



We Want Great Things for You

## MASTER OF SCIENCE IN PRODUCT DEVELOPMENT

**Program Director:** David S. Cameron

**Office:** E 225

McNichols Campus

**Telephone:** (313) 993-3378

**Fax:** (313) 993-1955

**E-mail:** [camerods@udmercy.edu](mailto:camerods@udmercy.edu)

**Website:** <http://eng-sci.udmercy.edu/mpd/index.html>

### Master of Science in Product Development

The Master of Science in Product Development (MPD) program at the University of Detroit Mercy (UDM) is a joint program of the College of Business Administration and the College of Engineering and Science at University of Detroit Mercy. It was developed in cooperation with Massachusetts Institute of Technology (MIT) and six major U.S. corporations with support from National Science Foundation. The program targets experienced engineers that will lead their engineering/manufacturing enterprise (product development, manufacturing, quality and supply management among others) into the 21st century.

Throughout the program industry leaders are invited as guest lectures to provide the students real live experiences and some of the courses are also taught by industry leaders – bringing industry expertise to the classroom.

The program is beneficial for all engineering personnel - product development, manufacturing, quality and supply management among others.

The MPD program objectives are:

- “Lean” and Structured **systems thinking/engineering with customer focus** and **total enterprise perspective**.
- In-depth understanding and application of current and advanced tools and techniques for design, analysis and management in product development and manufacturing – a rich blend of technical and business courses.
- Fostering Innovation and Creativity.
- Culture for Team Work.
- Learning from both the academicians and the industry leaders.
- Transformation of customer/market requirements into competitive product portfolios and product functions and features.

The MPD Program is designed and delivered to have systemic impact on product development and manufacturing capabilities.

The UDM Product Development Program leads to a Master of Science degree in engineering and management for professional engineers who seek to lead their organization’s product development, manufacturing, quality and supply management among others. The UDM Product Development Program will educate a new class of technologically grounded leaders: individuals with a special blend of engineering and management skills required to conceive and create today’s increasingly complex products and manufacturing systems -- it covers "end-to-end" product development process from customers needs identification to product design, development, manufacturing, marketing, quality, purchasing and customer support with emphasis on "systems" and customer focus through out.

The program features both technical content and intense classroom interactions with an array of seminars and case studies conducted in conjunction with industry. The curriculum is challenging and rigorous: it is intended for students who will **lead in** engineering/manufacturing activities not for those who will **leave** engineering/manufacturing activities.

### Admission Requirements (U.S. Citizens)

The dean of the College of Engineering and Science, upon recommendation of the program director, approves admission to the program. To be admitted, the applicant must:

- Submit evidence of all undergraduate work and preferably a Bachelor of Engineering from an accredited institution. Applicants with a degree in sciences, such as math, physics, chemistry, or computer science are welcome to apply.
- Have preferably a 3.00 grade point average. Applicants with less than a 3.0 may also apply.
- Have at least 5 years of post-baccalaureate industrial engineering experience, three years if the applicant possesses a Master’s or Doctorate Degree.
- Submit one letter of recommendation.
- Submit a resume, listing all training and workshops attended.
- Submit a statement of objectives for applying to the MPD program.

Prospective students are encouraged to submit their application as early as possible. Applications are reviewed on a "rolling admission process" on the 15th of each month, starting on September 2007 for the cohort starting January 2008. Once the maximum sized cohort for the January 2008 has been attained, students will be admitted for the next cohort, which will begin in January 2009.

## Degree Requirements

The 45-credit hour Master of Science in Product Development (MPD) curriculum involves 13 three-credit courses and a six credit capstone project/thesis. The UDM MPD program is a two calendar year (six semesters) experience beginning with an intensive full-time two week launch experience. Students must complete the program's courses in a defined sequence with the other members of their class. The remainder of the program requires two courses per semester and a required capstone thesis. To develop the competencies, students complete the following five program components:

1. A two week full-time launch experience during January is the student's first program activity. It introduces students to the systems concepts through their application to a real design project and other experiences specifically directed toward the development of team building and creativity skills. Completion of this initial experience in its entirety is a requirement of the program.

