INTEGRATED PRODUCT DESIGN

UNIVERSITY OF PENNSYLVANIA

Guidelines for Graduate Study

July 2019

University of Pennsylvania
School of Engineering and Applied Science
Integrated Product Design, MEAM Department
229 Towne Bldg., 220 S. 33rd Street
Philadelphia, PA 19104-6315
www.me.upenn.edu/ipd
meam-ipd@seas.upenn.edu
Tel. 215-898-2826
Fax 215-573-6334

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These guidelines are subject to change.

1. INTRODUCTION

The University of Pennsylvania's Integrated Product Design program is intended to cultivate design professionals that possess both a breadth of knowledge and a depth of expertise in a specialty, in order to effectively bridge the domains of technology, manufacturing, business, aesthetics, and human-product interaction. The guiding philosophy of the program is to teach students to create products and to understand and address the social, environmental and experiential contexts of those products so that product design can be harnessed as a force for the greater good.

The program builds the skills to investigate, imagine, conceptualize and model a wide range of products and their complementary business models. The program draws on the strengths of three internationally recognized schools within the University: the School of Engineering & Applied Science (SEAS), the Wharton School, and the School of Design.

The graduate courses that make up the program are intended to create an interdisciplinary point of view and are taught by professors from all three schools. Studio classes accompany classroom studies, providing creative and analytical approaches, and shifting students between rigorous, technical and explorative processes in the development of both experiential and theoretical knowledge. Collaborative team projects and student-driven independent projects complement the core courses to give students both a solid grasp of the fundamentals and a deep understanding of the nuances of these fields.

The information presented in these Guidelines is not exhaustive; students should also obtain information from the Penn Engineering website: www.seas.upenn.edu/graduate/handbook

More information, updated periodically, on the IPD program is also available on the website, ipd.me.upenn.edu. Reading all of the rules and procedures is essential in order to be familiar with various degree requirements and the plentiful opportunities that are available.

These guidelines together with the information presented on the above listed websites will answer most questions. Advice and answers to questions not covered in these sources may be obtained from the Director[1], Executive Director[2] or Graduate Program Coordinator[3].

* *Students who matriculated before July 2019 are subject to the policies that were in effect as of their matriculation date.*

2. PROGRAM ADVISING

There are two areas of advising within the IPD program, master's program academic progress advising and Final Project advising. The first person with whom a new student will have contact will be the Director, Executive Director or Graduate Program Coordinator of the IPD program. These people are responsible for monitoring the student's academic plan and progress during the IPD Master's program. In addition, during the last two semesters of Final Project work, each team or individual pursuing a Final Project is responsible for selecting additional Final Project Advisors to join the Director, Executive Director and IPD 799 faculty in overseeing the team or individual's Final Project. Ideally, representation will come from the School of

[1] Dr. Mark Yim, Room 229-A Towne Bldg. (215-898-5269; yim@grasp.cis.upenn.edu)
[2] Sarah Rottenberg, Room 270 Towne Bldg. (srot@design.upenn.edu)
[3] Maryeileen B. Griffith, Room 229 Towne Bldg. (215-898-2826; mebg@seas.upenn.edu)

Engineering and Applied Science, the School of Design and from the Wharton School. In certain cases, Final Project committee members may come either from another area of Penn pertinent to the project pursued, or from outside the university. Choices of advisors must be approved by the course faculty. These individuals will form the "Final Project Advisory Team" on the particular project.

3. DEGREE REQUIREMENTS

To achieve a Master's of Integrated Product Design (M:IPD) or a Master's of Science in Engineering Integrated Product Design (MSE:IPD) the requirements consist of a total of ten courses (not including foundation courses), seven of which must be from within the School of Engineering and Applied Science. Detailed curriculum requirements for each degree track is given below. The degree requirement also includes four sequential credits of studio work that must be taken in order over the course of four semesters. In accordance with SEAS policy, "No grade lower than a 'C-' will be counted in courses designated as 'core' courses or those courses must be retaken." Since this program is cross-disciplinary, students who do not have the applicable foundation in each of the three areas, engineering, design arts, and marketing, may be required to enroll in foundation courses in these areas. Foundation courses must be taken in the first year of study and a grade of "B-" or better must be earned to satisfy the foundation requirement. If a student is unsuccessful in earning the grade of "B-" or better in a required foundation course, s/he will be required to take an additional course in which the grade of "B-" must be earned to graduate. This course will be determined by the student and the Academic Advisor.

