosystems engineering and hydrogeology and petroleum engineering majors. Team-oriented design projects involving the application of geologic and engineering methods to the solution of subsurface problems, using field case histories. Projects are selected for each student based on his or her petroleum engineering technical area option. The equivalent of three lecture hours a week for one semester, with additional hours to be arranged. Offered on the letter-grade basis only. Prerequisite: The following with a grade of at least C- in each: Petroleum and Geosystems Engineering 323K, 323L, 362, and 358 or 368.

Uninorte
Barranquilla, Colombia
https://www.uninorte.edu.co/

INV7365 – Capstone Design

Capstone Design is a course where students must propose, design, develop, document and build a system or device in the area of Electronics Engineering; is a design course where students must use tools and skills acquired in previous courses so that they can solve a particular problem using an approach from the point of view of Electronics Engineering. The first part of the course is focused on the definition and planning of the project, while the second part involves the regular reporting of progress on the project.
Students must define their project, prepare a schedule and a budget. They must also apply the methodology of experimental design their own project, in order to objectively demonstrate the proper operation of their prototype.
At the same time, students should review the code of Ethics, understand it and apply it not only in the field of engineering, but in different activities of daily life.

3.000 Credit hours
3.000 Lecture hours
0.000 Lab hours

Type of Course: Required

Department:
Electrical and Electronics Engineering

Prerequisites:
IEN8430 – Inter. Comm. and Programming.
IEL4045 – Control Systems
IEN7123 – EE Design
IIN4317 – Comprehensive Exam II
IGL1080 – Language Requirement VIII

UIS
Facultad de Fisicoquímicas
Escuela de Metalúrgica
Bucaramanga, Colombia
https://www.uis.edu.co/

Tomaron una materia del 8vo semestre
Cada profesor coordina un curso de 15 estudiantes máximo porque los dividen en equipos de a 3; para un total de 5.
El curso dispone de 3 horas de acompañamiento docente
Plantean 4 entregas a lo largo de las 16 semanas

Recomendaciones:
Ampliar a 4 horas el curso porque debido a desconocimiento observado en los estudiantes acerca de como elaborar un proyecto, las primeras 4 semanas se consumen aterrizando a los estudiantes en:
1.¿Qué es un proyecto?
2.¿Que es un proyecto de diseño?
3.¿Qué es un proyecto de diseño de ingeniería?
4.Conceptualización
5. Modelamiento
6. Materiales
7. Proceso de Fabricación

En la reforma utilizarán Trabajo de Grado I para el espacio del capstone design y dejarán solo Trabajo de Grado II para los que decidan hacer tesis como opción de grado.

Feedback del consultor internacional acerca del Capstone Design:

- Es importante recordar que si la experiencia de capstone se realiza en grupo de estudiantes estos no deben superar los 4 estudiantes, dado que si se supera esta cifra es muy difícil comprobar que todos los estudiantes hayan realizado dicha experiencia.

•Para las evidencias del Capstone Design, se sugiere que sean 3 informes, donde deberán estar traducidos al inglés, estos informes no necesariamente deberán ser de calificaciones baja, media y alta, se sugiere que sean proyectos con buenas calificaciones. Al par evaluador se le deberá mostrar el informe calificado con los comentarios y notas realizadas por el profesor (Esto puede ser en español) y una versión del documento entregada por el estudiante traducida al inglés.

•Los estudiantes deberán presentar el informe en un lenguaje de gramática adecuado.

•Es importante que los informes que presenten los estudiantes tengan la estructura planteada, esto con el fin de que el evaluador cuando vaya a revisar la tabla de contenido pueda observar fácilmente si los estudiantes aplicaron estándares, requisitos de seguridad, restricciones, consideraciones de salud pública, consideraciones globales, consideraciones ambientales, entre otras que le apliquen al trabajo realizado según las definiciones de **Capstone Design**

Estructura

Typical Contents of the report:

- Title of the design project with name of the students involved.
- Table of Contents with page numbers
- Project Statement
- Multiple Solutions with emphasis
  - Multiple constraints such as economics (cost), space, time, regulations, legal, constructability, manufacturability
  - Codes and standards
  - Safety requirements
  - Public Health considerations
  - Global considerations
  - Environmental considerations
  - Cultural considerations
  - Welfare considerations
  - Social considerations
- Selection of final solution
- Building a prototype, if applicable
- Testing the prototype, if applicable
- Making changes to the design, if needed
- Conclusions and recommendations

Tabla checklist para corroborar que el informe cuenta con las características necesarias

CAPSTONE DESIGN FORMAT
Petroleum Engineering Program

Course name:
Group:
Professor:

