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

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

301 Gerberding Hall • Box 351230 • Seattle, Washington 98195-1230 • 206-543-5010 • FAX: 206-616-1784

IND E-060104

Creating & Changing Undergraduate Academic Programs

College: Engineering **Department or Unit:** Industrial Engineering **Date:** 6/1/04

New Programs

☐ Leading to a Bachelor of _____ *in* _____ *degree*
☐ Leading to a Bachelor of _____ *degree with a major in* _____
☐ Leading to a _____ Option *within the existing major in* _____
☐ Leading to a Minor *in* _____

Changes to existing programs

☐ New Admission Requirements for the Major *in* _____ *within the Bachelor of* _____
☐ Revised Admission Requirements for the Major *in* _____ *within the Bachelor of* _____
☒ Revised Program Requirements for the Major *in* Industrial Engineering *within the Bachelor of Science in Industrial Engineering.*
☐ Revised Requirements for the Option *in* _____ *within the major in* _____
☐ Revised Requirements for the Minor *in* _____

Other Changes

☐ Change name of program *from* _____ *to* _____
☐ New or Revised Continuation Policy *for* _____
☐ Eliminate program *in* _____

Proposed Effective Date: *(quarter/year)* ___Autumn 2004_____

Contact Person	Phone Number	Email
Claire Fraczek	543-5041	msclaire@u.washington.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.

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)*

Chair/Program Director	Date 6/2/04	Dean	Date 6/15/04
College Committee	Date 6/7/04	Faculty Council on Academic Standards	Date 10-8-04

Industrial Engineering Program Changes
October 1, 2004 SCAP Meeting

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):* ~~IND E 237,~~ IND E 310, IND E 311, IND E 316, ~~IND E 324, IND E 325,~~ IND E 337, IND E 494, IND 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

Bachelor of Science in Industrial Engineering Graduation Requirements

Mathematics.....[24 credits]

- ♦ MATH 124 (or 127)* [5cr] Calculus with Analytic Geometry I
- ♦ MATH 125 (or 128)* [5cr] Calculus with Analytic Geometry II
- ♦ MATH 126 (or 129)* [5cr] Calculus with Analytic Geometry III
- MATH 307 [3cr] Intro to Differential Equations *[pr: MATH 125]*
- MATH 308 [3cr] Linear Algebra with Applications *[pr: MATH 126]*
- IND E 315 [3cr] Prob. & Statistics for Engineers *[pr: MATH 307]*

**The sequence of MATH 127, 128, 129 may be taken in lieu of 124, 125, 126.*

Physical Sciences.....[25 credits]

- ♦ CHEM 142 [5cr] General Chemistry with lab
- ♦ CHEM 152 [5cr] General Chemistry with lab *[pr: CHEM 142]*
- ♦ 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]*

**The accompanying lab sections to PHYS 121, 122, 123 must be completed*

Written and Oral Communications.....[12 credits]

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

Visual, Literary & Performing Arts/Individuals & Society [VLPA/I&S].....[30 credits]

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

General Engineering/Computing Courses.....[28 credits]

- CSE 142 [4cr] Computer Programming for Engineers
- 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]*
- CEE 220 [4cr] Intro to Mechanics of Material *[pr: AA 210]*
- ME 230 [4cr] Kinematics & Dynamics *[pr: AA 210]*
- IND E 250 [4cr] Fund. of Engineering Economy

Industrial Engineering Required Core Courses.....[19 credits]

- IND E 237 [3cr] Intro to Manufacturing Systems
- IND E 316 [3cr] Design of Experiments *[pr: IND E 315]*
- IND E 324 [3cr] Applications of Linear Programming *[pr: MATH 308, CSE 142]*
- IND E 325 [3cr] Nonlinear Programming & Stochastic Models *[pr: IND E 315, IND E 324]*
- IND E 494 [4cr] Design in the Manufacturing Firm *[pr: TC 333, IND E 237]*
- IND E 495 [3cr] IE Senior Design *[pr: IND E351 & 494]*

Technical Electives.....[minimum 42 credits]

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

A. Operations Research:
- 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:
- IND E421 [3cr] Statistical Quality Control *[pr: IND E 315]*
- IND E426 [3cr] Reliability Engineering & System Safety *[pr: IND E 315]*

C. Production/Operations:
- IND E 430 [4cr] Manufacturing Scheduling& Inventory *[pr: IND E 237 &325]*
- IND E 433 [3cr] Intro Computational Manufacturing *[pr: IND E 237 & 324]*
- IND E 439 [4cr] Plant Layout & Material Handling

D. Design:
- IND E 351 [3cr] Human Factors
- IND E 455 [3cr] 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 also be chosen from the approved Undergraduate Technical Elective List. Refer any questions to the IE Advisor.

