SUSTAINABLE PRODUCT DESIGN AND INNOVATION (B.S.)

Integrative Studies Requirements

40 credits minimum

Code	Title	Credits	Completed
Major Requirements (66 credits)			
SPDI Core Courses			
SPDI-110	Electricity & Electronic Fundamentals	4	
IISPDI-151	Product Design Principles	4	
SPDI-180	Metal Processes & Prototyping	4	
SPDI-221	Three Dimensional CADD	4	
SPDI-302	Properties of Materials	2	
SPDI-304	Materials - a Life Cycle View	4	
SPDI-351	Product Design II	4	
Management Core Courses			
MGT-101	Introduction to Management	4	
MGT-140	Quantitative Decision-Making	4	
MGT-215	Accounting for Sustainable Business	4	
Select **one** of the following:		4	
MGT-331	Principles of Marketing		
MGT/SPDI-446	Competitive Manufacturing Management		
SPDI/Management/Physics Electives			
Select **four credits** of the following:		4	
MGT-451	Business and Society		
INPHYS-131	Engineering Fundamentals		
SPDI-121	Design Visualization in PD & Engineer		
SPDI-170	Introduction to Woodworking Technology		
INSPDI-183	Ultra-Precision Manufacturing		
SPDI-290	Special Topics		
SPDI-298	Independent Study		
SPDI-321	Advanced 3D CADD		
SPDI-330	Metrology & CMM		
SPDI-380	CAD/CAM/ CNC Using MasterCAM		
INSPDI-385	Bio-Fabrication		
SPDI-410	Mechatronics and Automation		
SPDI-450	Product DfMA		
SPDI-456	Portfolio Design		
SPDI-490	Advance Special Topics		
SPDI-495	Seminar		
SPDI-498	Independent Study		
Required Allied Discipline Courses			
IAART-103	Three-Dimensional Design	4	
SAFE-215	Human Factors in Safety	4	
Select **at least one** of the following MATH courses:		4	
MATH-111	Applied College Algebra		
MATH-112	Precalculus		
MATH-211	Calculus I		
SPDI Capstone Courses			
SPDI-352	Product Design III	4	
SPDI-400	Manufacturing Enterprise	4	
Internships and/or Cooperative Education Experiences are recommended:			
SPDI-294	Cooperative Education (counts toward elective credit)		
SPDI-494	Advanced Cooperative Education (counts toward elective credit)		
Total Credits		**66**	

Options

While not required for the SPDI major, each student may choose one of the following options. These options are **General Engineering** and **Manufacturing Engineering**. Please note that some courses within the options may require prerequisite courses.

SPDI: Manufacturing Engineering Option

This option prepares students for career growth and flexibility in many aspects of 21st century manufacturing. Students electing the Manufacturing Engineering option will build on their SPDI major's knowledge and skills in design thinking, product design and development processes, materials and manufacturing methods, business management, and sustainability, with additional cross-disciplinary courses in Mathematics, Physics, Chemistry, Computer Science, and Statistics. Students also have the opportunity to gain further knowledge and skills that create key competitive advantages in today's advanced manufacturing companies including LEAN manufacturing, advanced CAD, CAM, CNC programming, metrology, design for manufacturing and assembly, and mechatronics and automation. To fulfill the Manufacturing Engineering option students must take the following courses while fulfilling the requirements for the SPDI major. Failure to do so may impact time to graduation:

Code	Title	Credits	Completed
Major Requirements (106 credits)			
SPDI Core Courses			
SPDI-110	Electricity & Electronic Fundamentals	4	
IISPDI-151	Product Design Principles	4	
SPDI-180	Metal Processes & Prototyping	4	
SPDI-221	Three Dimensional CADD	4	
SPDI-302	Properties of Materials	2	
SPDI-304	Materials - a Life Cycle View	4	
SPDI-351	Product Design II	4	
Management Core Courses			
MGT-101	Introduction to Management	4	
MGT-140	Quantitative Decision-Making	4	
MGT-215	Accounting for Sustainable Business	4	
SPDI/MGT-446	Competitive Manufacturing Management	4	
SPDI/Management/Physics Core Course			
INPHYS-131	Engineering Fundamentals	4	
Required Allied Discipline Courses			
IAART-103	Three-Dimensional Design	4	
SAFE-215	Human Factors in Safety	4	
Select **at least one** of the following MATH courses:		4	
MATH-112	Precalculus		
MATH-211	Calculus I		
SPDI Capstone Courses			
SPDI-352	Product Design III	4	
SPDI-400	Manufacturing Enterprise	4	
In addition to the SPDI major, take the following SPDI courses:			
SPDI-321	Advanced 3D CADD	4	
SPDI-330	Metrology & CMM	2	
SPDI-380	CAD/CAM/ CNC Using MasterCAM	4	
SPDI-410	Mechatronics and Automation	4	
SPDI-450	Product DfMA	4	
SPDI-456	Portfolio Design	2	
In addition to the SPDI major, take the following Allied Discipline Courses:			
INPHYS-141	College Physics I	4	
or INPHYS-241	University Physics I		
PHYS-142	College Physics II	4	
or PHYS-242	University Physics II		
ISCS-140	Programming Foundations I	4	
INSAFE-213	Safety Chemistry	4	
Select **at least one** of the following:		4	
MATH-341	Applied Statistics		
ISMGT-383	Applied Data Analysis & Vis		
IIPHYS-342	Data Analysis for Scientists		
Total Credits		**106**	

SPDI: General Engineering

This option can help prepare the student for career growth and flexibility related to new product design and development, engineering and manufacturing and for further academic study upon graduation in Engineering and Physics. Students electing the General Engineering Option will build on their SPDI major's knowledge and skills in design thinking, product design and development processes, materials and manufacturing methods, business management, and sustainability, with a strong crossdisciplinary foundation in Math and Physics and in other engineering related disciplines of chemistry, data analytics, and areas of interest. To fulfill this option students must take the following courses while fulfilling the requirements for the SPDI major. Failure to do so may impact time to graduation:

Code	Title	Credits	Completed
Major Requirements (102 credits)			
SPDI Core Courses			
SPDI-110	Electricity & Electronic Fundamentals	4	

IISPDI-151	Product Design Principles	4	
SPDI-180	Metal Processes & Prototyping	4	
SPDI-221	Three Dimensional CADD	4	
SPDI-302	Properties of Materials	2	
SPDI-304	Materials - a Life Cycle View	4	
SPDI-351	Product Design II	4	
Management Core Courses			
MGT-101	Introduction to Management	4	
MGT-140	Quantitative Decision-Making	4	
MGT-215	Accounting for Sustainable Business	4	
Select **one** of the following:		4	
MGT-331	Principles of Marketing		
MGT/SPDI-446	Competitive Manufacturing Management		
SPDI/Management/Physics Core Course			
INPHYS-131	Engineering Fundamentals	4	
Required Allied Discipline Courses			
IAART-103	Three-Dimensional Design	4	
MATH-211	Calculus I	4	
SAFE-215	Human Factors in Safety	4	
SPDI Capstone Courses			
SPDI-352	Product Design III	4	
SPDI-400	Manufacturing Enterprise	4	
In addition to the SPDI major, choose the following Allied Discipline Courses:			
Mathematics			
MATH-212	Calculus II	4	
MATH-335	Linear Algebra	4	
Physics			
INPHYS-241	University Physics I	4	
PHYS-242	University Physics II	4	
Allied Disciplines			
Select **one** of the following:		4	
ISCS-210	Python Programming		
IIPHYS-342	Data Analysis for Scientists		
ISMGT-383	Applied Data Analysis & Vis		
Chemistry:			
INCHEM-111	General Chemistry	4	
CHEM-112	General Chemistry II	4	
General Engineering Electives			
Select **two** of the following:		8	
PHYS-339	Classical Mechanics		
SPDI-410	Mechatronics and Automation *		
ARCH-375	Statics and Structural Analysis		
INOPTC-101	Introduction to Optics		
or INOPTC-1 & INOPTC-12	Laser Optics and Thin Film in Optics		
MATH-311	Vector Calculus		
MATH-312	Differential Equations		
Total Credits		**102**	

Electives

Select additional courses of your choice to bring total number of credits earned to 120. Students are encouraged to complete a minor or an organized cluster of courses related to their career interests.

Degree Requirements

120 credits
40 credits at the upper-level