Students' supervisors are strongly encouraged to attend the orientation day of the program, and to work closely with the students throughout the program. This allows them to appreciate the value of this investment, to better integrate the students' learning with ongoing work assignments, and to work with the students to choose their projects and capstone applications which benefit both the student and the company.

2. Three required core courses explore systems thinking, philosophy and strategies related to product design, analysis, manufacturing, and management.

MPD 5050 Systems Architecture  
 MPD 5100 Systems Engineering  
 MPD 5200 Systems & Project Management

3. Six required courses develop a broad fundamental knowledge of concepts, methods and tools related to product and manufacturing systems, organizations, marketing and finance.

MPD 5250 Engineering Risk-Benefit Analysis  
 MPD 5300 Systems Optimization  
 MPD 5350 Organizational Processes  
 MPD 5400 Finance & Managerial Accounting  
 MPD 5450 Marketing Management  
 MPD 5500 Operations Management

4. Students choose four electives to broaden their understanding of areas of special interest and utility to them and their companies.

Choose 1 Engineering Elective:

MPD 5550 Robust Design  
 MPD 5760 Mechatronics System Design

Choose 1 Management Elective:

MPD 5800 Entrepreneurship & E-Commerce  
 BTM 5000 Business Turnaround Management

Choose 2 Product Development Electives:

MPD 5600 Product Planning & Development  
 MPD 5750 Design for 'X' (DFX)

The above electives were selected based on the degree to which courses meet the objectives of the curriculum for the UDM Product Development Program. The electives are changed as needed to better reflect the competitive industrial environmental.

5. All students complete a capstone project describing a real initiative in one or more core aspects of engineering enterprise. This provides an integrative experience whereby students can both confirm and increase their understanding of previous program knowledge and demonstrate their ability to apply their knowledge, skills, attitudes and behaviors essential to competent leadership in an engineering enterprise.

In order to amplify the complex issues of systems design and assure student understanding of the application of theory and practice, all of the courses involve use of hands-on case studies and/or projects.

Guest lecturers from the industry are regularly invited to the class to provide the students with the practical dimension of challenges and opportunities. Some of the courses are also co-taught by industry leaders. A partial list of recent guest lecturers and those being scheduled along with the industry leaders teaching the class follows.

### *Ford Motor Company*

Jim Padilla	President and COO
Joseph Hinrichs	Vice President, North American Manufacturing, Ford Motor
Phil Martens	Group Vice President, Product Creation
Gerhard Schmidt	Vice President, Research & Advanced Engineering
Marty Mulloy	Vice President, Labor Relations
Anne Stevens	Vice President, Americas
Shamel Rushwin	Vice President, Manufacturing Operations
Chris Theodore	Vice President, Advanced Product Creation

***DaimlerChrysler***

Frank Klegon	Vice President, Product Development
--------------	-------------------------------------

***Nissan – USA***

Bob Sump	Vice President, Component Engineering
----------	---------------------------------------

***Magna International***

Mark Hogan	President
------------	-----------

***Visteon***

Jim Orchard	President, North America
John Maples	Vice President, Quality & Supply Chain

***TARDEC***

Richard McClelland	President, North America
John Maples	Director: Research, Development & Engg Center

***Walbridge Aldinger***

Rick Haller	President & COO
-------------	-----------------

***Delphi***

David Nelson	Vice President, Global Supply Management
--------------	------------------------------------------

***Lear Corporation***

Len Tedesco	Vice President, Electronics – Engineering
-------------	-------------------------------------------

***Tower Automotive***

Kathleen Ligocki	President & CEO
------------------	-----------------

***Faurecia-US***

Jim Orchard	President
-------------	-----------

***Deloitte Consulting***

Mark Davis	Partner
Leon Darga	Partner

***College of Creative Studies***

Imre Molnar	Dean of the College
-------------	---------------------

***American Axle & Manufacturing***

Yogendra Rahangdale	President & COO
---------------------	-----------------

***Arvin Meritor***

Tom Watson	Vice President, Research & Technical Planning, ArvinMeritor
------------	-------------------------------------------------------------