Item	Description	Page
Name of the project		Front page
Description		
Previous knowledge and skills used		
Engineering Standards used		
Design constrains used		
System, component or process designed		
Desired needs and specifications met		
Iterative, creative, decision-making process		
Opportunities identified		
Analysis and synthesis performed		
Multiple solutions considered		
Evaluation of solutions against requirements		
Risks considered		
Trade-offs considered		
Solution		

Engineering Senior Capstone Design Presentations

Rhode Island University
College of Engineering

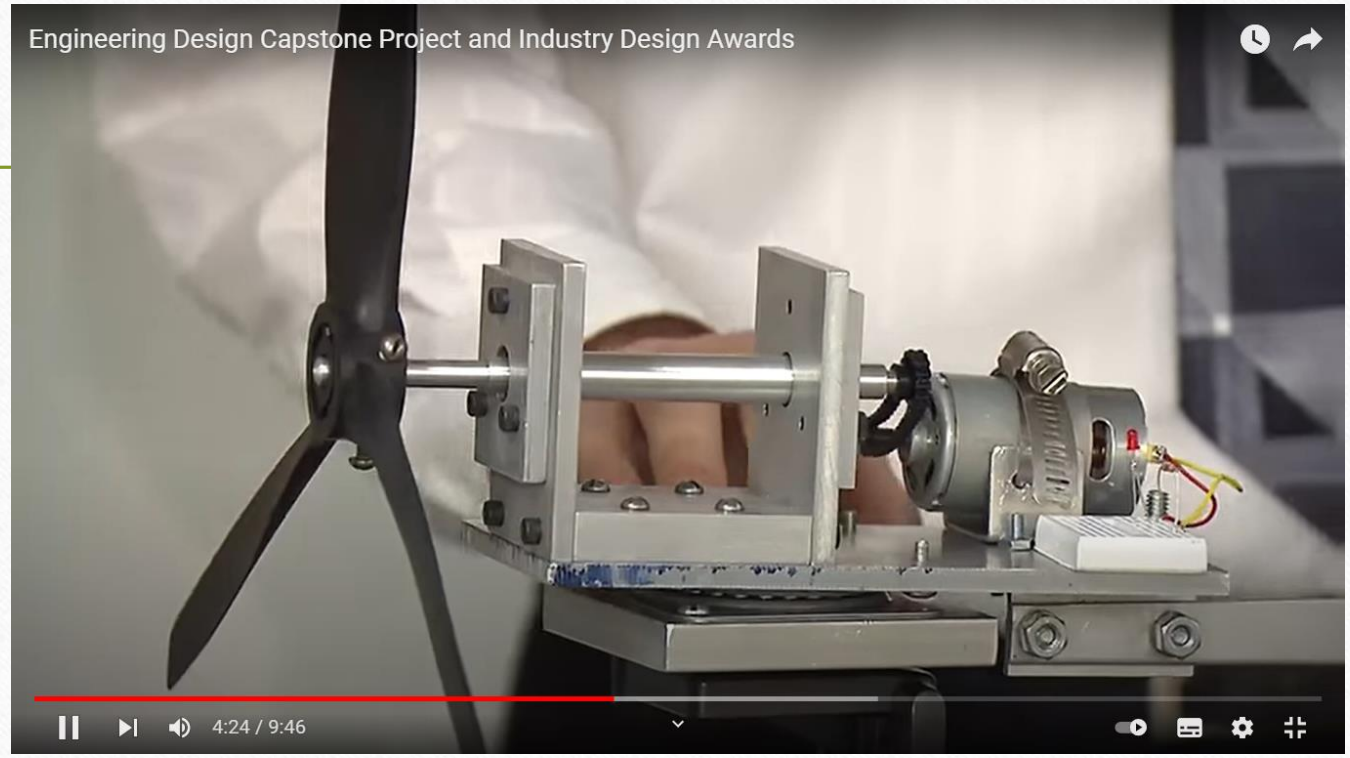
Remarks:
10 people per team
1 course coordinator

https://youtu.be/WjcDa2dQPro

Engineering Design Capstone Project and Industry Design Awards

Case Western Reserve University

Remarks:
5 people per team
5 industry –judges
12 weeks long



https://youtu.be/Q76Fl0nbSSU

COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

Remarks:

Teamwork

Exhibition

Innovation

Senior Design Exposition

https://youtu.be/aksEBTIg4SM

WATERLOO | ENGINEERING

EDUCATING THE ENGINEER OF THE FUTURE

https://youtu.be/-ETVSm__oVY