

## ISYE-4801: PRODUCT DEVELOPMENT - DESIGN TO VALUE (DTV)

Fall 2026

Day/time/location is TBD

**CREDIT:** 1-0-1 (*1 hour lecture, 0 hour lab, 1 credit for curriculum*)  
**PREREQUISITE(S):** Junior standing or above  
**CLASS SIZE:** ~10-15 for 2-3 teams of ~5-6 students each (to be determined in class)

**INSTRUCTOR:** Guillermo Lopez Velarde  
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**OFFICE (off campus):** 1358 Collier Rd NW | Atlanta GA 30318  
**OFFICE HOURS:** By appointment (email / phone preferred)

**REFERENCE MTLs:** DTV Capability Building Training Kits and Documentation Materials.  
*Copyrighted materials, any copying and distribution without explicit consent from instructor is strictly prohibited. Hard copies of relevant materials, required as support for team project preparation, to be distributed during class*

### OBJECTIVE

The objective of this course is to introduce the Design-to-Value (DTV) approach and its main processes to the audience. **DTV is a methodology aimed at improving product portfolio margin contribution through design optimization**, and is **comprised of three main lenses: consumer, design and supply insights**. The focus of this class will be to internalize best in class practices across these three lenses, **through a combination of theory and hands on practice modules**. Two types of **real physical products will be used during the course, mini bike pumps** to support the training during class, **and vacuum cleaners** for a team project that will result in a mid-term and final presentations of the team analyses and recommendations.

Special emphasis will be placed on how well the team incorporates DTV best practices into the final solution and how well the team presents the findings throughout the course. In addition to learning the DTV methodology, this course should also improve other skills such as teamwork, presentation skills, both oral and written, critical thinking and problem solving.

### COURSE DESCRIPTION

- As stated above, this course will cover the Design-to-Value process which encompasses three lenses, consumer, design and supply insights. The main purpose of DTV is to optimize product margins while delivering a better product to the consumer. Each lens is comprised of specific tools that help create a multifunctional fact-base for proper design decision-making. For this class specifically, we will focus on the following tools:
  - **Consumer insights:** Feature and attribute benchmarking, performance tests and social media analysis (“Buzz” analytics) across the target and competitor products.
  - **Design insights:** focuses on conducting systemic competitive product teardowns to support design improvement idea generation and prioritization (based on impact and feasibility criteria), both from value add and cost savings perspectives.
  - **Supply insights:** The focus of this lens will be to support supplier price negotiations with the development and use of “cleansheet” should cost analysis. A cleansheet is a

bottom-up, fact-based cost estimate of the entire supply chain to produce a component or sub assembly under best-in-class assumptions.

- The course will use real products: (1) mini bike pumps to support concepts imparted during class and (2) a vacuum cleaners to be used for a team project to be covered in parallel to the class (products and tools will be provided by class/instructor)

## **GRADING**

The grades will be based on the quality of the final project presentation, analyses and results (50%), attendance (30%), and in-class participation and contribution (20%). The individual contribution assessment may result in grade differentiation within a team.

## **TOPICAL OUTLINE (TENTATIVE)**

Weeks 1-3: Introduction to DTV, case examples, introduction to bike pumps class exercise and team project. Week 3 no-class.

Weeks 4-6: Intro to consumer insights, feature benchmarking, performance tests, “buzz” analytics.

Weeks 7-10: Intro to design insights, competitive teardowns, ideation generation and prioritization. Week 8 no-class

Week 11: Mid-term presentation

Weeks 12-14: Intro to supply insights, cleansheet (should cost) analysis, and supplier negotiations.

Weeks 15-16 (TBD/TBC): Final team project presentations

## **COURSE OUTCOMES**

At the end of this course, the students will be able to:

- understand the nature of a multifunctional and practical product design and margin optimization problems.
- gather and synthesize relevant information across the 3 lenses (consumer, design and supply), to support product design and margin optimization recommendations and results.
- incorporate consumer and supply chain implications into design optimization.
- be professional, ethical while working efficient and effectively in teams.
- and communicate effectively within the team, with the instructor and with others involved both orally and in written report.

## **ISYE ABET STUDENT OUTCOMES A – I**

- a) an ability to apply knowledge of mathematics, science, and engineering
- b) an ability to design and conduct experiments, as well as to analyze and interpret data
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, manufacturability, and sustainability
- d) an ability to function on multidisciplinary teams
- e) an ability to identify, formulate, and solve engineering problems
- f) an understanding of professional and ethical responsibility
- g) an ability to communicate effectively
- h) the broad education necessary to understand the impact of engineering solutions
- i) a recognition of the need for, and an ability to engage in life-long learning

## TYPICAL CLASS SCHEDULE – (FALL 2026, TENTATIVE)

<u>Date</u>	<u>(Wk #)</u>	<u>Topic(s) Covered</u>
<b>DTV Introduction</b>		
Date TBD	(1)	Introduction to Design to Value
Date TBD	(2)	Real World Case Examples, Introduction to Bike Pumps Exercise, Team Project
Date TBD	(3)	Holiday, Labor Day, no class
<b>Consumer Insights</b>		
Date TBD	(4)	Consumer Insights Theory / Overview
Date TBD	(5)	BuzzAnalytics™ (Social Media Listening) Exercise
Date TBD	(6)	Feature Benchmarking & Performance Tests Exercise
<b>Design Insights</b>		
Date TBD	(7)	Design Insights Theory / Overview
Date TBD	(8)	Typically Fall break, no class
Date TBD	(9)	Teardown & Idea Generation Exercise
Date TBD	(10)	Idea Prioritization Exercise
Date TBD	(11)	Projects Progress Reviews (Covers Content Wks 1-10)
<b>Supply Insights</b>		
Date TBD	(12)	Cleansheet Theory / Overview
Date TBD	(13)	Cleansheet Structure and Modeling
Date TBD	(14)	Cleansheet Use in Supplier Negotiations
<b>Final Project Presentations</b>		
Date TBD	(15)	Final Presentations (TENTATIVE, TBD/TBC)
Date TBD	(16)	Final Presentations (TENTATIVE, TBD/TBC)