ME310 Design Innovation

Global network of designers, engineers, and innovators challenging complex real world problems

École des Ponts ParisTech in partnership with **Stanford University**

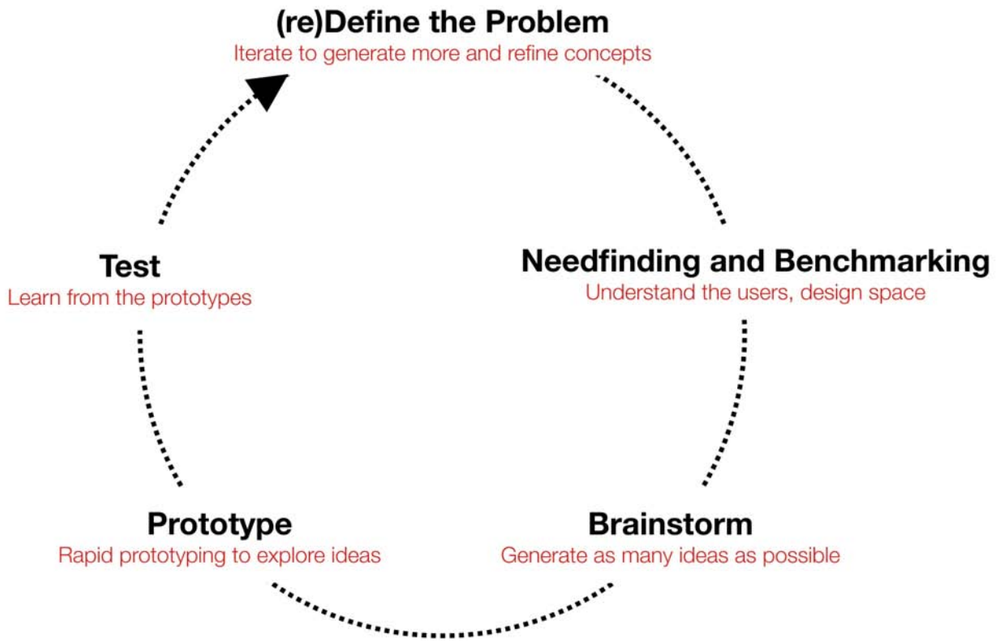
The ever evolving Design Innovation Course

ME310 is a year-long project-based design engineering course that began at Stanford University and has been operating continuously for over forty years. Originally created to provide engineering students with real engineering challenges, the course has evolved over the ages to meet the changing demands of the labor market. Over its lifetime, the course has shifted from practical engineering experience to design of mechatronic systems to design innovation and global collaboration. Meanwhile, ME310 has gone beyond the hedges of Stanford University and is now being taught in four different continents and eight different countries. The course is now focused on teaching students the innovation methods and processes required for designers, engineers, and project managers of the future.

In ME310, student teams work on innovation challenges proposed by corporate partners for eight months. Through the projects, students go through an intense and iterative process of need finding, ideation, and rapid prototyping to create and develop new concepts. Company involvement provides the reality that is important for teams to improve their innovation abilities. In the end, teams deliver functional proof-of-concept prototypes along with in-depth documentation that not only capture the essence of designs but the learnings that led to the ideas.

Furthermore, every team in ME310 collaborates with another team from a foreign university for the duration of the project. The partnership adds diversity to the project teams and students are given the opportunity to experience true global collaboration, a skill required in this highly globalized world. All teams in ME310 start their projects at Stanford University where they participate in a design thinking workshop and experience the entrepreneurial culture of Silicon Valley.

Students collaborate in the Stanford ME310 Design Loft.



ME310 approach to design innovation

Stanford Design Innovation Process

The core pedagogy of ME310 is the Stanford Design Innovation Process that has fueled much of the entrepreneurial culture in the Silicon Valley. At the heart of the process is the notion that in order to innovate, one must understand the needs of the user and the context surrounding the design. Unlike most other engineering design courses, ME310 requires the students to get out into the field and interview users to understand people's values as well as thoroughly benchmark existing products and technologies. By understanding the past and present, the students are able to design what the future can be.