**Scheduled/Being Scheduled Guest Speakers...**

George W. Dettloff	President & CEO, SKF USA
Hideki Isetani	Executive Director, Global Engineering Processes, General Motors
Terence Adderley	Chairman & CEO, Kelly Services, Inc. (October 11, 2007)
Lyle Otremba	Vice President, Sales and Engineering, Body & Chassis, Cooper-Standard Automotive
Bill Ford	Executive Chairman, Ford Motor Company
L. Brooks Patterson	Oakland County Executive
Alan Mulally	President & CEO, Ford Motor Company
Derrick Kuzak	Group Vice President, Global Product Development, Ford Motor Company
Phil Martens	President Light Vehicle Systems, ArvinMeritor
Bob Sump	Vice President, Component Engineering, Nissan-USA

**Overall Program Schedule****First Year - 2008**

January	Winter Term	Summer Term	Fall Term
MPD 535	MPD 560	MPD 505	MPD 540
Launch Experience	MPD 545	MPD 520	MPD 510

**Second Year - 2009**

January	Winter Term	Summer Term	Fall Term
MPD 599	MPD 555	MPD 525	MPD 530
	MPD 550	MPD 576	MPD 580
			Capstone Thesis Presentation

All classes meet for 3 hours per week. For the convenience of students, classes are offered in the late afternoon-early evening time period (Mondays and Wednesdays: 4:00 to 7:00pm). Students must receive release time during the two-week *launch experience*.

All course material is posted on a website by individual instructors.

**For further information, please write, call or e-mail:**

David S. Cameron, Program Director  
University of Detroit Mercy  
Detroit, MI 48221-3038  
camerods@udmercy.edu  
(313) 993-3378

or

Theresa Carson  
Graduate Admissions Counselor  
carsonta@udmercy.edu  
(313) 993-3309

**International Students:** contact Steven Coddington at  
[coddinism@udmercy.edu](mailto:coddinism@udmercy.edu) or (313) 993-3310

## Courses Descriptions

**BTM 5000 Business Turnaround Management 3 cr.**  
(also offered as MBA 564). This is a gateway course that introduces the concepts, theories, models, strategies and cases relevant to business turnaround and transformation management; and offers an overview of strategies such as cash flow management, downsizing, outsourcing, mergers, acquisitions, liquidation and Chapter 7 and 11 Bankruptcy Law provisions, marketing/finance interface, sustainable competitive advantage and corporate strategic alliances.

**MPD 5050 Systems Architecture 3 cr.**  
Provides an understanding (supported by theory and case studies) of the principles of system architecture such that participants learn some of the basic tools required to: (1) structure and learn all the early, conceptual phases of the system development process; (2) support an ongoing system development project through its system engineering and design phase; and (3) think independently and holistically about product architecture. Topics include: what is SA; overview of the architecting process; architecting heuristics and principles; builder-architected systems; manufacturing systems models and modeling.

**MPD 5100 Systems Engineering 3 cr.**  
Provides an understanding of key elements of Systems Engineering. Within this framework, elements of Systems Engineering enablers, requirements analysis, top level architecture development, robust design, trade-off study techniques, embedded real-time software design, and product-process modeling are addressed. Particular emphasis is placed on the criticality and correctness of requirements and the effects that requirements have on the product development process. Industry participation provides an understanding of current real-world experiences that highlight problems and solutions related to large-scale, complex system.

**MPD 5200 Systems & Project Management 3 cr.**  
Provides understanding of up-to-date project management methods, tools and actual practice in order to effectively plan, organize, and control product development projects. The course design is based on: (a) experiential learning as the course is organized around learning by doing; (b) the learning process is focused and facilitated by projects of interest to the automotive domain; (c) teamwork and creative thinking is practiced during the course; (d) connections with Systems Engineering and Systems Architecture are demonstrated and maintained.

