STARWEAVER

Introduction to Engineering Design

Instructors: Anna Delgove Alday **+1 more**

2,271 already enrolled

Included with coursera PLUS • Learn more

4 modules
Gain insight into a topic and learn the fundamentals.

4.9 ★
(10 reviews)

Beginner level
Recommended experience

6 hours to complete

Flexible schedule
Learn at your own pace

What you'll learn

- ✓ Analyze the fundamental principles and concepts that underpin engineering design and their application in problem-solving.
- ✓ Develop skills in using essential design tools and software for creating, analyzing, and refining engineering projects.
- ✓ Identify and apply various stages of the engineering design process, from conceptualization to implementation.
- ✓ Assess and enhance quality, functionality, and performance of design solutions through critical thinking and iterative improvement.

Skills you'll gain

Creativity | Analytical Skills | Engineering Design Process | Computer-Aided Design | Simulation and Simulation Software | Emerging Technologies | Sustainable Design | Engineering | Engineering Practices | User Feedback | Innovation | Prototyping | User Centered Design | Conceptual Design | Problem Solving | View less skills

Details to know

Shareable certificate
Add to your LinkedIn profile

Taught in English

Assessments
4 assignments

See how employees at top companies are mastering in-demand skills

PETROBRAS TATA DANONE
Capgemini P&G L'ORÉAL

In today's fast-paced technological environment, understanding the fundamentals of engineering design is crucial for aspiring engineers and professionals alike. This comprehensive course serves as a primer, introducing participants to key concepts and methodologies essential for designing innovative solutions to complex problems. It provides an overview of the engineering design process, emphasizing the integration of creativity and functionality in problem-solving.

Key skills covered in this course include creative problem-solving techniques specific to design engineering, utilization of computer-aided design (CAD) and simulation tools, project management strategies, and critical analysis for refining design concepts.

Participants should have a general interest in engineering and design, along with a basic understanding of mathematics and science to fully engage with the course materials and exercises.

The course spans 4.0 hours and caters to participants ranging from beginner to intermediate levels. It is suitable for engineering students, aspiring designers, technical project managers, product developers, and professionals with an interest in engineering and product design.

By the end of this course, participants will have gained a solid understanding of the foundational principles of engineering design and its pivotal role in problem-solving and innovation. Practical skills will be developed through hands-on exercises covering the entire design process, from conceptualization and analysis to prototyping and evaluation. Additionally, participants will learn to leverage modern engineering tools and software to enhance both the creative and technical aspects of their projects.

Read less

Foundations of Engineering Design

Module 1 • 1 hour to complete

Module details

Module 1 focuses on laying the foundations of engineering design, covering principles, practical applications, and key elements of the design process.

What's included

10 videos | 4 readings | 1 assignment | 2 discussion prompts

Hide info about module content

10 videos • Total 29 minutes

Introduction to the course and instructor • 2 minutes

Fundamentals of engineering design • 2 minutes

The engineering design process • 2 minutes

A historical overview of engineering design • 2 minutes

From theory to practice: Implementing design principles • 3 minutes

Collaborative design: Team dynamics and communication • 3 minutes

Design evaluation and feedback integration • 3 minutes

Role of innovation and people related issues within the process • 3 minutes

Optimization of the design taking into account all relevant factors • 2 minutes

Management of the total knowledge needed for the design task • 3 minutes

4 readings • Total 20 minutes

Welcome to the course • 5 minutes

Mastering the Art of Concept Generation • 5 minutes

Effective Communication Strategies for Collaborative Engineering Design • 5 minutes

Unleashing Innovation: Strategies for Optimizing Engineering Design • 5 minutes

1 assignment • Total 30 minutes

Foundations of Engineering Design • 30 minutes

2 discussion prompts • Total 10 minutes

Learning from Failure: Transforming Design Paradigms • 5 minutes

Engineering Through Time: Drawing from Historical Innovations • 5 minutes

Navigating the Design Process

Module 2 • 1 hour to complete

Module details

Module 2 focuses on navigating the design process, covering detailed exploration of design process steps, brainstorming and creative problem-solving techniques, and introduction to design constraints and considerations.

What's included

10 videos 3 readings 1 assignment 2 discussion prompts

Hide info about module content

10 videos • Total 40 minutes

Introduction to module 2 • 2 minutes

Initiating design and creative discovery • 4 minutes

Concept generation and early prototype generation • 3 minutes

Optimizing design and bringing it to market • 5 minutes

Fundamentals of brainstorming and creative thinking • 5 minutes

Techniques and tools for brainstorming • 3 minutes

Applying creative problem-solving in design • 5 minutes

Functional and performance constraints • 2 minutes

Economic and environmental constraints • 3 minutes

Social and cultural constraints • 3 minutes

3 readings • Total 15 minutes

Navigating the Journey: From Design Optimization to Successful Market Entry • 5 minutes

Unleash Creativity: Techniques and Tools for Effective Brainstorming • 5 minutes

Engineering Solutions: Balancing Economics and Environment • 5 minutes

1 assignment • Total 30 minutes

Navigating the Design Process • 30 minutes

2 discussion prompts • Total 10 minutes

Iterative Innovation: Prototyping's Role in Design Evolution • 5 minutes

Sustainability vs. Economics: Engineering Solutions for the Future • 5 minutes

Mastering Design Tools and Techniques

Module details

Module 3 • 1 hour to complete

Module 3 focuses on mastering design tools and techniques, covering CAD software, prototyping and simulation basics, and materials selection in design.