The design process in ME310, unlike many other design and development processes, is cyclical. By going through the process multiple times, not only does it maximize student learning, it maximizes project learning for the student teams. The iterative nature assures that teams are not stuck on one idea for too long and that ideas are being continuously tested through rapid prototyping and testing. "Fail early and fail often so you can succeed faster," is one of the mantra for ME310.

Our **Approach**

Digital assistive device for executives

Improving the open-air driving experience

Personal Air-conditioning for the office

Next generation portable internet device

Project topics for innovation

Projects in ME310 have come from companies small and large in various industries including consumer electronics, automotive, telecommunications, healthcare, aeronautics, software, households products, transportation, government. Project topics are often broad enough so that students must not only solve but define the problem while delivering surprise and delight to the corporate partners. At the same time, projects should be well defined so that students are working within a realistic context, the best training ground for innovators of tomorrow. Example project topics from the past include:

- Digital assistive device for executives
- Improving the open-air driving experience
- Personal Air-conditioning for the office
- Next generation portable internet device
- New paradigms for automotive human-machine interaction
- Distributed ideation and design tools
- New products and services for mobil healthcare
- Atmospheric water generator

Our **Projects**

Our **Community**

Diversity drives innovation

Students in ME310 come from different backgrounds and disciplines including various forms of engineering, industrial design, business, and economics. The diversity assures that teams take multiple perspectives on any given challenge, increasing the probability of breakthrough discoveries and innovation. Many of the students are in their first or final year in the Master's program (or the equivalent) and some are working towards their doctoral degree. All students have core competencies in their respective fields and many have prior design project experience in academia or industry.

The instructors in ME310 are just as diverse as the students offering multiple points-of-view on engineering, design, and project management. All of them are passionate about letting the students design and innovate and will go beyond their professorial duty to assure that students are given the best possible environment to work in. Teaching assistants are also part of the teaching team, providing peer support and advice only possible by someone who has recently completed the course. The teaching team consists of over thirty professors, instructors, and teaching assistants who actively support the hundred or so students participating in ME310.

In addition to the teaching team, teams in ME310 are assigned industry coaches who are typically alumni of the course and working in a field related to the project topic. They provide a great resource to the student teams who can access a wealth of knowledge through the coaches and their social network. Coaches often meet with their teams once a week.

After the Global Paper Bike Competition at Stanford University.
Paper Bike is an intense two-week introductory design exercise in ME310.

Our **Place**

Innovation Environment

Every student team in ME310 is provided a dedicated space in the design loft at each of the schools. The design loft is the heart and soul of ME310 where the community comes together and collaborates. Most of the lofts are equipped with tools for rapid prototyping and global collaboration such as Polycom video conferencing systems. The dedicated space allows student teams to design their workspace in a way that suits their working style and transform it into a space they want to spend time in. The end result is a space dedicated to the culture of innovation.

Opposite: ME310 design loft at Stanford University
Top: Common space in the ME310 Garage in Aalto University
Bottom: Students brainstorm at École des Ponts ParisTech

Some of the past corporate partners in ME310

Why ME310 for **Students**

Experience the Stanford Design Innovation Process

Design thinking or the design innovation methodology pioneered by IDEO and engrained in the DNA of the Stanford design community is a hot topic in the business, product design, and applied research fields. The best way to learn the tools and processes is to experience it through a real world design innovation challenges.

Work with innovators around the world

Students may have friends from or traveled to different countries and cultures but ME310 is an opportunity for them to truly collaborate with both in person and across national boundaries. After ME310, students gain a sense of empathy for people with different backgrounds and viewpoints, not to mention friendships that last a lifetime.

Take a project from beginning to end

Unlike most project-based courses in universities, ME310 projects are proposed by real companies, many of them leaders in their industry, looking for innovative products and services. Projects topics are loosely defined, and students are required not only to come up with radically brilliant ideas, they must prove the concept through real functional prototypes. ME310 is one of the most memorable and intense experiences that students go through, and something they can be proud of for the rest of their lives.

Aalto University was established on January 1st, 2010 through the merger between Helsinki University of Technology, Helsinki School of Economics, and University of Art and Design Helsinki. Prior to Aalto University, ME310 was hosted at Helsinki University of Technology but students from all three schools participated regularly, making it one of the most diverse programs in ME310.