**MPD 5250 Engineering Risk-Benefit Analysis 3 cr.**  
Provides an understanding of three methodologies: cost-benefit analysis (CBA); reliability and probabilistic risk assessment (RPRA); and decision making in various areas. The course presents and interprets a framework for balancing risks and benefits to applicable situations.

**MPD 5300 Systems Organization 3 cr.**  
Application-oriented introduction to optimization and simulation focuses on understanding system trade-offs. Introduces modeling methodology (linear, integer and nonlinear programming, genetic algorithms), modeling tools (sensitivity and post-optimality analysis), software applications in production planning and scheduling, inventory planning, distribution systems planning, facility sizing and capacity expansions, and product development.

**MPD 5350 Organizational Processes 3 cr.**  
Provides an understanding of the analytic framework and tools needed to analyze, manage, and lead the organization of the future. Features expected to characterize the emerging "new" organizational forms are examined and contrasted with the traditional predecessors with the pros and cons of each. Course focuses on the levels of skills participants will need for the "new organization". Through cases, exercises, readings, teamwork, discussions, and papers, the course allows students to integrate conceptual material with his/her own experiences, beliefs, and actions.

**MPD 5400 Finance & Managerial Accounting 3 cr.**  
This course enables the participants to translate financial statements into meaningful information for use in business decision making. Participants gain an understanding of the company's financial condition and performance and build confidence in analyzing financial reports. They examine the firm's health, strengths, and weaknesses, considering both recent performance and future prospects. Financial concepts and practices are used to explore the acquisition and management of new resources.

**MPD 5450 Marketing Management 3 cr.**

The overall objective is to facilitate student's familiarity with markets and their players. This course focuses on how managers in all functional areas address marketing mix problems in the context of a company's corporate strategy. Specific objectives include: develop an ability to analyze consumer behavior, internal constraints, and environmental influences that affect the marketing function; understand the aspects of the marketing mix; understand how brand managers and other marketing professional develop marketing plans, and to practice these skills.

**MPD 5500 Operations Management 3 cr.**

Provides an understanding of concepts for design, planning and control of manufacturing and service operations. Provides basic definitions of operations management terms, tools and techniques for analyzing operations, and strategic context for making operational decisions. The material is presented in four modules: (a) operations analysis, (b) coordination and planning (c) logistics and supply chain management, and (d) operations strategy. Also explored are such issues as product development, technology and re-engineering.

**MPD 5550 Robust Design 3 cr.**

The course enables participants to develop products/processes that produce consistent, high-level performance despite being subjected to a wide range of changing environmental, customer and manufacturing conditions. The course is based on the orthogonal array technique for designing experiments to develop robust systems. Numerous case studies are presented.

**MPD 5600 Product Planning & Development 3 cr.**

Provides an understanding of structured methodologies and effective tools that support product development practice. Emphasis is placed on the activities related to the concept development phase of the product development process. Topics include development processes and organizations, identifying customer needs, establishing product specifications, concept generation, concept selections, and concepts testing.

**MPD 5750 Design for 'X' (DFX) 3 cr.**

Provides a fundamental understanding of and ability to effectively consider design implications of Design for X, where X will be many different topics related to product design and development, such as assembly, manufacturability, durability, serviceability, recyclability, damageability, health and safety, ergonomics, quality/robustness, FEA, cast and molded parts and additional topics. Case studies from industry are discussed throughout.

**MPD 5760 Mechatronics System Design 3 cr.**

Mechatronics is the synergistic combination of precision mechanical engineering, electronic control, and intelligent software in a systems framework, used in the design of products and manufacturing processes. Design of modern day

products involves the familiarity of different engineering disciplines and an ability to work in multi-disciplinary teams. In this course, mechatronic principles will be introduced to the students through both theory and hands-on exercises where students will be required to work in multi-disciplinary teams. Topics will include principles, components, and design of mechatronic systems, including modeling and simulation, sensors, actuators, control strategies, and instrumentation. The course will culminate in a mini-capstone design project where the students will work in teams to design, build and test a mechatronic system.