Foundation Courses for both the M:IPD & MSE:IPD 0-3 CUs or proficiency shown	
Engineering Basics	IPD 500 – Product Engineering Basics (1 CU)
Design Art Basics	PD 503 – Product Design Fundamentals (1 CU)
Marketing Basics	EAS 545 – Engineering Entrepreneurship I (1 CU) or MKTG 101 – Introduction to Marketing (1 CU)
Students wishing to take a course other than the above to satisfy the foundation requirement must obtain course approval from the Director or Executive Director..	

Curriculum for M:IPD Program 10 CU + 2 Semesters of Seminar	
Core Courses (5 CU)	
	IPD 515 – Product Design **OR** IPD 514 – Design for Manufacturability (1st year) (1 CU)
	IPD 551 – Design Process (1st Semester) (1 CU)
	IPD 552 – Problem Framing (2nd Semester) (1 CU)
	IPD 799 002 – Final Project (3rd Semester) (1 CU)
	IPD 799 002 – Final Project (4th Semester) (1 CU)
Engineering Breadth (1 CU)	
	CIS 557 – Programming for the web (1 CU)
	CIT 590 – Programing Language and Technique (1 CU)

	ENGR 566 – Design of Appropriate Biomedical Technologies for Point of Care Diagnostics (1 – 2 CUs, with advisor approval)
	ESE 519 – Real Time Embedded Systems (1 CU)
	ESE 545 – Data Mining (1 CU)
	IPD 501 – Integrated Computer-Aided Design, Manufacturing, and Analysis (1 CU)
	IPD 504 – Rehab Engineering & Design (1 CU)
	IPD 514 – Design for Manufacturability (1 CU)
	IPD 516 – Advanced Mechatronics in Reactive Spaces (1 CU)
	IPD 529 – Designing Connected Objects and Experiences (1 CU)
	MEAM 508 – Materials and Manufacturing for Mechanical Design (1 CU)
	MEAM 510 – Design of Mechatronic Systems (1 CU)
	MEAM 520 – Introduction to Robotics (1 CU)
	MEAM 527 – Finite Element Analysis (1 CU)
	MEAM 535 – Advanced Dynamics (1 CU)
	MEAM 554 – Mechanics of Materials (1 CU) or comparable approved by the Director
Design Arts Breadth (1 CU)	
	ARCH 733 – Building Product Design (1 CU)
	ARCH 739 – Architecture of Health
	ARCH 742 – Function of Fashion Architecture
	ARCH 751 – Ecology, Technology, and Design
	ARCH 780 – Arch in the Schools (1 CU)
	CPLN 571 – Sensing the City
	FNAR 506 – Design 21: Design After the Digital Age
	FNAR 566 – Graphic Design (1 CU)
	FNAR 570 – Graphic Design Practicum
	FNAR 634 – Art of the Web: Interactive Concepts for Art & Design
	FNAR 637 – Information Design & Visualization
	FNAR 678 – Interfacing Cultures: Designing for Mobile, Web & Public Media
	IPD 516 (ARCH 746) – Advanced Mechatronics in Reactive Spaces (1 CU)
	IPD 521 (ARCH 721) – Designing Smart Objects for Play and Learning (1 CU)
	IPD 526 (ARCH 726) – Furniture Design (1 CU)
	IPD 527 (ARCH 727) – Industrial Design I (1 CU)
	IPD 528 (ARCH 728) – Design of Contemporary Products (1 CU)
	IPD 530 (ARCH 730) – Building Product Workshop (1 CU)
	IPD 532 (ARCH 632) – Surface Effects (1 CU)
	IPD 544 (ARCH 744) – Digital Fabrication (in Architecture (1 CU)
	IPD 568 (FNAR 568) – Interactive Design Studio: Cultures of Making (1 CU)
	OIDD 659 – Advanced Tools & Methods for Product Design
	Or comparable approved by the Director
Business Breadth (1 CU)	
	EAS 545 – Engineering Entrepreneurship I (1 CU)
	EAS 546 – Engineering Entrepreneurship II (1 CU)
	EAS 512 – Engineering Negotiation (1 CU)
	ESE 540 – Engineering Economics (1 CU)
	FNCE 750 – Venture Capital and the Finance of Innovation (1 CU)
	MGMT 801 – Entrepreneurship (1/2 CU)

