

NFC ACADEMY



ENGINEERING & PRODUCT DEVELOPMENT COURSE OVERVIEW

Engineers address society's needs and problems by designing and producing products and services. The field is diverse and includes Christian professionals who design skyscrapers, design machinery, oversee public works, and develop software and systems.

The purpose of this course is to provide an overview of the concepts of product engineering and development from a Christ-centered perspective. Students will analyze the life cycle of a product to prepare it for distribution and target markets. The course begins with building an understanding of the product life cycle, from the initial idea to drafting requirements to using 3-D modeling tools and other design tools. The final unit focuses on assembling project plan pieces for a product and evaluating the plans for a successful product launch. In addition, the course will provide information about the different careers available to students interested in engineering, product development, and project management, as well as, organizations that provide encouragement to Christian engineers.

OBJECTIVES

- Understand the field of engineering design and product development, as well as economic and project management concepts.
- Recognize the complex variables that need to be planned and coordinated as part of the product development life cycle.

- Develop ideas for overcoming challenges and issues related to engineering and product development and identify different career paths related to engineering and project management.
- Analyze product development life cycle management and discuss the role of data and human resources.
- Identify best practices for project management in engineering and strategies for building successful projects that utilize communication and critical thinking skills required for addressing complex problems.
- Evaluate and critique multiple perspectives and multiple vested interests involved in engineering project management and product development.

For topics in this course, it is helpful for students to be familiar with general concepts about engineering, as well as the basics of accessing IT tools and resources for conducting research on web sites.

If students are not familiar with these topics, it is important for them to familiarize themselves with online resources for engineering and product development.

Engineering and Product Development Outline

Unit 1: Introduction to Engineering and Product Development

- Chapter 1: Engineering and Product Concepts
 - Introduction to Engineering
 - Fundamentals of Product Development
 - Identifying and Testing Product Concepts
- Project: Analyze Product Engineering
- Project: Product Development Process
- Chapter 2: Specifications, Design and Testing Products
 - Requirements in Engineering, Design and Developing a Prototype
 - Testing the Product
 - Deploying Products to Market
- Project: Write Engineering Requirements for Your Product
- Project: Software Deployment Plan

Unit 2: Project Charter and Requirements (PDLC Phases)

- Chapter 1: The Components of Project Charters
 - What is a Project Charter?
 - Writing Project Charters and Understanding Requirements

- Analyzing Project Charters
- Project: Write a Project Charter
- Project: Write a Charter for a Recycling Project
- Chapter 2: Establishing Requirements
 - What are Requirements?
 - Defining and Writing Requirements
 - Writing Product Requirements
- Project: Competing with the Best
- Project: Reverse Engineering

Unit 3: Design and 3-D Modeling

- Chapter 1: Exploring the Possibilities in Design
 - Design Engineering
 - Analyze Problems and Potential Solutions in Design Engineering
 - Analyze Design Plans
- Project: Student Engineer Needed: Houseplant Watering System
- Project: Design a Running Shoe
- Chapter 2: Becoming Familiar with Design Tools
 - Engineering Modeling Tools
 - Practice Using Engineering Modeling Tools
 - Evaluate Engineering Tools and Careers
- Project: Design a Part in 3-D
- Project: Evaluate 3-D Modeling Tools

Unit 4: Product Launch (Implementation)

- Chapter 1: Putting Implementation into Action
 - The Implementation Stage
 - Analyze an Implementation Plan
 - PLM, Implementation, and Industry Concepts
- Project: Write an Implementation Plan
- Project: Prepare a Presentation about Engineering Contests
- Chapter 2: Getting the Product Ready for the Market
 - Implementation Plan and Product Launch
 - Implementation Plan and Product Life Cycle
 - Marketing, Engineering, and Implementation
- Project: Timeline, Market, Budget

- Project: Reverse Engineer a Marketing Plan

Unit 5: Review Full Product Development Life Cycle

- Chapter 1: Putting Together the Pieces of the Plan
 - Reviewing the Product Development Life Cycle and Key Strategies
 - Assembling a Successful Project Plan
 - Planning, Structure, and Thinking Behind Project Plans
- Project: Write a Project Plan
- Project: Write Part of a Project Plan Chart
- Chapter 2: Perfecting Your Project Plan
 - Compare and Contrast Project Plans
 - Assembling Project Plans and Engineering for the Twenty-First Century
 - How to Evaluate Project Plans
- Project: Develop a 3-D Game Project Plan and Sample Game
- Project: Write a Project Brief and Evaluate It

GRADING INFORMATION

GRADING COMPONENTS

Lessons	35%
Quizzes	25%
Projects	10%
Tests	30%

GRADING SCALE

100-90	A
89-80	B
79-70	C
69-60	D
Below 60	F