COURSE AND CURRICULUM CHANGES

Approved at the faculty meeting

COLLEGE OF ENGINEERING

Undergraduate/Graduate

April 25, 2008

3:30 p.m.

1066 Rathbone

IMPACT CHANGES

Units that may be directly impacted by these changes have been notified. These are

College of Architecture
Departments of:
Management
Mathematics

Please provide the sponsors of this proposal any information regarding fiscal or programmatic impact on your department, program and/or students.

Architectural Engineering and Construction Science and Management

Effective Fall 2008

NEW COURSE

ADD: ARE 310. Introduction to AutoCAD. (1) I, II. An introduction to the basics of AutoCAD. One hour lecture and three hours lab a week or equivalent. Pr.: CNS 321.

Rationale: It is intended that this one-hour introductory course be taught as a two week evening course of four hours per day. It will cover similar material as ARE 311 but in lesser coverage. It is intended that if students take the ARE 311 2-credit hour course (typically offered in intersession), it can be used as a substitute.

Impact: While this course will be required for both Architectural Engineering and Construction Science majors, it is meant to be introductory only. It will become part of the normal teaching load for one of our newest faculty members.

ADD: CNS 542. Ethics and Professional Standards. (1) I, II. An application of the concepts of ethics as applied to the professional standards of the design and construction industry. Two hours recitation per week. (eight-week course). Co-requisite CNS 540.

Rationale: Professional standards and accreditation standards have pressed for a course in the application of ethics to the professional practices of the design and construction industry. This case-study intensive course will be an excellent coverage of that material.

Impact: No major impact.

CHANGE

From: ARE 311. CAD in Engineering and Construction. (2) I, II. On sufficient demand. Basics of CAD and the applications to the engineering and construction industry. Two hours recitation and six hours lab a week (7 week course). Pr.: ~~CNS 210.~~

To: ARE 311. CAD in Engineering and Construction. (2) I, II. On sufficient demand. Basics of CAD and the applications to the engineering and construction industry. Two hours recitation and six hours lab a week (7 week course). Pr.: CNS 200

Rationale: CNS 210 was replaced by CNS 200 for the Architectural Engineering & Construction Science and Management programs.

Impact: None

Curriculum Revisions:

Effective Fall 2009

Architectural Engineering

Drop:	ENVD 205 Graphics	2
	Free Elective	3
	Total	5
Add:	ARE 310 Introduction to AutoCAD	1
	Free Elective	4
	Total	5

*No change in credits required for degree.

Construction Science and Management

Drop:	ENVD 205 Graphics	2
	Total	2
Add:	ARE 310 Introduction to AutoCAD	1
	CNS 542 Ethics & Professional Standards	1
	Total	2

*No change in credits required for degree.

Rationale: The ENVD course has been required for a number of years. This course has been taught for ARE and CNSM students only but has failed to address the necessary information and skills required for our programs. The ARE/CNS Department has made numberous attempts for many years to revise the course content with no success. Therefore, since we already absorb and teach the course information needed in subsequent courses, we are wishing to drop it.

Impact: It will mean a loss of approximately 250 students that the College of Architecture would be teaching in the Fall and Spring of 2009-2010. This is a significant number of student credit hours. We have discussed this at length with the College of Architecture and they are aware of this proposal.

While we already teach a basic two-hour course in AutoCAD, our industry has insisted that we teach a one-hour introductory course in the topic. In addition, the accreditation for Construction Science and Management requires the equivalent of one credit hour of ethics and professional standards be required in the program. We have tried to teach it across the curriculum and we will continue to do so, but we found that the students need a more in-depth coverage as an introduction.

EFFECTIVE: FALL 2007

Curriculum in Architectural Engineering

Bachelor of Science in Architectural Engineering

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
			FRESHMAN				
~~ENVD~~	~~205~~	~~Graphics~~	~~2~~	CNS	320	Construction Materials	2
MATH	220	Analytic Geom & Calc I	4	MATH	221	Analytic Geom & Calc II	4
CHM	210	Chemistry I	4	CHM	230	Chemistry II **OR**	
DEN	210	History of Bldg & Const	3	BIOL	198	Prin of Biology	4
ARE	100	Arch Engg Orientation	1	ECON	110	Prin of Macroeconomics	3
ARE	020	Architectural Engg Sem	0	ENGL	100	Expository Writing I	3
			14	ARE	020	Architectural Engg Sem	0
							16
			SOPHOMORE				
PHYS	213	Engineering Physics I	5	ART	100	2D Design **OR**	
SPCH	105	Public Speaking IA	2	ART	200	3D Design	3
ENGL	200	Expository Writing II	3	CE	333	Statics	3
MATH	222	Analytic Geom & Calc III	4	PHYS	214	Engineering Physics II	3
CNS	200	Comp Appl in Engg & Const Sci	2	MATH	240	Elem Diff Equations	4
ARE	020	Architectural Engg Sem	0	ARE	020	Architectural Engg Sem	0
			16				15
			JUNIOR				
CNS	321	Const Tech & Detailing	3	CNS	325	Construction Drawing	3
CE	533	Mechanics of Materials	3	ARE	534	Thermal Systems	3
CE	534	Mechanics Materials Lab	1	CE	212	Elem Surveying Engg	3
ME	513	Thermodynamics	3	CE	537	Intro Structural Analysis	3
ARE	532	Lighting Systems Design	2	EECE	519	Elect Circuits & Control	4
GEOL	100	Earth in Action	3	ARE	020	Architectural Engg Sem	0
IMSE	530	Engineering Economics	2				16
ARE	020	Architectural Engg Sem	0				
			17				
			SENIOR				
ARE	411	Arch Engg Design	3	ARE	524	Steel Structures	3
ENGL	415	Written Comm for Engr	3	ARE	528	Reinforced Concrete Structures	3
ME	512	Dynamics	3	ARE	536	Plumb/Fire Prot Sys Des	3
ARE	522	Loading & Stability of Struc	2	ARE	640	Building Mech Systems	3
ARE	533	Building Elect Systems	3	ME	571	Fluid Mechanics	3
ARE	537	Acoustic Systems	2			UGE Hum or Soc Sci Elect	3
ARE	020	Architectural Engg Sem	0			(Upper Level)	
			16	ARE	020	Architectural Engg Sem	0
							18
			FIFTH YEAR				
ARE	590	Integrated Bldg Sys Des	3	ARE	690	Senior Project	3
CE	522	Soil Mechanics I	3	ARE	539	Arch Engg Management	3
		Complementary Elective	3			Complementary Elective	3
		Complementary Elective	3			Complementary Elective	3
		Free Elective	~~3~~			UGE Hum or Soc Sci Elec	3
ARE	020	Architectural Engg Sem	0			(Upper Level)	
			15	ARE	020	Architectural Engg Sem	0
							15