	MGMT 810 – Social Entrepreneurship (1 CU)
	MKTG 711 – Consumer Behavior (1 CU)
	MKTG 728 – Contagious: How Products, Ideas, and Behaviors Catch On (1 CU)
	MKTG 730 – Digital Marketing (1 CU)
	MKTG 753 – New Product Management (1CU)
	MKTG 756 – Marketing Research (1 CU)
	MKTG 776 – Applied Probability Models in Marketing (1 CU)
	MKTG 793 – Retailing (1/2 CU)
	MKTG 892 – Creativity (1 CU)
	OIDD 614 – Managing the Productive Core of the Firm: Innovation (1/2 CU)
	OIDD 651– Innovation, Problem Solving and Design (1 CU)
	OIDD 652 – Design of Web-Based Products and Services (1/2 CU)
	OIDD 656 – Operations Strategy and Process Management (1 CU)
	OIDD 662 – Enabling Technologies (1 CU)
	Or comparable approved by the Director
Elective (**2 CU**) Two additional graduate level courses in either engineering, design, business or independent study or another area pertinent to the individual's specific area of interest or study. Electives should be chosen from the breadth lists above, from the elective list below or with advisor approval.	
	IPD 509 – Need Finding (1 CU)
	IPD 511 – Creative Thinking and Design (1 CU)
	IPD 525 – Ergonomics/Human Factors Based Product Design (1 CU)
	Or comparable approved by the Director
IPD 699 – Integrated Product Design Seminar (0 CU; 2 semesters)	

Curriculum for MSE:IPD Program **10 CU + 2 Semesters of Seminar**	
Core Courses (6 CU)	
	IPD 514 – Design for Manufacturability (1 CU)
	IPD 551 – Design Process (1st Semester) (1 CU)
	IPD 552 – Problem Framing (2nd Semester) (1 CU)
	IPD 799 001 – Final Project (3rd Semester) (1 CU)
	IPD 799 001 – Final Project (4th Semester) (1 CU)
	MEAM 510 – Design of Mechatronic Systems (1 CU)
Engineering Breadth (2 CU)	
	CIS 557 – Programming for the web (1 CU)
	ENGR 566 – Design of Appropriate Biomedical Technologies for Point of Care Diagnostics (1 – 2 CUs, with advisor approval)
	ESE 545 – Data Mining (1 CU)
	IPD 501 – Integrated Computer-Aided Design, Manufacturing, and Analysis (1 CU)
	IPD 504 – Rehab Engineering & Design (1 CU)
	IPD 516 – Advanced Mechatronics in Reactive Spaces (1 CU)
	IPD 519 – Real Time Embedded Systems (1 CU)
	IPD 525 – Ergo/Human Fac. Based Product Design (1 CU)

