PROGRESSIVE DEGREE PROGRAM
COURSE PLAN TEMPLATE

USC SCHOOL	Viterbi School of Engineering
ACADEMIC DEPARTMENT	Daniel J. Epstein Department of Industrial & Systems Engineering
GRADUATE PROGRAM	Product Development Engineering – Management Specialization
POST CODE	1224
TERM EFFECTIVE DATE	Fall 2025

PROGRAM DESCRIPTION
A brief description of the graduate program.

The MSPDE is a joint program with the Aerospace and Mechanical Engineering (AME) Department that prepares engineers to become leaders in engineering design and new product development. The MSPDE program offers two areas of specialization, namely Product Development Management (PDM) and Product Development Technology (PDT). The PDM specialization will prepare students as future product development project managers, and the PDT specialization will prepare students for a career as product development chief engineers.

This plan is for the PDM (Product Development Management) Specialization administered by the ISE Department.

COMMON BACHELOR DEGREE PROGRAM PATHWAYS
A list of common bachelor's degrees that undergraduate students pursue in advance of pursuing a progressive degree option with this graduate program. Some programs are restricted to certain majors while others are open to all students.

Engineering	
Science	

PREPARATORY UNDERGRADUATE COURSES
A list of courses at the undergraduate level that prepare students for the graduate program. Required coursework is listed first, followed by recommended courses. If not applicable, this section will be blank.

Dept. Prefix - Course #	**Course Title**	**Required or Recommended**	**Units**
AME-305, 408, 409, 410, or ISE-460	Engineering Design, Engineering Economy	Required	
	Calculus I, Calculus II, Calculus III	Required	
	Linear Algebra	Recommended	

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CORE GRADUATE PROGRAM REQUIREMENTS (# units required)

A list of all required graduate courses for the graduate program. None of these courses may be used toward satisfying undergraduate degree requirements.

If special exceptions for any of these courses are made by the academic department, the course # is marked with an asterisk (*) and the exception is explained in the "Department Notes" section at the end of this course plan template.

Dept. Prefix - Course #	Course Title	Units
	Core Courses	**8**
ISE 545	Principles and Practices of Global Innovation	4
ISE 501 / AME 501	Innovative Conceptual Design for New Product Development	4
	Management Specialization Required	**8**
ISE 515	Engineering Project Management	4
ISE 544 or ISE 585 or ISE 588	Leading & Managing Engineering Teams or Strategic Management of Technology Innovation or Management of Rapid Product Development	4
	Management Specialization Electives (choose one)	**4**
AME 504	Mechatronic Systems Engineering	4
AME 510	Advanced Computational Design and Manufacturing	4
ISE 514	Advanced Production Planning & Scheduling	4
ISE 525	Design of Experiments	4
ISE 527	Quality Management for Engineers	4
ISE 544	Leading and Managing Engineering Teams	4
ISE 561	Economic Analysis of Engineering Projects	4
ISE 562	Decision Analysis	4
ISE 580	Performance Analysis with Simulation	4
ISE 583	Enterprise Wide Information Systems	4
ISE 585	Strategic Management of Technology	4
ISE 588	Management of Rapid Product Development	4
ISE 610	Advance Design of Experiments & Quality Engineering	4
	Minimum units required for degree	**20**

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PRE-APPROVED ELECTIVE COURSEWORK

Elective coursework is approved at the discretion of the academic department. Note the following details about the total number and units required of elective coursework.

4	**TOTAL ELECTIVE UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**
0	**TOTAL ELECTIVE UNITS REQUIRED FOR THE PROGRESSIVE GRADUATE DEGREE**

TOTAL UNIT COUNTS AND REQUIRED GRADUATE UNITS

28	**TOTAL UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**
8	**TOTAL GRADUATE UNITS THAT MAY BE WAIVED (IF ANY)**
20	**MINIMUM NUMBER OF GRADUATE UNITS THAT MUST BE AT THE 500 LEVEL OR ABOVE**

NOTES FROM THE DEPARTMENT

This section highlights any unique considerations, exceptions, or requirements for the graduate program. If a program has specific restrictions (courses, majors, etc.), they are detailed below.