Number of hours required for graduation is 158

- Humanities and Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).

- Complementary Electives are to be selected from the approved departmental list.

EFFECTIVE: FALL 2009

Curriculum in Architectural Engineering

Bachelor of Science in Architectural Engineering

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
			FRESHMAN				
MATH	220	Analytic Geom & Calc I	4	CNS	320	Construction Materials	2
CHM	210	Chemistry I	4	MATH	221	Analytic Geom & Calc II	4
DEN	210	History of Bldg & Const	3	CHM	230	Chemistry II **OR**	
ARE	100	Arch Engg Orientation	1	BIOL	198	Prin of Biology	4
GEOL	100	Earth in Action	3	ECON	110	Prin of Macroeconomics	3
ARE	020	Architectural Engg Sem	0				
			15	ENGL	100	Expository Writing I	3
				ARE	020	Architectural Engg Sem	0
							16
			SOPHOMORE				
PHYS	213	Engineering Physics I	5	ART	100	2D Design **OR**	
SPCH	105	Public Speaking IA	2	ART	200	3D Design	3
ENGL	200	Expository Writing II	3	CE	333	Statics	3
MATH	222	Analytic Geom & Calc III	4	PHYS	214	Engineering Physics II	3
CNS	200	Comp Appl in Engg & Const Sci	2	MATH	240	Elem Diff Equations	4
ARE	020	Architectural Engg Sem	0	ARE	020	Architectural Engg Sem	0
			16				15
			JUNIOR				
CNS	321	Const Tech & Detailing	3	CNS	325	Construction Drawing	3
CE	533	Mechanics of Materials	3	ARE	534	Thermal Systems	3
CE	534	Mechanics Materials Lab	1	CE	537	Intro Structural Analysis	3
ME	513	Thermodynamics	3	EECE	519	Elect Circuits & Control	4
ARE	532	Lighting Systems Design	2	ARE	522	Loading & Load Paths/Bldg	2
IMSE	530	Engineering Economics	2	ARE	310	Intro to CAD	1
CE	212	Elem Surveying Engg	3	ARE	020	Architectural Engg Sem	0
ARE	020	Architectural Engg Sem	0				16
			17				
			SENIOR				
ARE	411	Arch Engg Design	3	ARE	524	Steel Structures	3
ENGL	415	Written Comm for Engr	3	ARE	536	Plumb/Fire Prot Sys Des	3
ME	512	Dynamics	3	ARE	640	Building Mech Systems	3
ARE	528	Reinforced Concrete Structures	3	ME	571	Fluid Mechanics	3
ARE	533	Building Elect Systems	3			UGE Hum or Soc Sci Elect	3
ARE	537	Acoustic Systems	2			(Upper Level)	
ARE	020	Architectural Engg Sem	0	ARE	020	Architectural Engg Sem	0
			17				15
			FIFTH YEAR				
ARE	590	Integrated Bldg Sys Des	3	ARE	690	Senior Project	3
CE	522	Soil Mechanics I	3	ARE	539	Arch Engg Management	3
		Complementary Elective	3			Complementary Elective	3
		Complementary Elective	3			Complementary Elective	3
		Free Elective	4			UGE Hum or Soc Sci Elec	3
ARE	020	Architectural Engg Sem	0			(Upper Level)	
			16	ARE	020	Architectural Engg Sem	0
							15

Number of hours required for graduation is 158

- Humanities and Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).
- Complementary Electives are to be selected from the approved departmental list.

EFFECTIVE: FALL 2007

Curriculum in Construction Science and Management

Bachelor of Science in Construction Science and Management

First Semester Course			Sem Cr Hrs				Second Semester Course	Sem Cr Hrs
				FRESHMAN				
~~ENVD~~	~~205~~	~~Graphics~~	~~2~~		ECON	110	Prin of Macroeconomics	3
MATH	220	Anal Geom & Calc I	4		PHYS	113	General Physics I	4
DEN	210	History of Bldg & Const	3		CE	212	Elem Surveying Engg	3
CNS	100	Const Sci/Mgmt Orientation	1		CNS	320	Construction Materials	2
SPCH	105	Public Speaking IA	2				UGE Hum or Soc Sci Elec†	3
ENGL	100	Expository Writing I	3		CNS	016	Construction Science Seminar	0
CNS	016	Construction Science Seminar	0					15
			15					
				SOPHOMORE				
CNS	231	Statics A	3		CE	331	Strength of Materials	3
PHYS	114	General Physics II	4		CE	332	Strength of Matls Lab	1
CNS	200	Comp Apps in Engr & Const	2		CNS	321	Const Tech & Detailing	3
ACCT G	231	Acctg for Bus Operations	3		CNS	330	Site Construction	3
ENGL	200	Expository Writing II	3				UGE Hum or Soc Sci Elec	3
CNS	016	Construction Seminar	0				(Upper Level)†	
			15				UGE Hum or Soc Sci Elec	3
							(Upper Level)†	
					CNS	016	Construction Seminar	0
								16
				JUNIOR				
CNS	522	Theory of Structures	3		CNS	524	Steel Construction	3
CNS	325	Construction Drawings	3		CNS	540	Const Methods & Equip	3
CNS	536	Water Supply & Plumbing	3		CNS	535	Elect Service & Install	3
CNS	534	Heat & Air Cond	3		ENGL	417	Written Comm for Workplace	3
ARE	537	Acoustic Systems	2		MANGT	390	Business Law I*	3
STAT	350	Business & Economic Stats*	3		CNS	650	Construction Safety	2
CNS	016	Construction Seminar	0		CNS	016	Construction Seminar	0
			17					17
				SENIOR				
CNS	523	Timber Construction	2		CNS	528	Concrete & Masonry Const	3
CNS	645	Const Sched & Cost Control	3		CNS	640	Construction Operations	3
CNS	641	Construction Estimating	4		CE	322	Soil & Found Const	3
CNS	642	Const Management	3				Professional Elective	3
		Management Elective* (General)	3				Management Elective* (Labor)	3
		Professional Elective	2				Management Elective*	3
CNS	016	Construction Seminar	0		CNS	016	Construction Seminar	0
			17					18

