



## ISE FOCUS AREA: Design & Manufacturing

Department of Industrial and Systems Engineering

General Education (19 sh)		sh
ALL	RHET:1030 Rhetoric	4
F/S	Diversity & Inclusion	3
ALL	Be Creative	3
ALL	Required Gen Ed Course: PSY:1001 Elementary Psychology	3
ALL	Approved Gen Ed Course	3
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Math & Basic Science Core (24 sh)		sh
F/S	MATH:1550 Math I: Single Variable Calculus (P: ALEKS score $\geq$ 75 or MPT Level 3 score $\geq$ 9)	4
F/S	MATH:1560 Math II: Multivariable Calculus (P: MATH:1550)	4
ALL	MATH:2550 Math III: Matrix Algebra (P: MATH:1550)	2
ALL	MATH:2560 Math IV: Differential Equations (P: MATH:1560 & MATH:2550)	3
ALL	STAT:2020 Probability & Statistics For Engr & Phys Sci (P: MATH:1560)	3
ALL	CHEM:1110 Principles of Chemistry I (P: ALEKS score $\geq$ 55 or MPT Level 3 score $\geq$ 9)	4
F/S	PHYS:1611 Introductory Physics I / Lab (C: MATH:1550)	4

Engineering Core (7 sh)		sh
F	ENGR:1000 Engineering Success for First-Year Students (First semester standing)	1
F	ENGR:1100 Introduction to Engineering Problem Solving	3
F/S	ENGR:1300 Introduction to Engineering Computing (C: MATH:1550)	3

ISE Requirements (40 sh)		sh
F/S	PHYS:1612 Introductory Physics II / Lab (P: PHYS:1611; C: MATH:1560)	4
F	ISE:2360 Design for Manufacturing	3
S	ISE:2500 Engineering Economy (C: STAT:2020)	3
S	ISE:3300 Manufacturing Systems (P: ISE:2360 & ISE:3700)	3
F	ISE:3350 Process Engineering (P: ISE:3700)	3
F	ISE:3400 Human Factors (P: PSY:1001)	3
S	ISE:3450 Ergonomics	3
S	ISE:3500 Information Systems Design (P: ENGR:1300)	3
F	ISE:3600 Quality Control (P: STAT:2020 or BAIS:9100 or STAT:3100 & STAT:3101 & STAT:3200)	3
F	ISE:3610 Stochastic Modeling (P: STAT:2020; C: ISE:3700)	3
S	ISE:3660 Data Analytics with R (P: STAT:2020)	3
F	ISE:3700 Operations Research (P: MATH:2550; C: STAT:2020)	3
S	ISE:3750 Digital Systems Simulation (P: ISE:3700 & ISE:3610)	3

ISE Capstone Design Courses (4 sh)		sh
F/S	ISE:4600 Industrial Engineering Design Project (IEDP) (C: ALL IE Required Courses - ISE:2500, ISE:3300, ISE:3350, ISE:3400, ISE:3450, ISE:3500, ISE:3600, ISE:3660, & ISE:3750)	4

ISE Departmental Seminars (0 sh)		sh
F	ISE:2000 Sophomore Seminar: Industrial Engineering (Status: Sophomore)	0
S	ISE:3000 Professional Seminar: Industrial Engineering (Status: Junior)	0

