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	Elect & Electronic Fund	4	
IISPDI-151	Product Design Principles	4	
SPDI-180	Metal Procs & Proto	4	
SPDI-221	3-D 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 Decision Making	4	
Select **one** of the following:		4	
MGT-331	Principles of Marketing		
MGT/SPDI-446	Competitive Manufacturing Mgt		
SPDI/Management/Physics Electives			
Select **four credits** of the following:		4	
MGT-451	Business and Society		
INPHYS-131	Engineering Fundamentals		
SPDI-121	Design Vis in Pd & Eng		
SPDI-170	Intro Woodworking Tech		
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	3-D 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	Adv Cooperative Education (counts toward elective credit)		
Total Credits		**66**	

Options

The SPDI Major Pathway is cross-disciplinary and provides a strong foundation in the processes of New Product Design and Manufacturing while integrating Sustainability principles and decision-making methods. This Pathway allows for exploring other Minors and academic interests. While not required for the SPDI major, each student may choose one of the following other Pathways as Options. These Options are#General Engineering#and#Manufacturing Engineering. Courses for the option that also fulfill requirements for the SPDI major are not counted twice for overall college credit. 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
Manufacturing Engineering (minimum of 40 additional Credits)			_____
Core Courses (20 Credits)			_____
SPDI-321	Advanced 3D CADD [1]	4	_____
SPDI-330	Metrology & CMM [1]	2	_____
SPDI-380	CAD/CAM/ CNC Using MasterCAM [1]	4	_____
SPDI-410	Mechatronics and Automation [1]	4	_____
SPDI-450	Product DfMA [1]	4	_____
SPDI-456	Portfolio Design [1]	2	_____
Allied Courses (16 Credits)			_____
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	_____
or ISCS-210	Python Programming		_____
INCHEM-111	General Chemistry	4	_____
Select **one** of the following:		4	_____
MATH-341	Applied Statistics		_____
ISMGT-383	Applied Data Analysis & Vis		_____
IIPHYS-342	Data Analysis for Scientists		_____
Total Credits		**40**	_____

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
SPDI General Engineering Courses (Minimum of 36 Credits)			_____
SPDI Core 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	_____
Chemistry			_____
INCHEM-111	General Chemistry	4	_____
CHEM-112	Gen Chemistry II	4	_____
Allied Courses			_____
Select **one** of the following:		4	_____
ISCS-210	Python Programming		_____
IIPHYS-342	Data Analysis for Scientists		_____
ISMGT-383	Applied Data Analysis & Vis		_____
Engineering Electives			_____
Select **two** of the following:		8	_____
PHYS-339	Classical Mechanics		_____
SPDI-410	Mechatronics and Automation [1]		_____
ARCH-375	Statics/ Structural Analysis		_____
INOPTC-101	Introduction to Optics		_____
or INOPTC-1	Laser Optics		_____
or INOPTC-1	Thin Film in Optics		_____
MATH-311	Vector Calculus		_____
MATH-312	Differential Equations		_____
Total Credits		**36**	_____

Students are encouraged to complete a minor or an organized cluster of courses related to their career interests.

Electives

Select additional courses of your choice to bring total number of credits earned to 120.

Degree Requirements

120 credits
40 credits at the upper-level