Number of hours required for graduation is 130

† Humanities and Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).

• Management Electives and Professional Electives are to be selected from the approved departmental lists.

* These courses in Statistics and Business & Management require Junior standing.

EFFECTIVE: FALL 2009

Curriculum in Construction Science and Management

Bachelor of Science in Construction Science and Management

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
			FRESHMAN				
MATH	220	Anal Geom & Calc I	4	ECON	110	Prin of Macroeconomics	3
DEN	210	History of Bldg & Const	3	PHYS	113	General Physics I	4
CNS	100	Const Sci/Mgmt Orientation	1	CE	212	Elem Surveying Engg	3
SPCH	105	Public Speaking IA	2	CNS	320	Construction Materials	2
ENGL	100	Expository Writing I	3			UGE Hum or Soc Sci Elec†	3
CNS	016	Construction Seminar	0	CNS	016	Construction Seminar	0
			13				15
			SOPHOMORE				
CNS	231	Statics A	3	CE	331	Strength of Materials	3
PHYS	114	General Physics II	4	CE	332	Strength of Matls Lab	1
CNS	200	Comp Apps in Engr & Const	2	CNS	321	Const Tech & Detailing	3
ACCTG	231	Acctg for Bus Operations	3	CNS	330	Site Construction	3
ENGL	200	Expository Writing II	3			UGE Hum or Soc Sci Elec (Upper Level)†	3
CNS	016	Construction Seminar	0			UGE Hum or Soc Sci Elec (Upper Level)†	3
			15	CNS	016	Construction Seminar	0
							16
			JUNIOR				
CNS	522	Theory of Structures	3	CNS	524	Steel Construction	3
CNS	325	Construction Drawings	3	CNS	540	Const Methods & Equip	3
CNS	536	Water Supply & Plumbing	3	CNS	535	Elect Service & Install	3
CNS	534	Heat & Air Cond	3	ENGL	417	Written Comm for Workplace	3
ARE	537	Acoustic Systems	2	MANGT	390	Business Law I*	3
ARE	310	Intro to CAD	1	CNS	650	Construction Safety	2
STAT	350	Business & Economic Stats*	3	CNS	542	Ethics and Prof Standards	1
CNS	016	Construction Seminar	0	CNS	016	Construction Seminar	0
			18				18
			SENIOR				
CNS	523	Timber Construction	2	CNS	528	Concrete & Masonry Const	3
CNS	645	Const Sched & Cost Control	3	CNS	640	Construction Operations	3
CNS	641	Construction Estimating	4	CE	322	Soil & Found Const	3
CNS	642	Const Management	3			Professional Elective	3
		Management Elective* (General)	3			Management Elective* (Labor)	3
		Professional Elective	2			Management Elective*	3
CNS	016	Construction Seminar	0	CNS	016	Construction Seminar	0
			17				18

Number of hours required for graduation is 130

† Humanities and Social Science Electives are to be selected from the approved catalog list of UGE courses (see Engineering UGE course requirements).

• Management Electives and Professional Electives are to be selected from the approved departmental lists.

* These courses in Statistics and Business & Management require Junior standing.

CIS Course Changes

FROM: **CIS 540. Software Engineering Project I.** (3) I. The first semester of a two-semester capstone course. Current practices of software development, requirements, design, prototyping, measures, and evaluation. Specification, design, and prototyping of a software system. Not available for credit to students with credit in CIS 543. Pr.: CIS 308 ~~and~~ 501.

TO: **CIS 540. Software Engineering Project I.** (3) I. The first semester of a two-semester capstone course. Current practices of software development, requirements, design, prototyping, measures, and evaluation. Specification, design, and prototyping of a software system. Not available for credit to students with credit in CIS 543. Pr.: CIS 308, 501, and STAT 325 or 510.

RATIONALE: Because some of the course material relies on statistical analysis, the additional background in statistics will better prepare students for this course.

IMPACT: None.

EFFECTIVE: Fall 2008.

FROM: **CIS 543. Software Engineering Design Project.** (3) I. Current practices of software development, requirements, design, prototyping, measures and evaluations. Specification, design, and prototyping of a software system. Not available for credit to students with credit in CIS 540. Pr.: CIS 308 ~~and~~ 501.

TO: **CIS 543. Software Engineering Design Project.** (3) I. Current practices of software development, requirements, design, prototyping, measures and evaluations. Specification, design, and prototyping of a software system. Not available for credit to students with credit in CIS 540. Pr.: CIS 308, 501, and STAT 325 or 510.

RATIONALE: Because some of the course material relies on statistical analysis, the additional background in statistics will better prepare students for this course.

IMPACT: Computer Engineering students are required to take this course; however, STAT 510 is listed in an earlier semester than is CIS 543 in their recommended curriculum.

EFFECTIVE: Fall 2008.

FROM: **CIS 560. Database System Concepts.** (3) ~~I, II~~. Concepts, approaches, and techniques in database management. Representation of information as data, data storage techniques, foundations of logical data models, data retrieval, database design, transaction management, integrity and security. Pr.: CIS 501; CIS 301 or MATH 510.

