

UNIVERSITY OF WASHINGTON

OFFICE OF THE PRESIDENT

October 29, 2004

Mark A. Emmert, President

Dean Denice D. Denton College of Engineering Box 352180

Dear Denice:

Based on the recommendation of its Subcommittee on Admissions and Programs, the Faculty Council on Academic Standards has recommended approval of the revised requirements for the Bachelor of Science degree in Industrial Engineering. A copy of the changes is attached.

I am writing to inform you that the Department of Industrial Engineering is authorized to specify these requirements for students admitted to the program beginning autumn quarter 2004.

The new requirements should be incorporated in printed statements and in individual department websites as soon as possible. The *General Catalog* website will be updated accordingly by the Registrar's Office.

Sincerely yours,

Mark A. Emmert

President

Man

Enclosure

cc:

Professor Vipin Kumar (with enclosure)

Mr. W. W. Washburn (with enclosure)
Mr. Robert Corbett (with enclosure)

Dr. Deborah Wiegand (with enclosure) INDE - 060104



Creating & Changing Undergraduate Academic Programs

IND E - 060104

College: Engineering Depa	rtment or Unit:	Industrial Eng	ineering	Date: 6/1/04
New Programs				
Leading to a Bachelor of	in			J
Leading to a Bachelor of Leading to a Bachelor of	deoree ni	th a major in		aegree
Leading to a	Intion within the e	vistina maior in		
Leading to a Minor in	opaon <i>minin inc</i> is	cisiing major in		
Changes to existing programs				
New Admission Requirements for	the Major <i>in</i>		within the Rack	ralar of
Revised Admission Requirements f	or the Major in		nithin the Bac	halan of
Revised Program Requirements for	the Major in Indi	strial Engineerin	a within the Rachel	on of Science in
Industrial Engineering.		odini Enighicemi	g within the Dathen	or of <u>Science in</u>
	on <i>in</i>	with	in the major in	
Revised Requirements for the Option Revised Requirements for the Minor	or in	wiin	.n ine major in	
Other Changes				
Change name of program from		to		
New or Revised Continuation Police	v for			
Eliminate program in	-, , ,		· · · · · · · · · · · · · · · · · · ·	
Proposed Effective Date: (quarter/ year	r) Autumn 20	Ω 4		
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Contact Person	Phon	e Number	E	mail
Claire Fraczek	543-5041		msclaire@u.v	vashington.edu

1. Explanation of and Rationale for Proposed Change: (Please use additional pages if necessary. For new programs, please include any relevant supporting documentation such as student learning outcomes, projected enrollments, letters of support, and departmental handouts.)

The Industrial Engineering program has concurrently requested an increase in the number of credits (from 3 to 4) for twelve (12) IND E courses. We are adding new material and contact hours to these courses. If approved, the course credit change will affect the graduation requirements in Industrial Engineering, since 5 of the courses are required core courses. This request is intended to reflect that change. Specifically, we request the following changes to the graduation requirements for a B.S.I.E.:

- An increase from 19 to 24 required credits in Industrial Engineering Core Courses. This
 accounts for one additional credit each in IND E 237 (new number is IND E 337), IND E 324
 and IND E 325 (new numbers are IND E 310 and IND E 311), IND E 316, and IND E 495.
- A change from 42 required Technical Electives to 37 required Technical Electives. This change would keep the total credits required for a BSIE at 180.

Please see the attached proposed change in graduation requirements.

^{*} For information about when and how to use this form please go to http://www.washington.edu/faculty/facsenate/councils/fcas/1503/.

Creating & Changing Undergraduate Academic Programs

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2.	Catalog	Copy

A. Catalog Copy as Currently Written (Include only sections/paragraphs that would be changed if your request is approved. Please cross out or otherwise highlight any deletions.)

Courses for the B.S.I.E. degree include a core of 19 credits of specialized industrial engineering courses normally taken after admission to the program, 42 credits of technical electives including at least 12 credits from specified IND E courses, and 35 credits of fundamental courses representing several engineering disciplines. The B.S.I.E. degree also requires 54 credits of specific courses in mathematics, physical sciences, and communications, as well as 30 credits of humanities and social sciences.

