

Northwestern University

Robert D. McCormick School of Engineering and Applied Science Syllabus 2015

COURSE: **MEM 417 Product Design For Engineers**

Please note that this is a syllabus and therefore a summary. It is advisable to check Blackboard often, where complete details will be posted.

TEXT: 1. Course Case Packet

TIME: Wednesday Evenings 6:30 - 9:30 pm June 22 Through Aug. 24th

LOCATION: Tentatively scheduled for Ford Design Center, ITW Classroom, 2133 Sheridan Rd.

OFFICE HOURS: Generally before or after each class, please email me if you need a specific meeting.

COURSE OVERVIEW:

This course is intended for those interested in learning how new products are created and the factors that influence their success and failure in the marketplace. The course will rely heavily on the best practices and execution of exploring both the market and technical white spaces in the process of Product Design & Development.

Class Structure:

Three hour class one day a week: (short break at each hour)

1. First hour - student presentations on readings with discussion of reading lessons.
2. Second hour - lecture on product development, and designing into the white space, topics and methodologies.
3. Third hour - lecture and or project work in research and NPD based design practices

Some Other Norms:

- o The Northwestern Academic Code of Conduct will apply to all class work.
- o Laptop use for class purposes only.
- o No cell phones, music players, PDA's or other devices used during class.
- o Please have a nameplate and sit in the same place so I can get to know you

Individual and Team Support:

Typically before and after class, also I will try to make myself available for phone conferences/Skype during the week to support the teams as needed, and of course you can email me at any time.

Student Work Expectations:

Each week every student is expected to do the course pack readings. On the Sunday prior to the upcoming Wednesday class each student is expected to submit a 1-Page (total of all readings) report in one .pdf document to Canvas. The format of the 1-Page is an application or reflection of the lesson from the reading based on your experiences.

Reading Presentations:

Instead of relying on one textbook or reading several books, I have researched numerous articles and identified the ones that convey the lessons in the most succinct, interesting and efficient format. Each week selected students will prepare and present a 10 minute PowerPoint on the reading as a basis for class discussion of the readings. I will send out a presentation schedule prior to the first class with your assigned presentation days. Please note that we will have I see this as an opportunity to allow each student to develop your individual critical thinking, analysis, organization and presentation skills. I consider presenting too the class a privilege, and I expect that each student be well prepared. **The best presentations are not simple summaries of the readings, but they take the lesson of the reading and apply that lesson to a business experience that further expounds on the lesson. Past presentations have been valuable contributions to the classroom experience for all of us.**

Individual and Team Patent Searching Experience:

An important component of New Product Design and Development is being able to conduct a Patent search, as well as other technical research, we will utilize the Thomson Innovation Patent database (provided for free) to learn and explore the IP searching best practices.

Team Experience:

During class 2 we will organize teams that will work together on the Thomson Innovation Patent Searching and Final Paper.

Mid-Term Paper: Submitted individually

Whenever possible we will use current projects that you are working on at work or in other courses for your Project deliverable. The expectation for your individual mid-term and final team project will be posted on Blackboard

Final Project Deliverable: Team submission and presentation

My goal is to enlighten you on the New Product Design and Development process of creating value and translating that value to competitive advantage. We will use actual current projects that you are working on for your final project deliverable.

GRADING:

		Points
Individual Class Contribution & Attendance	25%	
Attendance, my expectation is 0 unexcused absences	10%	100
Class participation, my expectation is everyone contributes each class	15%	150
Weekly Presentations	25%	
Individual Weekly Reading 1-Pagers submitted on time	15%	150
Individual Reading Presentation	10%	100
Individual Mid-Term Project	25%	
Individual market and technical "white space identification" paper	25%	250
Final Projects	25%	
Team white space analysis, user requirements, product specifications and product design project	25%	250
	Total Points	1,000