**MPD 5800 Entrepreneurship & E-Commerce 3 cr.**

Study the concept, theory, process, and strategies of intrapreneurship, particularly as evidence in some of the most efficient and innovatively organized start-ups, small, medium and large businesses of the world. Gain an understanding of the dynamics of the new world of e-business by studying the concepts, techniques, strategies and results of E-Business applications in most successful Net Companies. Assess entrepreneurship and intrapreneurship as witnessed in the auto industry; explore new innovation possibilities; and assess the ethics of entrepreneurship, intrapreneurship and E-Business.

**MPD 5990 Capstone/Thesis Research Project 3 cr.**

(Prerequisite: CSC 534). Database system architecture, the relational model, database design, transaction management, security, optimization, missing information, type inheritance, distributed database, decision support, temporal database, logic-based databases, object database, object relational database, projects.



UNIVERSITY OF DETROIT MERCY  
Master of Science of Product Development  
**Supplemental Application**  
Fax Number: (313) 993-3326

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Company Name: \_\_\_\_\_ Telephone: \_\_\_\_\_ E-Mail: \_\_\_\_\_

**Name of Supervisor/Manager:** \_\_\_\_\_

Providing Recommendation Letter:

Telephone: \_\_\_\_\_ E-Mail: \_\_\_\_\_

## BACKGROUND

### 1. EDUCATION:

B.S. - Major: \_\_\_\_\_ GPA: \_\_\_\_\_

M.S. - Major: \_\_\_\_\_ GPA: \_\_\_\_\_

Ph.D.- Major: \_\_\_\_\_ GPA: \_\_\_\_\_

### 2. EMPLOYMENT:

The MPD Program requires a detailed employment background including job titles and responsibilities.  
Please enclose your resume in additional to completing this section.

<u>Company</u>	<u>Title</u>	<u>Dates</u>
----------------	--------------	--------------

### 3. LEADERSHIP:

List in order of significance, leadership activities in which you have been involved.

<u>Organization</u>	<u>Title &amp; Responsibilities</u>	<u>Dates</u>
---------------------	-------------------------------------	--------------



## **Statement of Objective**

**(Please keep to one page)**

Why do you wish to join the Master of Science – Product Development Program? How does this fit with your future plans?

**Please return to:**

UDM Admissions  
4001 W. McNichols Road  
Detroit, Michigan 48221

**Fax Number: (313) 993-3326**



## Supervisor's Recommendation – UDM/MPD Applicant:

---

State your relationship to the applicant and how long you have known him/her.

Describe the general qualities of the candidate, and why you think they are a good match to the MPD Program. (What sets the person apart from others?)

How do you assess the candidate's leadership skills? If possible, describe a leadership situation that you have witnessed the applicant in.

Where do you see this applicant of five or ten years relative to your organization?

### **Organizational Commitment:**

Recommending an applicant for the MPD Program acknowledges and organizational commitment to the program. The MPD Program is rigorous and requires a higher level of involvement by the student's employer than most traditional master's programs. The following support from the student's organization is anticipated:

1. Accommodate, where possible, the study and learning demands of this rigorous program. The program is designed around cohorts of students pursuing the program in sequence through its completion.
2. Each student will work on class and capstone projects that are closely coupled to product development. Where possible, these should be tied to challenges facing the product development activities of the student's organization.
3. Ideally, student's roles and responsibilities at work will complement and capitalize on the product development competencies that are outcomes of the MPD Program.

The student's management is best prepared to provide support to this educational process by participating in a program orientation and on-going professional development activities.

---

Signature \_\_\_\_\_ Date \_\_\_\_\_

---

Print Name \_\_\_\_\_

---

Company \_\_\_\_\_ Division \_\_\_\_\_ Mail Drop \_\_\_\_\_

---

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

---

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ E-Mail \_\_\_\_\_

### **Please return to:**

University of Detroit Mercy, Office of Admissions, 4001 West McNichols Road, Detroit, MI 48221 or Fax (313) 993.3326