B. Proposed Catalog Copy, Reflecting Requested Changes (Include exact wording as you wish it to be shown in the printed catalog. Please underline or otherwise highlight any additions. If needed, attach a separate, expanded version of the changes that might appear in department publications.)

Courses for the B.S.I.E. degree include a core of 24 credits of specialized industrial engineering courses normally taken after admission to the program, 37 credits of technical electives including at least 16 credits from specified IND E courses, and 28 credits of fundamental courses representing general engineering and computing. The B.S.I.E. degree also requires 61 credits of specific courses in mathematics, physical sciences, and written and oral communications, as well as 30 credits of humanities and social sciences.

3. Signatures (required)

	1.5	<u> </u>	
Chair Program Director	Date	Dean	Date
/www.	6/2/04	147	6/15/04
College Committee V	Date	Faculty Louncil on Academie Standards	Date
Niepin Keemas	6/7/04		10-8-0
		15-717	1.

Graduation Requirements

180 credits as follows:

General Education Requirements (91 credits)

- 1. Written and Oral Communications (12 credits): 5-credits in English composition from the University-approved list; T C 231; T C 333 (or department-approved alternative).
- 2. Visual, Literary, and Performing Arts (VLPA) and Individuals and Societies (I&S) (30 credits): A minimum of 10 credits is required in each area.
- 3. Natural World (49 credits)
 - a. Mathematics (24 credits): MATH 124, MATH 125, MATH 126, MATH 307, MATH 308; IND E 315
 - b. Science (25 credits): CHEM 142, CHEM 152; PHYS 121, PHYS 122, PHYS 123

Major Requirements (89 credits)

- 1. Engineering Fundamentals (28 credits): CSE 142, MSE 170, A A 210, E E 215, CEE 220, M E 230, IND E 250
- 2. Industrial Engineering Core (19 24 credits): 1ND E 237, 1ND E 310, 1ND E 311, 1ND E 316, 1ND E 324, 1ND E 325, 1ND E 337, 1ND E 494, 1ND E 495
- 3. Technical Electives (42 37 credits): At least one class from approved courses in each of the following areas: operations research, statistics, production/operations, design, and general engineering. A minimum of 21 credits must be completed in courses offered by units in the College of Engineering. See adviser for list of approved technical electives.
- 4. Grade Requirements: Minimum 2.00 GPA in all engineering courses with no grade below 1.0 in these courses.



CURRENT



Bachalor of Science in Industrial Engineering Graduation Requirements

◆ CHEM 152 [5cr] General Chemistry with lab <i>[pr. CHEM 142]</i> ◆ PHYS 121* [5cr] Mechanics with lab <i>[pr. MATH 124]</i>	Physical Sciences [25 credits] CHEM 142 [5cr] General Chemistry with lab	*The sequence of MATH 127, 128, 129 may be taken in lieu of 124, 125, 126.	IND E 315 [3cr] Prob. & Statistics for Engineers fpr: MATH 307]	MATH 308 [3cr] Linear Algebra with Applications for MATH 126]	MATH 307 [3cr] Intro to Differential Equations [pr. MATH 125]	◆ MATH 126 (or 129)* [5cr] Calculus with Analytic Geometry III	◆ MATH 125 (or 128)* [5cr] Calculus with Analytic Geometry II	Mathematics	Bachelor of Science in Industrial Engineering Graduation Requirements
Complete a minimum of 42 credits, including AT LEAST one course from	Technical Electives	IND E 495 [3cr] IE Senior Design fpr: IND E351 & 494]	IND E 494 [4cr] Design in the Manufacturing Firm fpr: TC 333, IND E 237]	IND E 325 [3cr] Nonlinear Programming &	IND E 324 [3cr] Applications of Linear Proc	IND E 316 [3cr] Design of Experiments for: IND E 315]	IND E 237 [3cr] Intro to Manufacturing Systems	[24 credits] Industrial Engineering Required Core Courses[19 credits]	Engineering Graduation Require
EAST one course from	s[minimum 42 credits]	<u> </u>	ing Firm <i>[pr: TC</i> 333, <i>IND € 237]</i>	[3cr] Nonlinear Programming & Stochastic Models for: IND E 315, IND E 324]	[3cr] Applications of Linear Programming for MATH 308, CSE 142]	r. IND E 315J	stems	urses[19 credits]	rements