TO: **CIS 560. Database System Concepts.** (3) I. Concepts, approaches, and techniques in database management. Representation of information as data, data storage techniques, foundations of logical data models, data retrieval, database design, transaction management, integrity and security. Pr.: CIS 501; CIS 301 or MATH 510.

RATIONALE: Because this course is required only for students in the CS Option, it needs to be taught only once per year.

IMPACT: None.

EFFECTIVE: Fall 2008.

FROM: **CIS 562. Enterprise Information Systems.** (3) ~~II~~. Data modeling for business applications, database management systems, relational data model, normal forms, query language, security features, web access and scripting languages, development process and management, issues in management of enterprise information systems. Pr: CIS 501.

TO: **CIS 562. Enterprise Information Systems.** (3) I. Data modeling for business applications, database management systems, relational data model, normal forms, query language, security features, web access and scripting languages, development process and management, issues in management of enterprise information systems. Pr: CIS 501.

RATIONALE: In order to make more effective use of our personnel, it is better to offer this course in Fall semesters.

IMPACT: None.

EFFECTIVE: Fall 2008.

FROM: **CIS 625. Concurrent Software Systems.** (3) ~~I~~. Architecture, design, modeling, implementation, and verification of concurrent, parallel, and distributed software; aspects such as real-time programming, parallel simulation; fault-tolerant programming; grid computing, embedded systems control. Pr.: CIS 501.

TO: **CIS 625. Concurrent Software Systems.** (3) II. Architecture, design, modeling, implementation, and verification of concurrent, parallel, and distributed software; aspects such as real-time programming, parallel simulation; fault-tolerant programming; grid computing, embedded systems control. Pr.: CIS 501.

RATIONALE: In order to make more effective use of our personnel, it is better to offer this course in Spring semesters.

IMPACT: None.

EFFECTIVE: Fall 2008.

We propose to reorder the courses in our three curricula as shown on the following pages. These changes will accomplish the following:

1. They will give incoming freshmen an opportunity to adjust to the rigors of university classes prior to taking CIS 200, which is a challenging course.
2. They will allow us to require either STAT 325 or STAT 510 as a prerequisite for CIS 540 and CIS 543, as indicated on the preceding page.
3. They will reflect the changes in the semesters in which CIS 562 and CIS 625 are offered.

These changes would go into effect in Fall 2008.

OLD

Curriculum in Computing and Information Sciences
Bachelor of Science in Information Systems

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
FRESHMAN							
CIS	015	Undergraduate Seminar	0	CIS	300	Data and Program Structures	3
CIS	200	Fundamentals of Software Design and Implementation	4	CIS	301	Logical Foundations of Programming	3
MATH	205	General Calculus and Linear Algebra	3	Humanities/SS elective (second of six)			3
ENGL	100	Expository Writing I	3	ECON	110	Principles of Macroeconomics	3
Humanities/SS elective (first of six)			3	Unrestricted elective			3
Total			**13**	**Total**			**15**
SOPHOMORE							
CIS	308	C/C++ Language Laboratory	1	CIS	450	Computer Architecture and Operations	3
CIS	501	Software Architecture and Design	3	MATH	312	Finite Applications of Mathematics	3
EECE	241	Introduction to Computer Engineering	3	DEN	325	Intro. to Personal and Prof. Devel.	1
ENGL	200	Expository Writing II	3	Natural science elective with laboratory (first of four)			4
SPCH	105	Public Speaking IA	2	Unrestricted elective			6
		or					
SPCH	106	Public Speaking I	3				
Humanities/SS elective (third of six)			3				
Total			**15-16**	**Total**			**17**
JUNIOR							
CIS	362	Introduction to Business Programming	3	CIS	415	Computers and Society	1
ACCT	231	Acctg. for Bus. Ops.	3	CIS	562	Enterprise Information Systems	3
STAT	325	Introduction to Statistics	3	Natural science elective (third of four)			4
ENGL	516	Written Communications for the Sci.	3	Humanities/SS elective (fourth of six)			3
Natural science elective (second of four)			3	Unrestricted Elective			5-6
Total			**15**	**Total**			**16-17**
SENIOR							
CIS	525	Telecommunications and Data Communications Systems	3	CIS	597	Information Systems Project	3
CIS	540	Software Engineering Project I		Humanities/SS elective (sixth of six)			3
		or		Technical elective			3
CIS	543	Software Design Project.	3	Unrestricted electives			8
Technical elective			3				
Natural science elective (fourth of four)			3				
Humanities/SS elective (fifth of six)			3				
Total			**15**	**Total**			**17**

A grade of C or better is required for all graded courses listed by specific course number above.
All students new to the CIS department must complete CIS 015.
Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 9 hours from at least two of the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.
An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.
124 hours required for graduation.

NEW

Curriculum in Computing and Information Sciences
Bachelor of Science in Information Systems

First Semester Course	Sem Cr Hrs	Second Semester Course	Sem Cr Hrs

FRESHMAN

CIS	015	Undergraduate Seminar	0	CIS	200	Fundamentals of Software Design and Implementation	4
EECE	241	Introduction to Computer Engineering	3	Humanities/SS elective (second of six)			3
MATH	205	General Calculus and Linear Algebra	3	ECON	110	Principles of Macroeconomics	3
ENGL	100	Expository Writing I	3	SPCH	105	Public Speaking IA	2
Humanities/SS elective (first of six)			3			or	
Unrestricted elective			3	SPCH	106	Public Speaking I	3
				Unrestricted elective			3
Total			**15**	**Total**			**15-16**

SOPHOMORE

CIS	300	Data and Program Structures	3	CIS	308	C/C++ Language Laboratory	1
CIS	301	Logical Foundations of Programming	3	CIS	501	Software Architecture and Design	3
ENGL	200	Expository Writing II	3	MATH	312	Finite Applications of Mathematics	3
Natural science elective with laboratory (first of four)			4	DEN	325	Intro. to Personal and Prof. Devel.	1
Humanities/SS elective (third of six)			3	Natural science elective (second of four)			4
				Unrestricted elective			4
Total			**16**	**Total**			**16**