Founded by Hasso Plattner, cofounder or SAP, HPI is an academic research institution that gears its teaching and research activities to the real needs of the IT sector. Its goal is to establish IT-Systems Engineering as a scientific discipline and to bridge the communication and understanding gap between IT specialists, business managers, users and customers, and all potential involved stakeholders in a interdisciplinary, multicultural, and cross-industrial world.

Kyoto Institute of Technology, set in the ancient capital of Japan and founded in 1949, emphasizes the union of science and art and focuses on the application of new technologies. Students from the Design Science Department and the Deparment of Design Engineering and Management participate in ME310.

Located in the picturesque St. Gallen at the base of the Swiss Alps, University of St. Gallen is the leading business school in German-speaking Europe. It also has one the largest management faculties in Europe and offers interdisciplinary classes such as economics and law. Students from the Institute of Information Management participate in ME310.

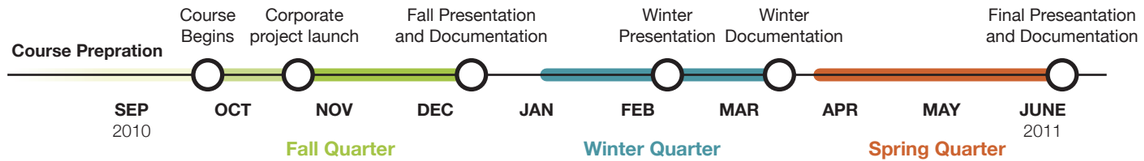
The Pontificia Universidad Javeriana is a private higher education institution and one of the older and most traditional Colombian universities, directed by the Society of Jesus. Students from different engineering disciplines at the sectional division in Cali participate in ME310.

Located between San Francisco and San Jose in the heart of Silicon Valley, Stanford University opened its doors in 1891 and is recognized as one of the world's leading research and learning institutions. Its alumni have founded companies such as Hewlett-Packard, Sun Microsystems, Nvidia, Yahoo!, Cisco Systems, Silicon Graphics and Google. ME310 began at Stanford University back in 1969 and have been training engineers,designers, and innovators ever since.

École des Ponts ParisTech is the leading French engineering school in civil engineering, urban planning, mechanical engineering, finance, and industrial engineering. Furthermore, qualified students from other ParisTech schools and universities from around the world are invited to participate. Over the last two years, students from Centrale Paris, Ecole des Mines de Nancy, EFREI, ESSEC, Polytechnique, Strate College Designers, Université Paris-Dauphine, Tokyo University, and Tokyo Institute of Technology have participated in the program. École des Ponts ParisTech will be partnering with the above six schools for the 2011-12 academic year.

Become part of the community

ME310 for the 2011-2012 academic year will begin in late September and finish in mid June. The corporate projects will begin in late October at Stanford University where all students will attend the ME310 kickoff workshop. Mid-project presentations will be held in mid-December and mid-February while intermediate documentations are due mid-December and mid-March.



ME310 is open to all graduate-level students with some project experience in the past. You do not have to be a student at École des Ponts ParisTech to participate in ME310. If you are interested, contact us (contact information on the next page) and let us know if your school is part of the ParisTech network or ERASMUS Programme.

Get involved in ME310 **2011-12**

Our new program in design thinking

ME310 at École des Ponts ParisTech is part of a new program in design thinking called d.thinking Ponts ParisTech. While there is no one exact definition, design thinking is the human-centered approach to create new value through the designer's sensibilities and methods. We believe that design thinking in the 21st century will match human needs with the incredible technological capabilities we developed in the 20th century.

In addition to ME310, 8 teams of around 60 students in engineering and design participate in our d.thinking Paris program Innovactors, which focuses on breakthrough innovation for sustainability. Design pedagogy includes future forecast and design fiction methodologies and tools. Students tackle abstract issues in sustainability to conceptualize and visualize new realistic worlds of the future.

Our goal is to develop d.thinking Ponts ParisTech to be the platform for design thinking activity, education, and training in Paris. In addition to ME310, we are currently running several shorter courses with different project topics and workshops around the world. We are just at the beginning of d.thinking Ponts ParisTech and always looking for more people to join us and take design thinking to another level. Interested? Join the movement!

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