5 .*	•	•
The accompanying	◆ PHYS 123*	◆ PHYS 122*
*The accompanying lab sections to PHYS 121, 122, 123 must be completed	[5cr] Waves with lab [<i>pr: MATH 126]</i>	[5cr] Electro/ Oscillatory with lab [pr: MATH 125]
N/I		

Written and Oral Communications.......112 credits

ENGL COMP TC 231 TC 333 [3cr] Intro to Technical Writing [pr: ENGL COMP]
[4cr] Adv. Tech Writing/Oral Present [pr: TC 231] [5cr] University English Composition requirement

Visual, Literary & Performing Arts/Individuals & Society

Minimum 10 credits in I&S required Minimum 10 credits in VLPA required

CSE 142	General Enginee
[4cr] Computer Programming for Engineers	General Engineering/Computing Courses[28]

IND E 250	ME 230	CEE 220	EE 215	AA 210	MSE 170	CSE 142
[4cr] Fund. of Engineering Economy	[4cr] Kinematics & Dynamics [pr: AA 210]	[4cr] Intro to Mechanics of Material fpr: AA 210]	[4cr] Fund. of Electrical Engineering [pr. PHYS 122, MATH 126]	[4cr] Engineering Statics for MATH 126, PHYS 121]	[4cr] Fund of Material Science fpr: CHEM 152]	[4cr] Computer Programming for Engineers

offered by units in the College of Engineering. EACH of the following 5 categories including a minimum of 21 credits from courses Complete a minimum of 42 credits, including AT LEAST one course from

A. Operations Research:

n. Operations is too career.	S
IND E 326	[3cr] Methods of Operations Research [pr. IND E 325]
IND E 424	[4cr] Simulation [pr. IND E 237 &325; 325 may be taken concurrently]
B. Statistics:	

C. Production/Operations:

IND E426 IND E 421

[3cr] Reliability Engineering & System Safety for: IND E 315]

[3cr] Statistical Quality Control fpr: IND E 315

[3cr] Human Factors	ND F 351
	Design:
[4cr] Plant Layout & Material Handling	IND E 439
[3cr] Intro Computational Manufacturing [pr. IND E 237 & 324]	IND E 433
[4cr] Manufacturing Scheduling& Inventory fpr: IND E 237 &325]	ND E 430

E. General Engineering: IND E 455

Ö

CSE 143	CHEME 260
[5cr] Computer Programming for Engineers II fpr: CSE 142]	[4cr] Thermodynamics fpr. CHEM 142, MATH 126, PH
CSE 142]	PHYS 121]

[3cr] User Interface Design [pr: IND E 316]

Undergraduate Technical Elective List. Refer any questions to the IE Advisor. Additional technical elective courses may also be chosen from the approved

Upper Division Admission Requirement

[pr] -- Prerequisite course(s)

Revised 9/24/03

Early Admission Requirements:

~Must be enrolled at UW w/ at least 15cr earned at UW

Industrial Engineering Undergraduate Technical Electives List (Revised 5/4/04)

Complète a minimum of 42 credits, including AT LEAST one course from EACH of the following 5 categories:

\$1 credits must be from the College of Engineering

A. Operations Research:

3 GNI

IND E 359 [3ct] Welpods of Operations Research [pr: IND E 355]

IND E 454 [4ct] Simulation [pr. IND E 237 &325; 325 may be taken concurrently]

B. Stats:

456 [3ct] Reliability Engineering & System Safety (pr. IND E 315) IND E 421 [3cr] Statistical Quality Control [pr: IND E 315] IND E

C. Production/Operations:

433 [3cr] Intro Computational Manufacturing [pr: IMD E 237 & 324] 430 [4ct] Manufacturing Scheduling& Inventory [pr: IND E 237 &325]

D. Design: 439 [4cr] Plant Layout & Material Handling IND E

426 [3cr] User Interface Design [pr: IND E 316]

351 [3cr] Human Factors

CHEME Se0 [4ct] Thermodynamics [pr: CHEM 142, MATH 126, PHYS 121] E. General Engineering:

143 [2ct] Computer Programming for Engineers II [pr: CSE 142]

Additional technical elective courses may be chosen from the list below to reach the minimum 42 credits.