Kelly Goulis — **Authorizing Dean's Name**

7/31/2025 | 5:18:03 PM PDT — **Date Approved**

Senior Associate Dean, Viterbi School of Engineering — **Authorizing Dean's Title**

PROGRESSIVE DEGREE PROGRAM
COURSE PLAN TEMPLATE

USC SCHOOL	Viterbi School of Engineering
ACADEMIC DEPARTMENT	Aerospace and Mechanical Engineering
GRADUATE PROGRAM	Product Development Engineering – Technology Specialization
POST CODE	1224
TERM EFFECTIVE DATE	Fall 2025

PROGRAM DESCRIPTION
A brief description of the graduate program.

The AME Department advises students in the MS in Product Development – Technology specialization. The Product Development Technology specialization will prepare students for a career as future product development engineers.

COMMON BACHELOR DEGREE PROGRAM PATHWAYS
A list of common bachelor's degrees that undergraduate students pursue in advance of pursuing a progressive degree option with this graduate program. Some programs are restricted to certain majors while others are open to all students.

Aerospace Engineering B.S.	Biomedical Engineering B.S
Mechanical Engineering B.S.	Civil Engineering B.S.
Astronautical Engineering B.S.	Physics B.S.
Open to all students if they fulfill course deficiencies	

PREPARATORY UNDERGRADUATE COURSES
A list of courses at the undergraduate level that prepare students for the graduate program. Required coursework is listed first, followed by recommended courses. If not applicable, this section will be blank.

Dept. Prefix - Course #	Course Title	Required or Recommended	Units
AME 204	Mechanics of Materials and Structures	Required	4
AME 301	Dynamics	Required	4
AME 309	Dynamics of Fluids	Required	4
AME 310	Engineering Thermodynamics i	Required	4
Math 125	Calculus I	Required	4
Math 126	Calculus II	Required	4
Math 226	Calculus III	Required	4
Math 245	Mathematics of Physics and Engineering I	Required	4
PHYS 151	Mechanics and Thermodynamics	Required	4

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PHYS 152	Electricity and Magnetism	Required	4
PHYS 153	Optics and Modern Physics	Recommended	4
AME 305 or AME 408	Mechanical Design or Computer-Aided Design of Mechanical Systems	Recommended	4
AME 431	Heat Transfer	Recommended	4
AME 451	Linear Control Systems I	Recommended	4

UNDERGRADUATE COURSES USED TO REDUCE GRADUATE LEVEL UNITS

A list of undergraduate level courses that may be used to reduce the number of graduate level units required for the graduate program. If there are none, that is specified instead.

Dept. Prefix - Course #	Course Title	Units
	None	

CORE GRADUATE PROGRAM REQUIREMENTS (# units required)

A list of all required graduate courses for the graduate program. None of these courses may be used toward satisfying undergraduate degree requirements.

If special exceptions for any of these courses are made by the academic department, the course # is marked with an asterisk (*) and the exception is explained in the "Department Notes" section at the end of this course plan template.