### KEY:

<sup>1</sup> offered in odd years

<sup>2</sup> offered in even years

### Engineering Fundamentals Electives (11 sh)

Select at least 11 sh from the list of courses below

ALL	ENGR:2110 Statics (P: MATH:1550; C: MATH:1560, PHYS:1611)	2
ALL	ENGR:2120 Electrical Circuits (C: MATH:2560)	3
ALL	ENGR:2130 Thermodynamics (P: CHEM:1110, PHYS:1611; C: MATH:1560)	3
ALL*	ENGR:2710 Dynamics (P: ENGR:2110 & MATH:1550)	3
ALL*	ENGR:2720 Materials Science (P: CHEM:1110; C: MATH:1550)	3
F/S	ENGR:2730 Computers in Engineering (P: ENGR:1300)	3
ALL*	ENGR:2750 Mechanics of Deformable Bodies (P: ENGR:2110; C: MATH:2560)	3
S	ENGR:3110 Intro to AI & Machine Learning in Engr (P: ENGR:1300; C: MATH:2550)	3
F	BME:2710 Engineering Drawing, Design, and Solid Modeling	3
S	CBE:2040 Environment, Energy, and Climate Change	3
F/S	ECE:2400 Linear Systems I (P: ENGR:2120 & MATH:2560)	3
F/S	ECE:2410 Principles of Electronic Instrumentation (P: ENGR:2120 & PHYS:1612 & MATH:2560)	4

### Required: Design & Manufacturing (6 sh)

F/S	ARTS:1020 Elements of 3D Design	3
F/S	TDSN:2240 Drafting and Modeling with AutoCAD & Rhino (P: Engineering Major*)	3

\*the prerequisite is waived for ISE students for Engineering Majors section only

### Electives: Design & Manufacturing (18 sh)

#### Elective: Focus Area - General Elective

select three courses from this list

F	ISE:4116 Manufacturing Processes, Simulations, and Automation (P: ME:2300 or ISE:2360)	3
S	ISE:4900 Introduction to Six Sigma (P: ISE:3600)	3
S	ISE:5310 Advanced Computational Design and Manufacturing (Recommend knowledge of C/C++ programming concepts)	3
S <sup>2</sup>	ISE:5620 Design of Experiments (P: STAT:2020)	3
S <sup>2</sup>	ISE:5650 Mechatronics Engineering for Smart Device Design (P: ENGR:2120 & ISE:2360)	3
F/S	BME:2500 Biomaterials and Biomechanics (P: ENGR:2110; C: HHP:3500 & BIOS:4120 or	4
F	BME:2710 Engineering Drawing, Design, and Solid Modeling	3
F	BME:5101 Biomaterials and Implant Design (P: ENGR:2750 & BME:2500)	3
S	ME:4112 Engineering Design Optimization (P: ENGR:2110 & MATH:2550; Status: junior)	3
S <sup>2</sup>	ME:5167 Composite Materials (P: ENGR:2750)	3
S	MTLS:4910 Mixed Media and Professional Practices (P: MTL:2910)	3
S	TDSN:3260 Design for Production (P: TDSN:2210, TDSN:2240, and TDSN:2250)	4
S	TDSN:3200 Product Design (P: TDSN:2210 and TDSN:2240) and C:TDSN:2250	4
F/S	MTLS:3285 Fabrication and Design: Hand-Made Bicycle (P: TDSN:2240)	4
F/S	TDSN:2280: Material, Tools and Fabrication (P: Engineering Major*)	3

\*the prerequisite is waived for ISE students for Engineering Majors section only

#### Elective: Focus Area - Math / Science

select one course from this list

ALL	BIOL:1411 Foundations of Biology (P: CHEM:1110 w/min C- or CHEM:1070 w/min A-)	4
ALL	CHEM:1120 Principles of Chemistry II (P: CHEM:1110 w/min C-)	4
F/S	MATH:3550 Engineering Math V (P: MATH:1560 & (MATH:2550 or MATH:2700); C:MATH:2560)	3
F/S	MATH:3800 Introduction to Numerical Methods (P: (MATH:2700 or MATH:2550) & (MATH:1560 or MATH:1860))	3
S	PHYS:2704 Physics IV - no lab required (P: PHYS:1612 & MATH:1860 or MATH:1550)	3

#### Elective: Focus Area - Above 3000-level engineering course

select one course

ALL	Any 3000 or above course offered by an engineering department	3
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#### Elective: Focus Area - Systems

select one course from this list

F/S	ENGR:2730 Computers in Engineering (P: ENGR:1300)	3
F/S	ISE:4172 Big Data Analytics (P: STAT:2020 or BAIS:9100)	3
F	ISE:4175 Safety Engineering	3
S	ISE:4900 Introduction to Six Sigma (P: ISE:3600)	3
ALL	Any 5000 or above Industrial Engineering (ISE) course	3