UED	Scheduling and Inventory	'	HTAMO		alaboM taadabsara2	1 '
426	Reliability	ε	TOMGO	र्ष्प3	Inventory/Materials Management	Þ
424	noitelumi&	Þ	BTBM	†9 †	Extractive Process Analysis	3
421	Statistical Quality Control	ε	ТМЭМ	422	Protecting Intellectual Property in Global Economy	2
156	Human Factors	ε	тмэм	413	Labor Law and Collective Bargaining	Þ
326	Methods of Operations Research	ε	MGMT	404	Organization Development and Change	Þ
562	Product Dissection	ε	MGMT	403	Activating High Performance	Þ
321	Intro to Finance and Accounting	ε	MGMT	405	Deal-Making and Negotiations	7
320	Intro to Marketing and Human Resources	S	MGMT	104	Leadership, Critical Thinking, & Decision Making	Þ
ZS 7	ezioN Istnemnonivna & Environmental	3	ТМЭМ	353	Business Ethics/Corporate Social Responsibility	7
667	Honors	3	ME	067	Naval Architecture	3
100	Intro to Engr Design (only It taken as Frosh/Soph)	S	WE	480	Intro to Computer-Aided Technology	Þ
Z8 2	Semi-conductor Materials & Devices	Þ	ME	428	Noise Control	ε
49 7	Electric Energy Distribution Systems	7	WE	604	IntroNum. Control/Comp.Aid. Mfg	ε
SIP	CompAided System Analysis & Design	ε	ME	403	Sesseson9 Isvome9-Isiteti	ε
A00₽	Engineering Robotics II	9	ME	374	Systems Dynamic Analy. & Design	S
\$007	Engineering Robotics I	7	WE	878	Intro to Systems Dynamics	Þ
172	Intro to Digital Systems & Computers	Þ	WE	322	Manufacturing Processes	Þ
SIP	Intro to Artificial Intelligence	ç	WE	324	Behavior of Engineering Materials	S
014	Computer Systems	3	HTAM	767	Special Topics-Probability (Intro Stochast Processes)	ε
εζε	Data Structures and Algorithms	3	HTAM	167	Special Topics-Probability (Intro Stochast Processes)	3
143	Computer Prog. for Engineers II	ç	HTAM	60 1	Discrete Optimization	ε
Þ6 Þ	Air-Pollution Control Equip, Design	3	HTAM	408	Nonlineat Optimization	ε
£67	Air-Pollution Source Testing/Equip. Eval.	3	HTAM	70 p	Linear Optimization	ε
987	Water-Quality Analysis	ε	HTAM	968	Probability 3	ε
197	Bio. Problems in Water Pollution	3:5	HTAM	382	Probability 2	ε
430	Issues in Professional ENGR Practice	ε	HTAM	36⊄	Probability 1	ε
£13	Transportation Tech. & Systems	ε	HTAM.	327	I sizylanA laeA of ontal	ε
014	Traffic Engineering Fund & Surveys	ε	HTAM	326	Advanced Calculus 2	ε
S07	Construction Planning & Sched.	3	HTAM	324	f sulusiced Calculus 1	ε
363	Constructional Materials	Þ	HTAM	309	Linear Analysis	ε
320	Environ, Engr. Water & Air Quality	Þ	SI	084	light of Database Mgt	Þ
908	Construction Engineering	ε	SI	300	Intro to Information Systems	S
274	Papermaking Processes	ε	IND E	5xx	All IND E Graduate Level Courses	Yer
LZÞ	Pulping & Bleaching Processes	ε	IND E	664	Special Projects (6 credits max)	Var
355	Biological Frameworks for Engineers	£	IND E	865	Special Topics in Industrial Engineering	VST
608	Creativity and Innovation	2	IND E	967	Entrepreneurship	ε
560	Тћеттодупатіся	7	IND E	997	User Intertace Design	ε
121	Ceramic Processing	Þ	IND E	627	Plant Layout & Material Handling	7
3669	Intro to Technology Commercialization	*	IND E	433	Intro Computational Manufacturing	ε
101	Fed. Income Tax Factors in Business Decisions	ε	IND E	431	Computer Integrated Manufacturing	7
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	426 321 321 322 326 326 327 320 320 400 400 402 402 403 403 403 403 403 403 403 403	699E Intone Tax Factora in Busineas Decisiona 599E Into to Technology Commercialization 260 Thermodynamics 260 Thermodynamics 260 Creativity and Innovation 271 Pulping & Bleaching Proceases 272 Environ. Engineering 273 Environ. Engineering 274 Poperational Materials 275 Environ. Engineering 276 Construction Engineering 277 Environ. Engineering & Sched. 278 Construction Planning & Sched. 279 Environ. Engineering Enud & Surveys 280 Construction Righting & Sched. 