What's included

10 videos 3 readings 1 assignment 2 discussion prompts

Hide info about module content

10 videos • Total 35 minutes

Introduction to module 3 • 1 minute

Introduction to CAD software • 3 minutes

Exploring advanced CAD features and applications • 3 minutes

Complementary design tools and integration • 3 minutes

Introduction to prototyping • 3 minutes

Prototyping techniques • 4 minutes

Fundamentals of simulation • 4 minutes

Fundamentals of material properties • 3 minutes

Material selection criteria and considerations • 3 minutes

Real-life examples and application in design • 3 minutes

3 readings • Total 15 minutes

Design Revolution: The Integration of CAD and Complementary Tools • 5 minutes

Engineering Design Optimization: A Comprehensive Guide • 5 minutes

Materials Selection in Mechanical Design: From Theory to Practice • 5 minutes

1 assignment • Total 30 minutes

Mastering Design Tools and Techniques • 30 minutes

2 discussion prompts • Total 10 minutes

Prototyping Methodologies: Navigating Modern Challenges • 5 minutes

CAD Advancements: Fostering Collaboration and Innovation • 5 minutes

Applying Engineering Design and Embracing Future Trends

Module details

Module 4 • 1 hour to complete

Module 4 focuses on applying engineering design principles and embracing future trends, covering case studies across various industries, emerging technologies, and a conclusion on key learnings.

What's included

11 videos 3 readings 1 assignment 2 discussion prompts

Hide info about module content

11 videos • Total 33 minutes

Introduction to module 4 • 1 minute

Engineering design in consumer electronics • 4 minutes

Engineering Design in Automotive and Transportation • 2 minutes

Engineering design in aerospace and defense • 3 minutes

Advances in digital design technologies • 3 minutes

Sustainable and smart design innovations • 4 minutes

The future of AI and automation in design • 3 minutes

Synthesis of engineering design principles • 3 minutes

Reflecting on the design process • 3 minutes

Fostering a culture of continuous improvement • 2 minutes

Wrap-up & Key takeaways • 1 minute

3 readings • Total 15 minutes

The Art and Science of Engineering Design in Consumer Electronics • 5 minutes

Innovations in Sustainable and Smart Design: A Greener Future • 5 minutes

Engineering Design Process: From Concept to Creation • 5 minutes

1 assignment • Total 30 minutes

Applying Engineering Design and Embracing Future Trends • 30 minutes

2 discussion prompts • Total 10 minutes

Engineering for Sustainability: Lessons from Tesla and SpaceX • 5 minutes

Technological Convergence: AI, Automation, and Sustainable Design in Engineering • 5 minutes

Instructors

Anna Delgove Alday
Starweaver
5 Courses • 22,945 learners

View all 2 instructors

Offered by

Starweaver

Learn more

Explore more from Electrical Engineering

Recommended | Degrees

Preview

University of Leeds

ndamental Skills in Engineering Design

urse

Preview

Siemens

tro to Siemens NX: Engineering Essentials and Part Design

urse

Preview

University of Michigan

troduction to Socially Engaged Design

urse

Free Trial

University of California San Diego

ıman-Centered Design: an Introduction

urse

Show 8 more

Why people choose Coursera for their career

Felipe M.

Learner since 2018

"To be able to take courses at my own pace and rhythm has been an amazing experience. I can learn whenever it fits my schedule and mood."

★ 4.9 10 reviews

5 stars	90%
4 stars	10%
3 stars	0%
2 stars	0%
1 star	0%

VV

★ 5 · Reviewed on Apr 12, 2025

WELL EXPLAINED COURSE ON THE DESIGN CYCLE ENGINEERING AND ITS CHALLENGES WITH NEW TECHNOLGICAL TRENDS AND ENVIRONAMENTAL SUSTAINIBILITY MAINTAINING THE ESSENCE OF FUNCTIONALITY AND EFFICIENCY .

MR

★ 5 · Reviewed on Jan 4, 2025

Really very helpful informative it helps me to plant and start new business from material to production and market

View more reviews

Open new doors with Coursera Plus

Unlimited access to 10,000+ world-class courses, hands-on projects, and job-ready certificate programs - all included in your subscription

Learn more →

Advance your career with an online degree

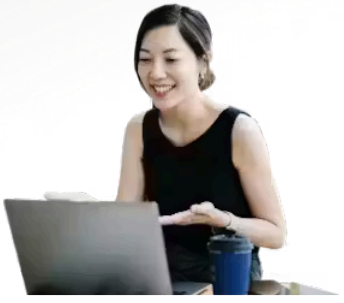
Earn a degree from world-class universities - 100% online

Explore degrees →

Join over 3,400 global companies that choose Coursera for Business

Upskill your employees to excel in the digital economy

Learn more →



Frequently asked questions

When will I have access to the lectures and assignments?

To access the course materials, assignments and to earn a Certificate, you will need to purchase the Certificate experience when you enroll in a course. You can try a Free Trial instead, or apply for Financial Aid. The course may offer 'Full Course, No Certificate' instead. This option lets you see all course materials, submit required assessments, and get a final grade. This also means that you will not be able to purchase a Certificate experience.

What will I get if I purchase the Certificate?

When you purchase a Certificate you get access to all course materials, including graded assignments. Upon completing the course, your electronic Certificate will be added to your Accomplishments page - from there, you can print your Certificate or add it to your LinkedIn profile.

Is financial aid available?

Yes. In select learning programs, you can apply for financial aid or a scholarship if you can't afford the enrollment fee. If fin aid or scholarship is available for your learning program selection, you'll find a link to apply on the description page.

More questions

Visit the learner help center

Financial aid available, learn more

Become a Partner

Social Impact

Free Courses

Share your Coursera learning story