JUNIOR

CIS	362	Introduction to Business Programming	3	CIS	415	Computers and Society	1
CIS	562	Enterprise Information Systems	3	CIS	450	Computer Architecture and Operations	3
ACCT	231	Acctg. for Bus. Ops.	3	Natural science elective (third of four)			3
STAT	325	Introduction to Statistics	3	Humanities/SS elective (fourth of six)			3
ENGL	516	Written Communications for the Sci.	3	Unrestricted Elective			5-6
Total			**15**	**Total**			**15-16**

SENIOR

CIS	525	Telecommunications and Data Communications Systems	3	CIS	597	Information Systems Project	3
CIS	540	Software Engineering Project I		Humanities/SS elective (sixth of six)			3
	or			Technical elective			3
CIS	543	Software Design Project.	3	Unrestricted electives			7
Technical elective			3				
Natural science elective (fourth of four)			3				
Humanities/SS elective (fifth of six)			3				
Total			**15**	**Total**			**16**

A grade of C or better is required for all graded courses listed by specific course number above.
All students new to the CIS department must complete CIS 015.
Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 9 hours from at least two of the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.
An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.
124 hours required for graduation.

OLD

Curriculum in Computing and Information Sciences
Bachelor of Science in Computer Science --- CS OPTION

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
FRESHMAN							
CIS	015	Undergraduate Seminar	0	CIS	300	Data and Program Structures	3
CIS	200	Fundamentals of Software Design and Implementation	4	MATH	221	Analyt. Geometry and Calc. II	4
MATH	220	Analytic Geometry and Calculus I	4	Humanities/SS elective (first of five)			3
ENGL	100	Expository Writing I	3	ECON	110	Principles of Macroeconomics	3
SPCH	105	Public Speaking IA	2	Unrestricted elective			3
		or					
SPCH	106	Public Speaking I	3				
Total			**13-14**	**Total**			**16**
SOPHOMORE							
CIS	301	Logical Foundations of Programming	3	CIS	450	Computer Architecture and Operations	3
CIS	308	C/C++ Language Laboratory	1	MATH	510	Discrete Mathematics	3
CIS	501	Software Architecture and Design	3	DEN	325	Intro. to Personal and Prof. Development	1
EECE	241	Introduction to Computer Engineering	3	Natural science elective with laboratory (first of four)			4
ENGL	200	Expository Writing II	3	Humanities/SS elective (second of five)			3
Unrestricted elective			3	Unrestricted elective			3
Total			**16**	**Total**			**17**
JUNIOR							
CIS	505	Introduction to Programming Languages	3	CIS	415	Computers and Society	1
CIS	520	Operating Systems 1	3	CIS	560	Database System Concepts	3
Humanities/SS elective (third of five)			3	CIS	575	Introduction to Algorithm Analysis	
Natural science elective with lab (second of four)			4			or	
Unrestricted elective			2-3	Technical Elective (first of two)			3
				ENGL	516	Written Comm. for the Sciences	3
				Humanities/SS elective (fourth of five)			3
				Natural science elective (third of four)			3
Total			**15-16**	**Total**			**16**
SENIOR							
CIS	570	Introduction to Formal Language Theory		CIS	598	Computer Science Project	3
		or		STAT	510	Introductory Probability and Statistics I	3
Technical Elective (first of two)			3	Technical elective (second of two)			3
MATH	551	Applied Matrix Theory	3	Unrestricted electives			6
Natural science elective (fourth of four)			3				
Humanities/SS elective (fifth of five)			3				
Unrestricted elective			3				
Total			**15**	**Total**			**15**

A grade of C or better is required for all graded courses listed by specific course number above.
All students new to the CIS department must complete CIS 015.
Either CIS 570 or CIS 575 must be completed.
Natural science courses must have departmental approval.
Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 6 hours selected from the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.
An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.
124 hours required for graduation.

NEW

Curriculum in Computing and Information Sciences

Bachelor of Science in Computer Science --- CS OPTION

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
FRESHMAN							
CIS	015	Undergraduate Seminar	0	CIS	200	Fundamentals of Software Design and Implementation	4
EECE	241	Introduction to Computer Engineering	3	MATH	221	Analyt. Geometry and Calc. II	4
MATH	220	Analytic Geometry and Calculus I	4	ECON	110	Principles of Macroeconomics	3
ENGL	100	Expository Writing I	3	Humanities/SS elective (second of five)			3
Humanities/SS elective (first of five)			3				
SPCH	105	Public Speaking IA	2				
		or					
SPCH	106	Public Speaking I	3				
Total			**15-16**	**Total**			**14**
SOPHOMORE							
CIS	300	Data and Program Structures	3	CIS	308	C/C++ Language Laboratory	1
CIS	301	Logical Foundations of Programming	3	CIS	501	Software Architecture and Design	3
ENGL	200	Expository Writing II	3	MATH	510	Discrete Mathematics	3
Natural science elective with laboratory (first of four)			4	DEN	325	Intro. to Personal and Prof. Development	1
Unrestricted elective			3	Natural science elective (second of four)			3
				Humanities/SS elective (third of five)			3
				Unrestricted elective			2-3
Total			**16**	**Total**			**16-17**
JUNIOR							
CIS	505	Introduction to Programming Languages	3	CIS	415	Computers and Society	1
CIS	560	Database System Concepts	3	CIS	450	Computer Architecture and Operations	3
Natural science elective with lab (third of four)			4	CIS	575	Introduction to Algorithm Analysis	
Unrestricted elective			6			or	
				Technical Elective (first of two)			3
				ENGL	516	Written Comm. for the Sciences	3
				Humanities/SS elective (fourth of five)			3
				Natural science elective (fourth of four)			3
Total			**16**	**Total**			**16**
SENIOR							
CIS	520	Operating Systems 1	3	CIS	598	Computer Science Project	3
CIS	570	Introduction to Formal Language Theory		STAT	510	Introductory Probability and Statistics I	3
		or		Technical elective (second of two)			3
Technical Elective (first of two)			3	Unrestricted electives			6
MATH	551	Applied Matrix Theory	3				
Humanities/SS elective (fifth of five)			3				
Unrestricted elective			3				
Total			**15**	**Total**			**15**

A grade of C or better is required for all graded courses listed by specific course number above.