281 Environ. Engineering Fund & Surveys 282 Constructions Intelligence 283 Environ. Engineering Fund & Surveys 284 Mater-Quality Analysis 285 Environ. Engineering Fund & Surveys 286 Water-Quality Analysis 287 Intro to Artificial Intelligence 288 Engineering Robotics II 289 Air-Pollution Control Equip, Design 290 Air-Pollution Source Testing/Equip. Eval. 291 Air-Pollution Control Equip, Design 292 Air-Pollution Source Testing/Equip. Eval. 293 Air-Pollution Source Testing/Equip. Eval. 294 Air-Pollution Source Testing/Equip. Eval. 295 Engineering Robotics II 296 Engineering Robotics II 297 Data Structures and Algorithms 298 Air-Pollution Control Equip, Design 299 Air-Pollution Control Equip. 290 Air-Pollution Control Equip. 291 Air-Pollution Control Equip. 292 Air-Pollution Source II 293 Air-Pollution Source II 294 Air-Pollution Source III 295 Engineering Robotics II 296 Engineering Robotics II 297 Data Structures and Aluman Resources 298 Human Factors 299 Human Factors 290 Human Factors 290 Human Factors 290 Human Factors 291 Human Factors 292 Human Factors 293 Human Factors 295 Human Factors 296 Human Factors 297 Human Factors 298 Human Factors 299 Human Factors 290 Human Factors 290 Human Factors 290 Human Factors 290 Human Factors 291 Human Factors 291 Human Factors 292 Human Factors 293 Human Factors 295 Human Factors 296 Human Factors 297 Human Factors 298 Human Factors 299 Human Factors 290 H	401 Fed. Income Tax Factors in Business Decisions 3 599E Intro to Technology Commercialization 4 720 Cetamic Processing 720 720 Thermodynamics 2 720 Creativity and Innovation 2 721 Pulping & Bleaching Processes 3 722 Electric Energy Distribution Systems 2 723 Data Structures and Algorithms 2 724 And Computer Protes 1 725 Data Structures and Algorithms 3 726 Methods Of Operations & Design 6 727 Intro to Digital Systems 3 728 Electric Energy Distribution Systems 3 739 And Processes 1 743 Computer Prog. 1 743 Computer Prog. 1 744 Computer Prog. 1 745 Data Structures and Algorithms 3 746 Methods Of Operations & Besign 6 747 And 1 748 Energy Distribution Systems 3 749 Air Pollution Source Testing/Equip, Eval. 3 740 Engineering Robotics II 6 740 Engineering Robotics II 7 741 Computer Prog. 1 742 Computer Systems 3 743 Electric Energy Distribution Systems 3 744 Air Intro to Digital Systems 5 745 Energy Distribution Systems 3 746 Air Intro to Engr Design (only It taken as Frost/Soph) 5 740 Honors 7 741 Intro to Engr Design (only It taken as Frost/Soph) 6 745 Froduct Diseascion 3 746 Human Factors 3 747 Intro to Engr Design (only It taken as Frost/Soph) 6 748 Human Factors 3 749 Human Ractors 3 750 Intro to Marketing Robotics II 6 751 Intro to Engr Design (only It taken as Frost/Soph) 7 752 Intro to Marketing Robotics II 7 753 Product Diseascion 3 754 Intro to Pinance and Accounting 3 755 Intro to Marketing Robotics II 7 756 Methods of Operations Research 3 757 Intro to Pinance and Accounting 3 758 Human Factors 3 759 Human Factors 3 750 Human Robotics II 7 751 Human Factors 3 752 Intro to Marketing Robotics II 7 753 Human Factors 3 754 Human Factors 3 755 Human Factors 3 756 Human Factors 3 757 Human Factors 3 758 Human Factors 3 758 Human Factors 3 759 Human Factors 3 750 Human Factors 3 751 Human Factors 3 752 Human Factors 3 753 Human Factors 3 754 Human Factors 3 755 Human Factors 3 756 Human Factors 3 757 Human Factors 3 758 Human Factors 3 758 Human Factors 3 759 Human Factors 3 750 Human Factors 3 750 Human Fact	401 Fed. Income Tax Factors in Business Decisions 3 MOMT 429 Fed. Income Tax Factors in Business Decisions 4 MOMT 420 Creativity Processes 4 IND E 250 Creativity and Innovation 2 1 IND E 260 The modynamics 3 1 IND E 260 The modynamics 3 1 IND E 260 The modynamics 3 1 IND E 260 The Model of the Model o	42.5 Reliability 33 PIMOR 431 42.5 Gremin Park Factors in Business Decisions 3 10 DE 433 42.5 Ceramic Processing 4 10 DE 439 42.7 Ceramic Processing 4 10 DE 439 42.7 Ceramic Processing 4 10 DE 439 42.7 Ceramiculos Riginal Processes 3 10 DE 439 47.7 Processes 3 10 DE 445 47.8 Processes 3 10 DE 445 47.9 Processes 3 10 DE 445 47.9 Processes 3 10 DE 449 <td> 100 Fed Indoormal Ex Residue 100 1</td>	100 Fed Indoormal Ex Residue 100 1