Grading always has an element of subjectivity, and even more so, in a class where there may be several suitable deliverables. But to the greatest degree possible, it will be made analytical. Your final grade will be a weighted average based on the percent

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Date	Theme	Class Course Pack Pre-Reading	
Class 1 6/24/2015	History and Practice of NPD	1.1 1.2 1.3 1.4	The Eureka Myth, (4p) The Knowledge Funnel How Discovery Takes Shape, (35p) The Interplay between Technology Push and Design Driven Innovation (44p) The Evolution of the Design Inspired Enterprise (5p)
Class 2 7/1/2015	Intellectual Property NPD Practices and Issues	2.1 2.2 2.3 2.4	Innovation and Invention – A Patent Guide for Inventors and Managers, (37p) International Enforcement of US Patents, (8p) The Value of a Patent to the Entrepreneur, (12p) Cellular Telecommunications: IP & Technical Standards (23p)
Class 3 7/8/2015	Design Based NPD Opportunity in the White Spaces	3.1 3.2 3.3 3.4	The White Space and Business Model Innovation (23p) Customer Discovery and Validation for Entrepreneurs (20) Giving Customers a Fair Hearing (9p) The Power of the Branded Differentiator (7p)
Class 4 7/15/2015	Design-NPD Projects	4.1 4.2 4.3 4.4	Idea Generation Innovations Starting Point (50p) Function over Form Using Nature's Rules to Fulfill Customers Functional Needs (34p) Design Thinking And Innovation at Apple (13p) Discovery Driven Planning (13p)
Class 5 7/22/2015	Engineering-NPD Projects	5.1 5.2 5.3 5.4 5.5	Discovering New Points of Differentiation (9p) Innovation Processes (29p) Control Tomorrow's Costs Through Today's Designs, (10p) Planning For Product Platforms, (15p) Open Innovation and the Stage Gate Process (27p)
Mid-Term TBD	Individual Exercise NPD White Space Research	Sect. 1 Sect. 2 Sect. 3 Sect. 4	Identify and define a user need based market white space, 25 points Define the project requirements and specifications, 25 points Search of the Technical Landscape, 100 points Map the Technical Landscape, 100 points
Class 6 7/28/2015	NPD Stakeholders Needs - Requirements	6.1 6.2 6.3 6.4	Balancing Act How to Capture Knowledge Without Killing It (5p) Agile Product Development (24p) Reducing the Risks of New Product Development (9p) A Practical Guide to Conjoint Analysis, (9p)
Class 7 8/5/2015	Development Specifications, Validation and Compliance	7.1 7.2 7.3 7.4	Specifications Do We really Understand What They Mean (7p) Quality in the Development Process (27p) Nobody Ever Gets Credit for Fixing Problems that Never Happened (26p) Avoid Hazardous Design Flaws (4p)
Class 8 8/12/2015	Lean NPD and Quality Execution	8.1 8.2 8.3 8.4	R&R Case (18p) Manufacturing by Design (10p) Creating Lean Suppliers (35p) How Open Innovation Can Help You Cope in Lean Times (11p)
Class 9 8/19/2015	NPD Leadership Based Sustainability	9.1 9.2 9.3 9.4	What Do We Mean by "Strategy for Sustainability" (22p) Sustainable Product Platforms (40p) Creating Competitive Advantage (21p) Cradle-to-Cradle Design at Herman Miller(21p)
Final 8/24/2015 Submit Paper	Team Deliverable NPD White Space Paper	Sect. 1 Sect. 2 Sect. 3 Sect. 4 Sect. 5	Team define a user need based market white space, 25 points Team detailed project requirements and specifications, 25 points Team detailed IP Search of the Technical Landscape, 50 points Team detailed Map the Technical Landscape, 50 points Team robust White Space design for the Project, 100 points

As all the projects are different, and this is the first time we will be running the class with these deliverables, we will have to allow for some common sense and adjustments. I will be working closely with each team to insure that if you are committed