	IPD 529 – Designing Connected Objects and Experiences (1 CU)
	MEAM 508 – Materials and Manufacturing for Mechanical Design (1 CU)
	MEAM 520 – Introduction to Robotics (1 CU)
	MEAM 527 – Finite Element Analysis (1 CU)
	MEAM 535 – Advanced Dynamics (1 CU)
	MEAM 554 – Mechanics of Materials (1 CU)
	Or comparable approved by the Director
Design Arts Breadth (1 CU)	
	ARCH 739 – Architecture of Health
	ARCH 742 – Function of Fashion Architecture
	ARCH 751 – Ecology, Technology, and Design
	ARCH 780 – Arch in the Schools (1 CU)
	CPLN 571 – Sensing the City
	FNAR 506 – Design 21: Design After the Digital Age
	FNAR 566 – Graphic Design (1 CU)
	FNAR 570 – Graphic Design Practicum
	FNAR 634 – Art of the Web: Interactive Concepts for Art & Design
	FNAR 637 – Information Design & Visualization
	FNAR 678 – Interfacing Cultures: Designing for Mobile, Web & Public Media
	IPD 516 (ARCH 746) – Advanced Mechatronics in Reactive Spaces (1 CU)
	IPD 521 (ARCH 721) – Designing Smart Objects for Play and Learning (1 CU)
	IPD 526 (ARCH 726) – Furniture Design (1 CU)
	IPD 527 (ARCH 727) – Industrial Design I (1 CU)
	IPD 528 (ARCH 728) – Design of Contemporary Products (1 CU)
	IPD 530 (ARCH 730) – Building Product Workshop (1 CU)
	IPD 532 (ARCH 632) – Surface Effects (1 CU)
	IPD 544 (ARCH 744) – Digital Fabrication (in Architecture (1 CU)
	IPD 568 (FNAR 568) – Interactive Design Studio: Cultures of Making (1 CU)
	OIDD 659 – Advanced Tools & Methods for Product Design
	Or comparable approved by the Director
Business Breadth (1 CU)	
	EAS 512 – Engineering Negotiation (1 CU)
	***EAS 545 – Engineering Entrepreneurship I (1 CU)
	EAS 546 – Engineering Entrepreneurship II (1 CU)
	ESE 540 – Engineering Economics (1 CU)
	FNCE 750 – Venture Capital and the Finance of Innovation (1 CU)
	MGMT 801 – Entrepreneurship (1/2 CU)
	MGMT 810 – Social Entrepreneurship (1 CU)
	MKTG 711 – Consumer Behavior (1 CU)
	MKTG 728 – Contagious: How Products, Ideas, and Behaviors Catch On (1 CU)
	MKTG 730 – Digital Marketing (1 CU)
	MKTG 753 – New Product Management (1CU)
	MKTG 756 – Marketing Research (1 CU)
	MKTG 776 – Applied Probability Models in Marketing (1 CU)
	MKTG 892 – Creativity (1 CU)
	OIDD 614 – Managing the Productive Core of the Firm: Innovation (1/2 CU)
	OIDD 651– Innovation, Problem Solving and Design (1 CU)
	OIDD 652 – Design of Web-Based Products and Services (1/2 CU)

	OIDD 656 – Operations Strategy and Process Management (1 CU)
	OIDD 662 – Enabling Technologies (1 CU)
	Or comparable approved by the Director
	IPD 509 – Need Finding (1 CU)
	IPD 511 – Creative Thinking and Design (1 CU)
	IPD 525 – Ergonomics/Human Factors Based Product Design (1 CU)
	Or comparable approved by the Director
Elective (1 **CU**) One additional graduate level courses in either engineering, design, business or independent study or another area pertinent to the individual's specific area of interest or study. Electives should be chosen from the breadth lists above, from the elective list below or with advisor approval.	
	IPD 509 – Need Finding (1 CU)
	IPD 511 – Creative Thinking and Design (1 CU)
	IPD 525 – Ergonomics/Human Factors Based Product Design (1 CU)
	Or comparable approved by the Director
IPD 699 – Integrated Product Design Seminar (0 CU; 2 semesters)	

Notes
* *If a course is cross-listed, students must register for the IPD section when available.*
** *Any deviation from the above must be approved by the Director.*
*** *EAS 545 cannot be counted towards both the foundation and business breadth.*