Dept. Prefix - Course #	Course Title	Units
	Core Courses	**8**
ISE 545	**Principles and Practices of Global Innovation**	**4**
ISE 501 / AME 501	**Innovative Conceptual Design for New Product Development**	**4**
	Technology Specialization Required	**7**
AME 503	**Advanced Mechanical Design**	**3**
AME 525 or AME 526 or AME 540	**Linear Algebra in Engineering Science, or Partial Differential Equations for Engineering Applications, or Probability and Statistics in Engineering Science**	**4**
	Technology Specialization Electives (choose one)	**6-8**
AME 408	**Computer-Aided Design of Mechanical Systems**	**3**
AME 410	**Engineering Design Theory and Methodology**	**3**
AME 502	**Modern Topics in Aerospace Design**	**3**
AME 505	**Machine Learning for Engineering Applications**	**4**
AME 525	**Linear Algebra in Engineering Science**	**4**
AME 526	**Partial Differential Equations for Engineering Applications**	**4**
AME 527	**Elements of Vehicle and Energy Systems Design**	**3**
AME 544	**Computer Control of Mechanical Systems**	**3**
AME 546	**Design for Manufacturing Assembly**	**4**
AME 547	**Foundations for Manufacturing Automation**	**4**
ASTE 523	**Design of Low Cost Space Missions**	**3**
CE 576	**Invention and Technology Development**	**3**
ISE 576	**Industrial Ecology**	**4**
ISE 585	**Strategic Management of Technology and Innovation**	**4**
MASC 551	**Mechanical Behavior of Engineering Materials**	**4**
MASC 583	**Materials Selection**	**4**
SAE 549	**Systems Architecting**	**3**
	General Elective (to reach a minimum of 24 units)	**1-3**

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	Minimum units required for degree	**24**

PRE-APPROVED ELECTIVE COURSEWORK

Elective coursework is approved at the discretion of the academic department. Note the following details about the total number and units required of elective coursework.

5-7	**TOTAL ELECTIVE UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**
1-3	**TOTAL ELECTIVE UNITS REQUIRED FOR THE PROGRESSIVE GRADUATE DEGREE**

TOTAL UNIT COUNTS AND REQUIRED GRADUATE UNITS

28	**TOTAL UNITS REQUIRED FOR THE TRADITIONAL GRADUATE DEGREE**
4	**TOTAL GRADUATE UNITS THAT MAY BE WAIVED (IF ANY)**
19	**MINIMUM NUMBER OF GRADUATE UNITS THAT MUST BE AT THE 500 LEVEL OR ABOVE**

NOTES FROM THE DEPARTMENT

This section highlights any unique considerations, exceptions, or requirements for the graduate program. If a program has specific restrictions (courses, majors, etc.), they are detailed below.

Electives are chosen from AME, ISE, and SAE.

Kelly Goulis

Authorizing Dean's Name

7/31/2025 | 5:18:03 PM PDT

Date Approved

Senior Associate Dean, Viterbi School of Engineering

Authorizing Dean's Title

PROGRESSIVE DEGREE PROGRAM
COURSE PLAN TEMPLATE

Masters Degree – Product Development Engineering
Progressive Degree Option

The MS in Product Development Engineering is an interdisciplinary degree program jointly offered by the Aerospace and Mechanical Engineering and the Daniel J. Epstein Industrial and Systems Engineering Departments. The Industrial and Systems Engineering Department will manage this joint degree program.

Developing new products is the essence of human intelligence in general, and engineering professions in particular. The growth of our economy has been largely determined by the engineer's performance and effectiveness in new product developments. The ever-increasing demands for product functions, coupled with low cost, high quality, and short lead-time requirements have made product development a very complex and inter-disciplinary activity. The recent high-tech revolutions and stringent environmental concerns have further contributed to the complexity of modern product development. There exists a great human resource need in the areas of new product developments.

There are three interrelated disciplines in product development: art, management, and engineering. The MS in Product Development Engineering program focuses on the engineering discipline, ranging from technology to systems. From the engineering viewpoint, product development can be seen as a process from invention, design, planning, production, to service phases. Three types of knowledge are needed for an engineer to go through these phases:

- knowledge to generate new product ideas
- knowledge to evaluate these ideas
- knowledge to structure and manage the development process

This innovative degree program provides students with an integrated education experience, including modern theories and practical experiences, to acquire this knowledge systematically so that they can accomplish these phases efficiently.

All students are required to take the (2) core courses. Then you will choose which Specialization and complete those requirements.