

INTEGRATED PRODUCT DESIGN, MSE

The MSE:IPD teaches students design processes to generate creative ideas, rapid prototyping techniques and how to creatively resolve tensions between design, engineering and business criteria.

The courses provide students with the opportunity to build greater skills in engineering disciplines related to product design while helping them contextualize those skills as a part of the product design process. MSE:IPD students master methods for prototyping, fabrication, manufacturing, and computer-aided design. They complement their strength in engineering with new skills in business and design arts.

For more information: <https://ipd.me.upenn.edu/ipd-programs/mse-ipd-degree/>

Curriculum

Code	Title	Course Units
Foundation		
IPD 5000	Product Engineering Basics	
IPD 5030	Design Fundamentals	
EAS 5450	Engineering Entrepreneurship I or MKTG 101 Introduction to Marketing	
Core Courses		6
IPD 5510	Design Processes (1st Semester)	
IPD 5520	Problem Framing (2nd Semester)	
IPD 7990	IPD Final Project (3rd Semester)	
IPD 7990	IPD Final Project (4th Semester)	
MEAM 5100	Design of Mechatronic Systems	
MEAM/IPD 5140	Design for Manufacturability	
Breadth Courses		
Engineering		2
Select 2 of the following		
BE/IPD 5140	Rehab Engineering and Design	
CIS 5190	Applied Machine Learning	
CIS 5450	Big Data Analytics	
CIS 5570	Programming for the Web	
CIS 5610	Advanced Computer Graphics	
CIT 5900	Programming Languages and Techniques	
ESE 5160	IoT Edge Computing	
ESE 5450	Data Mining: Learning from Massive Datasets	
IPD 5010	Integrated Computer-Aided Design, Manufacturing and Analysis	
IPD/MEAM 5160	Advanced Mechatronic Reactive Spaces.	
IPD 5250	Ergonomics/Human Factors Based Product Design	
IPD 5290	Designing Connected Objects and Experiences	
MEAM 5080	Materials and Manufacturing for Mechanical Design	

MEAM 5200	Introduction to Robotics	
MEAM 5270	Finite Element Analysis	
MEAM 5350	Advanced Dynamics	
Design		1
Select 1 of the following		
ARCH 7210	Designing Smart Objects for Play and Learning	
ARCH 7240/ IPD 5210	Technology in Design	
ARCH 7260	Furniture Design Strategic Process	
ARCH 7270/ IPD 5270	Industrial Design I	
ARCH 7280	Design of Contemporary Products: Design for Equity, Inclusion and Accessibility	
ARCH 7370	Semi-Fictitious Realms	
ARCH 7390	New Approaches to an Architecture of Health	
ARCH 7420	Function of Fashion in Architecture	
ARCH 7430	Form and Algorithm	
ARCH 7440/ IPD 5440	Image, Object, Architecture	
ARCH 7510	Ecology, Technology, and Design	
CPLN 5710	Sensing the City	
DSGN 5001	Art, Design and Digital Culture	
DSGN 5002	Design 21: Design After the Digital	
DSGN 5004	Art of the Web: Interactive Concepts for Art & Design	
DSGN 5007	Typography	
DSGN 5013	Graphic Design Practicum	
DSGN 5016	Cultures of Making	
DSGN 5017	Biological Design	
DSGN 5018	Graphic Design I: Creative Technologies	
DSGN 5021	Information Design and Visualization	
DSGN 5022	Interfacing Culture: Designing for Mobile, Web and Public Media	
DSGN 5023	User Experience (UX) and User Interface (UI) Design	
MEAM/IPD 5160	Advanced Mechatronic Reactive Spaces.	
Business		1
Select 1 of the following		
BDS 5010	Behavioral Science: Theory and Application of Experimental Methods (Business)	
BDS 5120	Power, Persuasion and Influence	
BDS 5210	Judgments & Decisions	
EAS 5120	Engineering Negotiation	
EAS 5450	Engineering Entrepreneurship I	
EAS 5460	Engineering Entrepreneurship II	
EAS 5490	Engineering Entrepreneurship Lab	
ESE 5400	Engineering Economics	
ENVS 6530	Corporate Sustainability Strategies	
FNCE 7500	Venture Capital and the Finance of Innovation	
HCMG 8670	Health Care Entrepreneurship	

MGMT 7290	Intellectual Property Strategy for the Innovation-Driven Enterprise
MGMT 7310	Technology Strategy
MGMT 8010	Entrepreneurship
MGMT 8020	Change, Innovation & Entrepreneurship
MGMT 8040	Venture Capital and Entrepreneurial Management
MGMT 8060	Venture Implementation
MGMT 8120	Social Entrepreneurship
MKTG 6110	Marketing Management
MKTG 6120	Dynamic Marketing Strategy
MKTG 7110	Consumer Behavior
MKTG 7120	Data and Analysis for Marketing Decisions
MKTG 7210	New Product Management
MKTG 7270	Digital Marketing and Electronic Commerce
MKTG 7370	Introduction to Brain Science for Business
MKTG 7410	Entrepreneurial Marketing
MKTG 7700	Digital Marketing, Social Media and E-Commerce
MKTG 7760	Applied Probability Models in Marketing
OIDD 6120	Business Analytics
OIDD 6140	Innovation
OIDD 6150	Operations Strategy
OIDD 6520	Design and Development of Web-Based Products and Services
OIDD 6620	Enabling Technologies

Total Course Units 10

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The curriculum is comprised of 6 core courses and 4 additional courses; one in design, one in business and two in engineering.

- Since the program is cross-disciplinary, students who do not have the requisite background in the three areas, engineering, design arts, and business, may be required to enroll in additional foundational courses in these areas.
- The core curriculum is comprised of 6 foundational courses that are required of all students regardless of their undergraduate degree.

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Select 4 additional courses; one in design, one in business and two in engineering from the preapproved list in the handbook. For more information about design, engineering and business courses see the Course Directory (<https://ipd.me.upenn.edu/courses/>).

Plan of Study

First Year

Summer		Course Units
IPD 5030	Design Fundamentals	1
Course Units		0.00
Fall		
IPD 5510	Design Processes	1
EAS 5450	Engineering Entrepreneurial	1

MEAM 5100	Design of Mechatronic Systems	1
Course Units		3.00
Spring		
IPD 5520	Problem Framing	1
IPD 5140	Design for Manufacturæ	1
Select 1 Design elective		1
Course Units		3.00
Second Year		
Fall		
IPD 7990	IPD Final Project	1
Select 1 Engineering elective		1
Select 1 Business elective		1
Course Units		3.00
Spring		
IPD 7990	IPD Final Project	1
Course Units		1.00
Total Course Units		10.00

For guidance on the policies and procedures that govern the program see the IPD Guidelines (<https://ipd.me.upenn.edu/ipd-guidelines/>).

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2022 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.