4. ATTENDANCE AT SEMINARS AND PROJECT PRESENTATIONS

The attendance of all full-time graduate students at IPD seminars and final presentations is mandatory. There are many good reasons why students should attend departmental seminars and presentations even when the seminars are not directly linked to their areas of research. For example:

- They provide an opportunity to learn about the state-of-the-art companies, designs, technologies, ideas, etc.
- They provide an opportunity for the student to get acquainted with people from other institutions and companies and get an inside view of their culture and ideas. On more than one occasion, during job interviews, interviewers have been known to mention a visit to Penn and delivering a seminar.
- They are meaningful simply to learn what new and interesting things are going on in the world.
- They are an excellent opportunity to get together as a department. It is hoped that a full attendance at these seminars will help create departmental spirit and cohesiveness.

Seminar Course IPD 699

The seminar course has been established so that students are recognized for their seminar attendance as well as to encourage students to attend. There are no quizzes, tests, or homework. There is also NO tuition charged for IPD 699. The course is graded S/U and does not count towards full-time enrollment status. In order to obtain a satisfactory (S) grade, the student must attend the IPD seminars. In order to obtain their degree, IPD students are required to accumulate 2 seminar course credits (IPD 699). Under special circumstances, e.g., in a case of a conflict with a course offering, the student may waive the seminar requirement for the particular semester by petitioning to the Director. Part-time students are exempted from the mandatory overall seminar attendance requirement although they are strongly encouraged to attend all possible seminars. Submatriculant students are full-time and therefore must accumulate 2 seminar course credits prior to graduation.

5. GENERAL INFORMATION

Registration:
All students enrolled in a degree program are required to be continuously registered. Three courses per semester (including studio project research, such as IPD 799 Final Project and IPD 599 Independent Study) is a normal full-time load for all students. The seminar course, IPD 699, does NOT count towards full-time status. Students must always consult with the Director or Executive Director if a deviation from the normal load is desired or being contemplated. Students must meet with their advisor to discuss course selection and obtain advisor's sign-off prior to registration.

Leaves of Absence:
Continuous registration as a graduate student is required unless a formal leave of absence is granted by the Dean of the student's school. A Leave of Absence (LOA) may be requested by submitting a Petition for Action (www.seas.upenn.edu/graduate/pdf/g-petition.pdf). More detailed information regarding LOA is available on the following website: www.seas.upenn.edu/graduate/handbook/g-academic.php

Obsoleteness:
The maximum time allowed for the completion of all master's degree requirements is seven years. Course units that are older than seven years may not be counted toward the degree requirements.

Changes in Course Program:
Students may add or drop courses without penalty during a semester if it is done by the deadline listed in the current graduate bulletin. The Director or Executive Director must be informed of the student's decision beforehand and must receive his/her approval. International students must consult with the office of International and Student Scholar Services before dropping a course.

Grades, Credits, and Academic Standing:
The grading system is as follows: A (4.0), Excellent; B (3.0), Good; C (2.0), Fair; D (1.0), Poor; F (0.0), Failure. A course in which an F was obtained must be taken again; however, the F will remain on the student's transcript. Courses for which a passing grade was obtained cannot be retaken for credit. An incomplete (I) or a no report (NR) are temporary notations and students are allowed a period of one semester to clear them from their transcripts. Failure to clear an "incomplete" or "no report" within the allotted time will result in an automatic grade of F. *No students will be permitted to graduate if there are any Incomplete, Unsatisfactory, or No Report notations on their records.*

M:IPD and MSE:IPD students in the School of Engineering are expected to maintain at least a B- average (2.7) in their work. A student whose record falls below a B- average will be put on academic probation and may be required to withdraw; graduation requires a minimum of a B- average.

Academic Integrity
Each student is expected to abide by Penn's Code of Academic Integrity (http://provost.upenn.edu/policies/pennbook/2013/02/13/code-of-academic-integrity). Students should not knowingly use any dishonest method to gain an unfair advantage over other students in academic pursuits, especially through, but not limited to:

- Giving or receiving any unauthorized aid on an assignment or exam, including working in groups on any assignment that has been designated as individual by the professor;
- Misrepresenting the originality of one's work (plagiarism), particularly through direct copying of work and also through failing to note the contributions of others, except as permitted by the instructor;

- Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor.