All students new to the CIS department must complete CIS 015.

Either CIS 570 or CIS 575 must be completed.

Natural science courses must have departmental approval.

Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 6 hours selected from the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.

An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.

124 hours required for graduation.

OLD

Curriculum in Computing and Information Sciences
Bachelor of Science in Computer Science --- SE OPTION

First Semester Course			Sem Cr Hrs	Second Semester Course			Sem Cr Hrs
FRESHMAN							
CIS	015	Undergraduate Seminar	0	CIS	300	Data and Program Structures	3
CIS	200	Fundamentals of Software Design and Implementation	4	MATH	221	Analyt. Geometry and Calc. II	4
MATH	220	Analytic Geometry and Calculus I	4	ECON	110	Principles of Macroeconomics	3
ENGL	100	Expository Writing I	3	Humanities/SS elective (first of five)			3
SPCH	105	Public Speaking IA	2	Unrestricted elective			3
		or					
SPCH	106	Public Speaking I	3				
Total			**13-14**	**Total**			**16**
SOPHOMORE							
CIS	301	Logical Foundations of Programming	3	CIS	450	Computer Architecture and Operations	3
CIS	501	Software Architecture and Design	3	MATH	510	Discrete Mathematics	3
EECE	241	Introduction to Computer Engineering	3	DEN	325	Intro. to Personal and Prof. Development	1
ENGL	200	Expository Writing II	3	Natural science elective with laboratory (first of four)			4
CIS	308	C/C++ Language Laboratory	1	Humanities/SS elective (second of five)			3
Unrestricted elective			3	Unrestricted elective			2-3
Total			**16**	**Total**			**16-17**
JUNIOR							
CIS	625	Concurrent Software Systems	3	CIS	544	Advanced Software Design & Devel.	3
ENGL	516	Written Communication for the Sciences	3	CIS	562	Enterprise Information Systems	3
Humanities/SS elective (third of five)			3	CIS	415	Computers and Society	1
Natural science elective with lab (second of four)			4	Humanities/SS elective (fourth of five)			3
Unrestricted elective			3	Natural science elective (third of four)			3
Total			**16**	Unrestricted elective			3
				Total			**16**
SENIOR							
CIS	540	Software Engineering Project I	3	CIS	541	Software Engineering Project II	3
MATH	551	Applied Matrix Theory	3	STAT	510	Introductory Probability and Statistics I	3
Natural science elective (fourth of four)			3	Technical Elective (second of two)			3
Humanities/SS elective (fifth of five)			3	Unrestricted electives			6
Technical elective (first of two)			3				
Total			**15**	**Total**			**15**

A grade of C or better is required for all graded courses listed by specific course number above.
All students new to the CIS department must complete CIS 015.
Natural science courses must have departmental approval.
Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 6 hours selected from the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.
An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.
124 hours required for graduation.

NEW

Curriculum in Computing and Information Sciences
Bachelor of Science in Computer Science --- SE OPTION

First Semester Course	Sem Cr Hrs	Second Semester Course	Sem Cr Hrs
FRESHMAN			
CIS 015 Undergraduate Seminar	0	CIS 200 Fundamentals of Software Design and Implementation	4
EECE 241 Introduction to Computer Engineering	3	MATH 221 Analyt. Geometry and Calc. II	4
MATH 220 Analytic Geometry and Calculus I	4	ECON 110 Principles of Macroeconomics	3
ENGL 100 Expository Writing I	3	Humanities/SS elective (second of five)	3
Humanities/SS elective (first of five)	3		
SPCH 105 Public Speaking IA	2		
or			
SPCH 106 Public Speaking I	3		
Total	**15-16**	**Total**	**14**
SOPHOMORE			
CIS 300 Data and Program Structures	3	CIS 501 Software Architecture and Design	3
CIS 301 Logical Foundations of Programming	3	CIS 308 C/C++ Language Laboratory	1
ENGL 200 Expository Writing II	3	MATH 510 Discrete Mathematics	3
Natural science elective with laboratory (first of four)	4	DEN 325 Intro. to Personal and Prof. Development	1
Unrestricted elective	3	Humanities/SS elective (third of five)	3
		Natural science elective (second of four)	3
		Unrestricted elective	2-3
Total	**16**	**Total**	**16-17**
JUNIOR			
CIS 450 Computer Architecture and Operations	3	CIS 415 Computers and Society	1
ENGL 516 Written Communication for the Sciences	3	CIS 625 Concurrent Software Systems	3
Humanities/SS elective (fourth of five)	3	STAT 510 Introductory Probability and Statistics I	3
Natural science elective with lab (third of four)	4	Humanities/SS elective (fifth of five)	3
Unrestricted elective	3	Unrestricted elective	6
Total	**16**	**Total**	**16**
SENIOR			
CIS 540 Software Engineering Project I	3	CIS 541 Software Engineering Project II	3
CIS 562 Enterprise Information Systems	3	CIS 544 Advanced Software Design & Devel.	3
MATH 551 Applied Matrix Theory	3	Technical Elective (second of two)	3
Unrestricted electives	3	Natural science elective (fourth of four)	3
Technical elective (first of two)	3	Unrestricted electives	3
Total	**15**	**Total**	**15**

A grade of C or better is required for all graded courses listed by specific course number above.
All students new to the CIS department must complete CIS 015.
Natural science courses must have departmental approval.
Humanities/SS electives must be taken from the list approved by the College of Engineering and must include 6 hours selected from the following departments: English, History, Modern Languages, and Philosophy (except PHILO 492). At least 6 of these hours must be UGE courses at the 300 level or above.
An unrestricted elective is any 100- or higher-level course, excluding courses listed as a prerequisite to a required course, approved by an adviser.
124 hours required for graduation.