CURRENT

450 Spreadsheet Models

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7	Scheduling and Inventory	430	IND E
ε	Reliability	927	IND E
Þ	noitelumiS	424	IND E
ε	Statistical Quality Control	421	IND E
ε	Human Factors	136	IND E
ε	Methods of Operations Research	326	IND E
ε	Product Dissection	295	IND E \ WE
ε	posture and Accounting	128	FM
G	Intro to Marketing and Human Resources	320	FM
ω	lndustrial & Environmental Moise	ZS †	ЕИЛН
3	Honors	667	ENGR
S	Intro to Engr Design (only It taken as Frosh/Soph)	100	ENGE
Þ	Semi-conductor Materials & Devices	Z8 2	33
Þ	Electric Energy Distribution Systems	49 7	33
ε	CompAided System Analysis & Design	915	33
9	Engineering Robotics II	A00₽	33
Þ	Engineering Robotics	\$007	33
Þ	Intro to Digital Systems & Computers	172	33
ç	Intro to Artificial Intelligence	515	CZE
3	Computer Systems	014	SSE
3	Data Structures and Algorithms	575	CSE
ç	Computer Prog. for Engineers II	143	CSE
3	Air-Pollution Control Equip, Design	Þ6Þ	990
3	Air-Pollution Source Testing/Equip. Eval.	664	SEE
ω	Vater-Quality Analysis	987	CEE
3:5	Bio. Problems in Water Pollution	197	CEE
3	Issues in Professional ENGR Practice	430	CEE
3	Transportation Tech. & Systems	413	E
ε	Traffic Engineering Fund & Surveys	014	CEE
3	Construction Planning & Sched.	504	CEE
Þ	Constructional Materials	363	EE CEE
Þ	Environ, Engr. Water & Air Quality	320	330
ε	Construction Engineering	908	EE
ε	Papermaking Processes	274	CHEWE
ε	Pulping & Bleaching Processes	127	CHEME
3	Biological Frameworks for Engineers	355	CHEME
2	Creativity and Innovation	308	CHEME
7	Тһегтодупатіся	560	CHEWE
Þ	Ceramic Processing	121	CERE
Þ	Intro to Technology Commercialization	3669	BIOEN
ε	Fed. Income Tax Factors in Business Decisions	104	atooA
12	2011	·OM	acinoo