If there is any doubt as to what is permissible, it is the student's responsibility to ask the instructor. Students caught cheating will be subject to disciplinary action, which may include referral to the Office of Student Conduct. For more information, please see the Student Guide on Academic Integrity: http://provost.upenn.edu/policies/pennbook/2013/02/13/code-of-academic-integrity

6. INDEPENDENT STUDY

Independent Study courses (IPD 599) are vehicles to accommodate special interests of the students which are not served through the regular courses. They create opportunities for mini-projects and a mentoring relationship between the student and the faculty. IPD 599 can only be counted towards the elective requirement and must be a topic independent of your final project work.

Since independent studies are less structured than regular courses and typically do not come with strict deadlines, occasionally students tend to fall behind in their work. There is also the possibility of miscommunication between the student and the faculty on the objectives, extent, scope, and the grading method for the independent study. The purpose of this policy is to set the rules for an independent study with the objectives of maintaining academic rigor and minimizing any potential for miscommunication.

An independent study course should require effort comparable to that of a regular course, about 9 hours a week or a total of 126 hours per semester. The student should meet the faculty member administering the independent study (the advisor) on a regular basis, at least once a week. It is the student's responsibility to schedule these weekly meetings. Past experience indicates that failure to maintain regular contact with the student's advisor can lead to a less than satisfactory performance in the independent study course. In the absence of regular contact, the student stands the risk of not being focused leading to an impression of dereliction. The key to a successful independent study is a steady effort throughout the semester. The student should not expect to be able to cram a semester's work into a few days of intensive work at the end of the semester.

Prior to the beginning of the semester in which the student contemplates taking the independent study, the student and his/her advisor should develop a brief document. The first paragraph of the document should describe the objectives, scope, and content of the independent study. The second paragraph should state how the independent study will be evaluated and how the student will be graded. The document should be signed by both the student and his/her advisor, and it should be submitted to the program Director for approval before the beginning of the semester.

At the conclusion of the independent study, the student should prepare a brief report specifying what material was covered during the independent study, those objectives that were met and those that were not. In the event that objectives were not met, a clear explanation should be provided as to why such objectives were not met. This document should also be signed by the student and his/her advisor, and it will be included in the student's file.

It is the student's responsibility to make sure that these guidelines are followed. Failure to follow these guidelines may result in the student not receiving credit for the independent study.

7. POLICY ON TRANSFER OF CREDIT UNITS EARNED IN OTHER INSTITUTIONS

IPD students may obtain credit for up to two approved graduate courses taken at another institution. These courses are referred to as transfer courses. Dual Degree and Submatriculant students who are double counting courses towards both degrees will not be permitted to transfer courses in addition to double counting courses. Transfer courses must be graduate level courses in which at least a B grade has been earned. Transfer credit will only be considered for courses taken prior to matriculation in the IPD graduate program. To obtain credit for courses taken at other institutions, the following procedure must be followed:

For each transfer course, obtain information about the, e.g. course description, syllabus, homeworks and/or exams and the title of the textbook prescribed for the course.

Identify a professor who teaches a similar course at Penn. If a similar course is not offered at Penn, identify a professor whose areas of expertise are in the general area of the course to be transferred. The professor should certify that the course is of similar level to a graduate course offered at Penn or, if a similar course is not offered at Penn, that the course qualifies for Penn students to take at the graduate level if it were offered here.

Submit a petition on a standard form (www.seas.upenn.edu/graduate/pdf/g-transfer-credit.pdf) to the program Director. Attach to the petition a copy of the transcript, the professor's certification, and documents and information noted on the standard form.

8. FINAL PROJECT

The IPD Final Project is the output of two semesters of interdisciplinary master's study combining engineering, design arts and business. In keeping with the nature of this unique major, every student aims to have a committee of advisors that include three different disciplines. This section is intended to help set the expectations of work on the part of the advisors and students.