Total credits required for Graduation.....180

♦ -- 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 ~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 5/4/04)

Complete a minimum of 42 credits, including AT LEAST one course from EACH of the following 5 categories:
21 credits must be from the College of Engineering

A. Operations Research:

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. Stats:

IND E 421 [3cr] Statistical Quality Control *[pr: IND E 315]*
IND E 426 [3cr] Reliability Engineering & System Safety *[pr: IND E 315]*

C. Production/Operations:

IND E 430 [4cr] Manufacturing Scheduling& Inventory *[pr: IND E 237 &325]*
IND E 433 [3cr] Intro Computational Manufacturing *[pr: IND E 237 & 324]*
IND E 439 [4cr] Plant Layout & Material Handling

CURRENT

D. Design:

IND E 351 [3cr] Human Factors
IND E 455 [3cr] 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 42 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
CHEME	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	400S	Engineering Robotics I	4
EE	400R	Engineering Robotics II	5
EE	415	Comp.-Aided 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
FM	320	Intro to Marketing and Human Resources	5
FM	321	Intro to Finance and Accounting	3
IND E / ME	295	Product Dissection	3
IND E	326	Methods of Operations Research	3
IND E	351	Human Factors	3
IND E	421	Statistical Quality Control	3
IND E	424	Simulation	4
IND E	426	Reliability	3
IND E	430	Scheduling and Inventory	4

Course	No.	Title	Cr.
IND E	431	Computer Integrated Manufacturing	4
IND E	433	Intro Computational Manufacturing	3
IND E	439	Plant Layout & Material Handling	4
IND E	455	User Interface Design	3
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	4
ME	373	Intro to Systems Dynamics	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
ME	480	Intro to Computer-Aided Technology	4
ME	490	Naval Architecture	3
MGMT	323	Business Ethics/Corporate Social Responsibility	4
MGMT	401	Leadership, Critical Thinking, & Decision Making	4
MGMT	402	Deal-Making and Negotiations	4
MGMT	403	Motivating High Performance	4
MGMT	404	Organization Development and Change	4
MGMT	413	Labor Law and Collective Bargaining	4
MGMT	422	Protecting Intellectual Property in Global Economy	2
METE	464	Extractive Process Analysis	3
OPMGT	443	Inventory/Materials Management	4
QMETH	450	Spreadsheet Models	4

PROPOSED

Bachelor of Science in Industrial Engineering Graduation Requirements

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- MATH 307 [3cr] Intro to Differential Equations *[pr: MATH 125]*
- MATH 308 [3cr] Linear Algebra with Applications *[pr: MATH 126]*
- IND E 315 [3cr] Prob. & Statistics for Engineers *[pr: MATH 307]*

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- CEE 220 [4cr] Intro to Mechanics of Material *[pr: AA 210]*
- ME 230 [4cr] Kinematics & Dynamics *[pr: AA 210]*
- IND E 250 [4cr] Fund. of Engineering Economy

Industrial Engineering Required Core Courses.....[24 credits]

- 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]*
- 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]*

Technical Electives.....[minimum 37 credits]

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 337 &311; 311 may be taken concurrently]*

B. Statistics:
- IND E 321 [4cr] Statistical Quality Control *[pr: IND E 315]*
- IND E426 [4cr] Reliability Engineering & System Safety *[pr: IND E 315]*

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:
- 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 also be chosen from the approved Undergraduate Technical Elective List. Refer any questions to the IE Advisor.

Total credits required for Graduation.....180

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[pr] -- Prerequisite course(s)
Revised 6/1/04

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~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]*

PROPOSED

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.

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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
CHEME	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	400S	Engineering Robotics I	4
EE	400R	Engineering Robotics II	5
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IND E	351	Human Factors	4
IND E	321	Statistical Quality Control	4
IND E	424	Simulation	4
IND E	426	Reliability	4
IND E	430	Scheduling and Inventory	4

Course	No.	Title	Cr.
IND E	431	Computer Integrated Manufacturing	4
IND E	433	Intro Computational Manufacturing	4
IND E	439	Plant Layout & Material Handling	4
IND E	455	User Interface Design	4
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ME	374	Systems Dynamic Analy. & Design	5
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ME	490	Naval Architecture	3
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MGMT	401	Leadership, Critical Thinking, & Decision Making	4
MGMT	402	Deal-Making and Negotiations	4
MGMT	403	Motivating High Performance	4
MGMT	404	Organization Development and Change	4
MGMT	413	Labor Law and Collective Bargaining	4
MGMT	422	Protecting Intellectual Property in Global Economy	2
METE	464	Extractive Process Analysis	3
OPMGT	443	Inventory/Materials Management	4
QMETH	450	Spreadsheet Models	4