Drop Courses

DROP: **CHE 354. Engineering Materials Laboratory.** (1) I, II. A series of laboratory experiences to enhance and supplement the course content of CHE 350 and 352. Experiments demonstrating mechanical properties, phase behavior, and microstructure of materials. Three hours lab a week. Pr. or conc.: CHE 350 or 352.

RATIONALE: The laboratory component of the introductory materials science and engineering courses is no longer required by any curriculum within the college. As a consequence, we have seen enrollments drop significantly over the past three years; typically six or fewer students have selected this as an elective. With these enrollment numbers, it is difficult to justify the investment in resources to maintain the laboratory. For both of these reasons, it is proposed that this course be dropped.

IMPACT: Minimal impact to other departments is anticipated. This action has been discussed with the Departments of Mechanical Engineering and of Industrial and Manufacturing Systems Engineering, the only two departments other than chemical engineering that have routinely enrolled students in the course.

EFFECTIVE DATE: Spring 2009

CURRICULUM CHANGES (IN THE FOOTNOTE STATEMENTS):

FROM:
§The advanced laboratory experience is to be a 2-credit-hour laboratory course selected from the following courses: Organic Chemistry Laboratory (CHM 532), Physical Methods Laboratory (CHM 596), General Biochemistry Laboratory (BIOCH 522), or Biochemistry I Laboratory (BIOCH 756). ~~General Microbiology (BIOL 455) may be counted as a 2-credit-hour laboratory experience with the remaining 2 credit hours being applied towards chemistry/biochemistry/biology electives.~~

TO:
§The advanced laboratory experience is to be a 2-credit-hour laboratory course selected from the following courses: Organic Chemistry Laboratory (CHM 532), Physical Methods Laboratory (CHM 596), General Biochemistry Laboratory (BIOCH 522), or Biochemistry I Laboratory (BIOCH 756).

RATIONALE:
The above change reflects recent changes within General Microbiology (BIOL 455) and prevents possible confusion with how to apply the four credit hours within a students program of study.

FROM:
The remaining ~~9~~ credit hours of technical electives are to be ~~selected to enhance the student's professional development. A minimum of five (5) credit hours are to be~~ chosen from courses identified as engineering topics with at least one course selected from either analytical mechanics (both statics and dynamics must be represented) or circuits, fields, and electronics.

TO:
The remaining six (6) credit hours of technical electives are to be chosen from courses identified as engineering topics with at least one course selected from either analytical mechanics (both statics and dynamics must be represented) or circuits, fields, and electronics.

RATIONALE:
This change is necessary to the designation of three credit hours of elective coursework as “unrestricted elective,” thus reducing the number of technical electives by three credit hours.

DROP:

~~* The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 200, which may be substituted for 3 credit hours of technical electives.~~

RATIONALE:
The availability of a free elective in the revisions being considered to the curriculum make permitting use of ENGL 200 as a technical elective unnecessary. The other comments are then unnecessary as they are merely the stated prerequisites for ENGL 415.

DROP:
(from the footnote statements):
~~Instrumental Methods of Analysis (CHM 566); (3 credit hours) and Instrumental Analysis Laboratory (CHM 567); (1 credit hour) may be substituted for Chemical Analysis (CHM 371). However, prerequisites would require that these courses be taken following Organic Chemistry I (CHM 531).~~

RATIONALE:
The prerequisites for Instrumental Analysis have been modified to include Chemical Analysis; thus this option is no longer feasible. Instrumental Analysis Laboratory no longer exists as an independent course; it has become one aspect of Physical Methods Laboratory.

ADD:
(to the footnote statements):
Three (3) credit hours of unrestricted elective are to be selected from courses numbered 100 or higher, excluding courses listed as a prerequisite to a required course.

RATIONALE:
The designation of three credit hours of elective coursework as "unrestricted elective" clarifies the nature of electives within the curriculum, simplifies the options available to students, and provides increased flexibility to individualize their program of study.

OLD
Curriculum for Bachelor of Science in Chemical Engineering
Number of hours required for Graduation = 128
Effective Fall 2007

Freshman

Fall semester

MATH 220	Analytic Geometry and Calculus I	4
CHM 210	Chemistry I**	4
ENGL 100	Expository Writing I*	3
CHE 110	Current Topics in Chemical Engineering	1
DEN 015	New Student Orientation Seminar	
Humanities/social science elective		3
CHE 015	Engineering Assembly	
		15

Spring semester

MATH 221	Analytic Geometry and Calculus II	4
CHM 230	Chemistry II**	4
ECON 110	Principles of Macroeconomics I	3
SPCH 105	Public Speaking IA	2
Humanities/social science elective		3
CHE 015	Engineering Assembly	
		16

Sophomore

Fall semester

MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
CHM 371	Chemical Analysis	4
CHE 320	Chemical Process Analysis	3
CHE 015	Engineering Assembly	
		16

Spring semester

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
CHM 531	Organic Chemistry I	3
CHE 416	Comp Tech in Chemical Engineering	3
CHE 350	Electronic Materials	
	or	
CHE 352	Structural Materials	2
CHE 015	Engineering Assembly	
		17

Junior

Fall semester

CHE 520	Chem Engineering Thermodynamics I	2
CHE 530	Transport Phenomena I	3
ENGL 415	Written Communication for Engineers*	3
Chemistry/biochemistry elective‡		3
Advanced laboratory experience§		2
Humanities/social science elective		3
CHE 015	Engineering Assembly	
		16

Spring semester

CHM 595	Physical Chemistry II	3
CHE 521	Chem Engineering Thermodynamics II	3
CHE 531	Transport Phenomena II	3
CHE 535	Transport Phenomena Lab	3
Technical elective		3
CHE 015	Engineering Assembly	
		15

Senior

Fall semester

CHE 550	Chemical Reaction Engineering	3
CHE 560	Separational Process Design	3
CHE 570	Chemical Engineering Systems Design I	2
Technical elective		3
UGE > 300 level humanities and social science elective		6
CHE 015	Engineering Assembly	
		17

Spring semester

CHE 542	Unit Operations Lab	3
CHE 561	Chemical Process Dynamics and Control	3
CHE 571	Chemical Engineering Systems Design II	4
Chemical engineering elective		3
Technical elective		3
CHE 015	Engineering Assembly	
		16

* The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 200, which may be substituted for 3 credit hours of technical electives.