Final Project Expectations

A viable IPD Project should include the following elements or qualities:

- Be a holistic offering, explicitly addressing design, engineering and business elements
- Solve a real problem in the world
- Be both commercially viable and socially valuable
- Be innovative: either entirely new to the world, a fundamental improvement on something that exists, or something that is translated from one domain to another in a new way
- Be user-centered
- Be prototyped for the purposes of evaluation and iteration
- Include a tangible object
- Be developed and prototyped to the fullest extent possible
- Contribute to the discourse on product design

In addition to the aforementioned requirements, students who pursue the MSE:IPD degree track (Master's of Science in Engineering) of the IPD program will be expected to complete final projects that demonstrate engineering knowledge and expertise, including the ability to implement the technology of the product, innovation in the technology of the products, the ability to fabricate the product, analysis of engineering performances, iteration and improvements of the product based on that analysis.

Team projects

Interdisciplinary group work is a cornerstone of the program. We expect IPD Final Projects to be team projects. Ideally teams will be formed by two or three students from different backgrounds. The expected work and contributions from each member should to be clearly delineated when teams form and on an ongoing basis.

Students will work together on one project, however they will submit separate project proposal (with shared text) but with emphasis on their respective parts of the work.

Final Project Advisory Team

The Final Project Advisory Team is comprised of the Director, Executive Director, IPD 799 faculty and one or more supporting project committee members. The supporting member(s) is typically chosen from the School of Engineering and Applied Science, the School of Design or from the Wharton School but can be from other schools or outside of the university if that is where relevant expertise can be found. This committee needs to advise in engineering, design arts and business areas and therefore should have recognized expertise in those three areas. The student(s) and project advisor should communicate regularly (typically once every few weeks) and may consider including the IPD Final Project instructor on major milestone communications. The other committee members communicate during the semester as needed with the whole committee meeting at least once per semester (just before or after mid-term is recommended). In addition to committee meetings, it is expected that committee members will attend major student project presentations. The Project Team (student) must secure the permission of the Advisors to include their names in the final presentations.

Timeline:

The final project follows a two semester sequence, structured with deliverables as follows:

- Project Proposal (Due at the middle of the 1st semester)
- Project Concept Presentation and Final Semester Development Plan (End of 1st project semester)
- Final Project Presentation and Digital Asset Submission (End of 2nd project semester)

Project Proposal (due at the end of the 1st project semester)

The project proposal is a brief document roughly 500-750 words long containing a basic description of what the student team wants to do and would be looking for in an advisor. Include a basic outline of the project that should preliminarily identify:

- The inspiration / source of the problem
- Preliminary research done to identify the problem conflicts or opportunity area
- Preliminary criteria for the idea
- Anticipated scope of the project
- The potential impact of the project on the project member(s), the community and/or the world.

If the project includes a team, students need to present an argument for why they are a good group to work together and what elements each member brings to the table.

After evaluation by IPD Final Project teaching staff, this preliminary proposal will be used to help find and acquire the project committee. Note that the project proposal is not expected to clearly define the project solution, nor what the team plans to accomplish in detail, but it should clearly define the larger parameters of the project area, and a few possibilities the student could envision exploring within that project area.

The following are some suggested guidelines for the write-up:

Title of project

Student's info (name, email address)
Potential advisors (name, affiliation, email address)

Proposal text
Proposal images
Supporting data

Project Concept Presentation and Final Semester Development Plan (End of 1st project semester)

At the conclusion of the first project semester, the student team will present the final project concept design that has been generated from the semester's efforts.