PROPOSED



Bachelor of Science in Industrial Engineering Graduation Requirements

Additional technical elective courses may also be chosen from the approved Undergraduate Technical Elective List. Refer any questions to the IE Advisor.	
E. General Engineering: CHEME 260 [4cr] Thermodynamics [pr: CHEM 142, MATH 128, PHYS 121] CSE 143 [5cr] Computer Programming for Engineers II [pr: CSE 142]	MSE 170 [4cr] Fund of Material Science [pr. CHEM 152] AA 210 [4cr] Engineering Statics [pr. MATH 126, PHYS 121] EE 215 [4cr] Fund. of Electrical Engineering [pr. PHYS 122, MATH 126]
IND E 351 [4cr] Human Factors IND E 455 [4cr] User Interface Design [pr. IND E 316]	ngineering/@c
C. Production/Operations: IND E 430 [4cr] Manufacturing Scheduling& Inventory [pr: IND E 337 &311] IND E 433 [4cr] Intro Computational Manufacturing [pr: IND E 337 & 310] IND E 439 [4cr] Plant Layout & Material Handling [pr: IND E 310] D. Design:	[VLPA/I&S] [30 credits] Minimum 10 credits in VLPA required. Minimum 10 credits in I&S required.
b. Statistics: IND E 321 [4cr] Statistical Quality Control (pr. IND E 315) IND E426 [4cr] Reliability Engineering & System Safety (pr. IND E 315)	[4cr]
	*The accompanying lab sections to PHYS 121, 122, 123 must be completed Written and Oral Communications
Complete a minimum of 37 credits, including AT LEAST one course from EACH of the following 5 categories.	 ► PHYS 121* [5cr] Mechanics with lab [pr. MATH 124] ◆ PHYS 122* [5cr] Electro/ Oscillatory with lab [pr. MATH 125] ◆ PHYS 123* [5cr] Waves with lab [pr. MATH 126]
Technical Electives[mjn mum:37 credits]	Physical Sciences[25 credits] CHEM 142 [5cr] General Chemistry with lab
IND E 337 [4cr] Intro to Manufacturing Systems IND E 494 [4cr] Design in the Manufacturing Firm [pr. TC 333, IND E 337] IND E 495 [4cr] IE Senior Design [pr. IND E 351 & 494]	IND E 315 [307] Linear Algebra with Applications [pr: MATH 126] IND E 315 [307] Prob. & Statistics for Engineers [pr: MATH 307] *The sequence of MATH 127, 128, 129 may be taken in lieu of 124, 125, 126.
IND E 310 [4cr] Applications of Linear Programming [pr: MATH 308, CSE 142] IND E 311 [4cr] Nonlinear Programming & Stochastic Models [pr: IND E 315, IND E 310] IND E 316 [4cr] Design of Experiments [pr: IND E 315]	जिल्ला जिल्ला जिल्ला
Industrial Engineering Required Core Courses	Mathematics

^{◆ --} Upper Division Admission Requirement

[pr] -- Prerequisite course(s)

Revised 6/1/04

Early Admission Requirements:

Total credits required for Graduation......180

~Must be enrolled at UW w/ at least 15cr earned at UW

~Autumn Quarter option ONLY

~Must complete: MATH 124, 125, 126 or equiv; 10 cr of Physical Science requirements; 5 cr ENGL COMP

Industrial Engineering Undergraduate Technical Electives List (Revised 6/2/04)

Complete a minimum of 37 credits, including AT LEAST one course from EACH of the following 5 categories:

A. Operations Research:

IND E 312 [4cr] Methods of Operations Research [pr. IND E 311]

IND E 424 [4cr] Simulation [pr: IND E 237 & 311; 311 may be taken concurrently]

B. Stats:

IND E 321 [4cr] Statistical Quality Control [pr. IND E 315]

IND E 426 [4 cr] Reliability Engineering & System Safety [pr: IND E 315]

C. Production/Operations:

IND E 430 [4cr] Manufacturing Scheduling& Inventory [pr: IND E 237 & 311]

IND E 433 [4cr] Intro Computational Manufacturing [pr: IND E 237 & 310]

IND E 439 [4cr] Plant Layout & Material Handling [pr: IND E 310]

D. Design:

IND E 351 [4cr] Human Factors

IND E 455 [4cr] User Interface Design [pr: IND E 316]

E. General Engineering:

CHEME 260 [4cr] Thermodynamics [pr. CHEM 142, MATH 126, PHYS 121]

CSE 143 [5cr] Computer Programming for Engineers II [pr. CSE 142]

Additional technical elective courses may be chosen from the list below to reach the minimum 39 credits.

Use the "Request for a Technical Elective Course" on the back of this form to request approval of a course not included below.

