

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

Fall 2026

Mondays/9:30-10:20am/Georgia Tower Building 10th floor, Room 1002

CRN: 84632 **SECTION:** GLV
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 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>
DTV Introduction		
Aug 24, 2026	(1)	Introduction to Design to Value
Aug 31, 2026	(2)	Real World Case Examples, Introduction to Bike Pumps Exercise, Team Project
Sept 7, 2026	(3)	Holiday, Labor Day, no class
Consumer Insights		
Sept 14, 2026	(4)	Consumer Insights Theory / Overview
Sept 21, 2026	(5)	BuzzAnalytics TM (Social Media Listening) Exercise
Sept 28, 2026	(6)	Feature Benchmarking & Performance Tests Exercise
Design Insights		
Oct 5, 2026	(7)	Fall break, no class
Oct 12, 2026	(8)	Design Insights Theory / Overview
Oct 19, 2026	(9)	Teardown & Idea Generation Exercise
Oct 26, 2026	(10)	Idea Prioritization Exercise
Nov 2, 2026	(11)	Projects Progress Reviews (Covers Content Wks 1-10)
Supply Insights		
Nov 9, 2026	(12)	Cleansheet Theory / Overview
Nov 16, 2026	(13)	Cleansheet Structure and Modeling
Nov 23, 2026	(14)	Cleansheet Use in Supplier Negotiations
Final Project Presentations		
Nov 30, 2026	(15)	Final Presentations (TENTATIVE, TBD/TBC)
Dec 7, 2026	(16)	Final Presentations (TENTATIVE, TBD/TBC)

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.