Concept presentation deliverables include:

- The initial areas of study as defined above and a brief review of functional user needs and interaction research
- Initial criteria generated and if the design process caused them to be changed and why.
- Final problem/opportunity definition
- Initial concept functionality, usability, visual communication
- An initial proposed business model that this concept should support
- A point of view on the social, ethical, and sustainability impact of the project on the project member(s), the community and/or the world.
- Scope and goals of the final semester development

Development plan deliverables include:

- The project goals for the final semester
- The process steps to achieve those goals
- The anticipated scope of effort and roles of participants
- Planned project deliverables
- Identification of the outside expertise that will be required to support the project
- A planned semester timeline including milestones (review dates), deadlines and estimated hours of effort

Final Project Presentation and Digital Asset Submission (end of 2nd project semester)

The last semester will focus on specific execution and refinement of the final project solution including user feedback and detail iteration. The semester will culminate in a public presentation of the final project. This presentation should include;

- A detailed description of the project
- Need finding, user, background area and marketing research
- Business plan/model
- In depth engineering and design explorations, alternative concepts and development
- A brief video about the project
- Data, preferably including video/audio of progressive user feedback during development
- A discussion of the ethical questions raised during and by the execution of this project
- Iterative and final functional prototypes
- Demonstrations are encouraged

9. SUBMATRICULATION

Outstanding undergraduate students at the University may apply (http://ipd.me.upenn.edu/pipd-admissions/submit-your-portfolio.php) to submatriculate into either of the IPD master's degree programs and take graduate-level courses as electives during their senior year. After fulfilling the requirements of both programs, the student will receive a BSE and a MSE or a BSE and a M:IPD degree. Undergraduates at the University of Pennsylvania may double-count up to three graduate level courses taken while enrolled as a submatriculant towards both the undergraduate and the graduate degrees. If studio work is begun before the end of the senior year (taking IPD 551 in the fall and IPD 552 in the spring), the degree may be completed in two extra semesters of study. In order to complete both degrees in only five years, students can consider:

- Taking the foundation courses during the undergraduate program.
- Take two extra graduate-level courses (cannot be counted towards the BSE degree) during the undergraduate program.
- Take two of the four IPD studio classes (IPD 551 and IPD 552) in the 4th (senior undergraduate) year.

Students enrolled as a submatriculant can only count graduate courses taken at Penn towards the master's degree. No transfer credit, study abroad, or study away courses will be accepted.

Applications to the program must be completed by the February 1st deadline and before the end of the junior year. Submatriculation applications are available via the Penn Engineering website.

10. DUAL DEGREE PROGRAMS

Students may apply to a dual degree program and receive an M:IPD or MSE degree in Integrated Product Design and any of the other disciplines in the Engineering School such as Electrical and Systems Engineering, Bioengineering, Computer Science, Chemical and Biomolecular Engineering, and Materials Science Engineering if admitted. The dual degree program requires the completion of at least 16 courses (not including foundation courses) and satisfaction of the degree requirements of each department in which the student wishes to major. This program typically requires four semesters to complete. To enroll in this program, the student must complete an application form, list the course plan for both programs and obtain the approval from the Director/Graduate Group Chairman of each department. Applications for this program are available at www.seas.upenn.edu/prospective-students/graduate/admissions.php

A dual degree is also offered with the School of Design (Architecture) and the Wharton School. Students must satisfy independent admission requirements for the School of Engineering, The Wharton School of Business and the School of Design (Architecture). This means that the appropriate standardized tests, such as the GRE, GMAT or MCAT, a completed application form and fee, transcript, and recommendations, must be sent to each school independently. Dual degree students can double count up to three courses towards both programs. However, seven course units taken only for the IPD degree must be within Engineering.

Please contact the appropriate School for more information about specific application and degree requirements.

11. SUMMER STUDIES

There are several possibilities for scholarly activities by graduate students at the University during the summer, including:

- Independent study (IPD 599) with an instructor willing to act as a supervisor during the summer.
- Course work outside SEAS, as well as a limited number of regular courses occasionally offered by some SEAS departments. The Director must approve summer school courses.

12. RECORDS

The official graduate student records are kept in 111 Towne Building; transcripts can be viewed on PennInTouch at https://medley.isc-seo.upenn.edu/penn_portal/intouch/splash.html. Graduate students are encouraged to periodically check the accuracy of their records and to bring any discrepancies to the attention of the Director.