Course	No.	Title	Cr.
ACCTG	401	Fed. Income Tax Factors in Business Decisions	3
BIOEN	599E	Intro to Technology Commercialization	4
CERE	421	Ceramic Processing	4
CHEME	260	Thermodynamics	4
CHEME	309	Creativity and Innovation	2
CHEME	355	Biological Frameworks for Engineers	3
СНЕМЕ	471	Pulping & Bleaching Processes	3
CHEME	472	Papermaking Processes	3
CEE	306	Construction Engineering	3
CEE	350	Environ, Engr: Water & Air Quality	4
CEE	363	Constructional Materials	4
CEE	405	Construction Planning & Sched.	3
CEE	410	Traffic Engineering Fund & Surveys	3
CEE	413	Transportation Tech. & Systems	3
CEE	430	Issues in Professional ENGR Practice	3
CEE	461	Bio. Problems in Water Pollution	3:5
CEE	486	Water-Quality Analysis	3
CEE	493	Air-Pollution Source Testing/Equip. Eval.	3
CEE	494	Air-Pollution Control Equip, Design	3
CSE	143	Computer Prog. for Engineers II	5
CSE	373	Data Structures and Algorithms	3
CSE	410	Computer Systems	3
CSE	415	Intro to Artificial Intelligence	5
EE	271	Intro to Digital Systems & Computers	4
EE	400\$	Engineering Robotics I	4
EE	400R	Engineering Robotics II	5
ĒΕ	415	CompAided System Analysis & Design	3
EE	457	Electric Energy Distribution Systems	4
EE.	482	Semi-conductor Materials & Devices	4
ENGR	100	Intro to Engr Design (only If taken as Frosh/Soph)	5
ENGR	499	Honors	3
ENVH	457	Industrial & Environmental Noise	3
M	320	Intro to Marketing and Human Resources	5
M	321	Intro to Finance and Accounting	3
ND E / ME	295	Product Dissection	3
ND E	312	Methods of Operations Research	4
ND E	1 -	Human Factors	14
ND E	321	Statistical Quality Control	4
NO E	424	Simulation	4
ND F.	426	Reliability	4
NO E	430	Scheduling and Inventory	4
	700	Anna and meditory	1 4

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approvai ur	e course.	not included below.	
Course	No.	Title	Cr.
IND E	431	Computer Integrated Manufacturing	4
INDE	433	Intro Computational Manufacturing	4
IND E	439	Plant Layout & Material Handling	4
IND E	455	User Interface Design	1 4
IND E	496	Entrepreneurship	3
IND E	498	Special Topics in Industrial Engineering	var
IND E	499	Special Projects (6 credits max)	var
IND E	5xx	All IND E Graduate Level Courses	var
IS	300	Intro to Information Systems	5
IS	480	Intro to Database Mgt	4
MATH	309	Linear Analysis	3
MATH	324	Advanced Calculus 1	3
MATH	326	Advanced Calculus 2	3
MATH	327	Intro to Real Analysis 1	3
MATH	394	Probability 1	3
MATH	395	Probability 2	3
MATH	396	Probability 3	3
MATH	407	Linear Optimization	3
MATH	408	Nonlinear Optimization	3
MATH	409	Discrete Optimization	3
MATH	491	Special Topics-Probability (Intro Stochast Processes)	3
MATH	492	Special Topics-Probability (Intro Stochast Processes)	3
ME	354	Behavior of Engineering Materials	5
ME	355	Manufacturing Processes	1 4
ME	373	Intro to Systems Dynamics	1 4
ME	374	Systems Dynamic Analy. & Design	5
ME	403	Material-Removal Processes	3
ME	409	IntroNum. Control/Comp.Aid. Mfg	3
ME	428	Noise Control	3
ИE	480	Intro to Computer-Aided Technology	1 4
ΛE.	490	Naval Architecture	3
MGMT	323	Business Ethics/Corporate Social Responsibility	4
MGMT	401	Leadership, Critical Thinking, & Decision Making	1 4
/GMT	402	Deal-Making and Negotiations	4
// GMT	403	Motivating High Performance	1 4
JGMT	404	Organization Development and Change	4
/GMT	413	Labor Law and Collective Bargaining	4
/GMT	422	Protecting Intellectual Property in Global Economy	2
METE	464	Extractive Process Analysis	3
PMGT	443	Inventory/Materials Management	┪
METH	450	Spreadsheet Models	4
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