**Chemical Principles I (CHM 220) and Chemical Principles II (CHM 250) may be taken instead of CHM 210, CHM 230, and CHM 371. If this option is elected, two additional credit hours of technical electives must be selected.

Instrumental Methods of Analysis (CHM 566); (3 credit hours) and Instrumental Analysis Laboratory (CHM 567); (1 credit hour) may be substituted for Chemical Analysis (CHM 371). However, prerequisites would require that these courses be taken following Organic Chemistry I (CHM 531).

‡Chemistry/biochemistry/biology electives: Chemistry: Possible selections include Organic Chemistry II (CHM 550), Instrumental Analysis (CHM 566), and Physical Chemistry I (CHM 585). Biochemistry: Possible selections include General Biochemistry (BIOCH 521), Physical Studies of Biomacromolecules (BIOCH 590), Biochemistry I (BIOCH 755), and Biochemistry II (BIOCH 765); Biology: BIOL 450 or above; some possible courses include Modern Genetics (BIOL 450), General Microbiology (BIOL 455), Plant Physiology (BIOL 500), Fundamentals of Ecology (BIOL 529) or Cell Biology (BIOL 541).

§The advanced laboratory experience is to be a 2-credit-hour laboratory course selected from the following courses: Organic Chemistry Laboratory (CHM 532), Physical Methods Laboratory (CHM 596), General Biochemistry Laboratory (BIOCH 522), or Biochemistry I Laboratory (BIOCH 756). General Microbiology (BIOL 455) may be counted as a 2-credit-hour laboratory experience with the remaining 2 credit hours being applied towards chemistry/biochemistry/biology electives.

The departmental requirements below must be satisfied.
32 credit hours of electives are required, and they are to be selected in consultation with the student's advisor. All electives must be on the lists approved by the department or have the approval of the department head and must support the educational objectives of the chemical engineering program. Both the required and elective components of a student's overall program of study must meet UGE criteria. 17 credit hours of technical electives are required. These electives must include one chemistry/ biochemistry/biology (3 credit hours) course, an advanced laboratory experience (2 credit hours), and a chemical engineering elective (3 credit hours).

The remaining 9 credit hours of technical electives are to be selected to enhance the student's professional development. A minimum of five (5) credit hours are to be chosen from courses identified as engineering topics with at least one course selected from either analytical mechanics (both statics and dynamics must be represented) or circuits, fields, and electronics.

15 credit hours of social sciences and humanities electives are required. These courses are to be selected from the list approved by the College of Engineering. At least 6 hours of 300-level or higher UGE courses must be included within these 15 hours. All courses must be taken for a letter grade.

NEW
Curriculum for Bachelor of Science in Chemical Engineering
Number of hours required for Graduation = 128
Effective Fall 2008

Freshman

Fall semester			Spring semester		
MATH 220	Analytic Geometry and Calculus I	4	MATH 221	Analytic Geometry and Calculus II	4
CHM 210	Chemistry I**	4	CHM 230	Chemistry II**	4
ENGL 100	Expository Writing I*	3	ECON 110	Principles of Macroeconomics I	3
CHE 110	Current Topics in Chemical Engineering	1	SPCH 105	Public Speaking IA	2
DEN 015	New Student Orientation Seminar		Humanities/social science elective		3
Humanities/social science elective		3	CHE 015	Engineering Assembly	
CHE 015	Engineering Assembly				**16**
		15			

Sophomore

Fall semester			Spring semester		
MATH 222	Analytic Geometry and Calculus III	4	MATH 240	Elementary Differential Equations	4
PHYS 213	Engineering Physics I	5	PHYS 214	Engineering Physics II	5
CHM 371	Chemical Analysis	4	CHM 531	Organic Chemistry I	3
CHE 320	Chemical Process Analysis	3	CHE 416	Comp Tech in Chemical Engineering	3
CHE 015	Engineering Assembly		CHE 350	Electronic Materials	
		16		**or**	
			CHE 352	Structural Materials	2
			CHE 015	Engineering Assembly	
					17

Junior

Fall semester			Spring semester		
CHE 520	Chemical Engineering Thermodynamics I	2	CHM 595	Physical Chemistry II	3
CHE 530	Transport Phenomena I	3	CHE 521	Chem Engineering Thermodynamics II	3
ENGL 415	Written Communication for Engineers*	3	CHE 531	Transport Phenomena II	3
Chemistry/biochemistry elective‡		3	CHE 535	Transport Phenomena Lab	3
Advanced laboratory experience§		2	Technical elective		3
Humanities/social science elective		3	CHE 015	Engineering Assembly	
CHE 015	Engineering Assembly				**15**
		16			

Senior

Fall semester			Spring semester		
CHE 550	Chemical Reaction Engineering	3	CHE 542	Unit Operations Lab	3
CHE 560	Separational Process Design	3	CHE 561	Chemical Process Dynamics and Control	3
CHE 570	Chemical Engineering Systems Design I	2	CHE 571	Chemical Engineering Systems Design II	4
Technical elective		3	Chemical engineering elective		3
UGE > 300 level humanities and social science elective		6	Unrestricted ~~Technical~~ elective		3
CHE 015	Engineering Assembly		CHE 015	Engineering Assembly	
		17			**16**

~~credit hours towards degree requirements. The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 200, which may be substituted for 3 credit hours of technical electives.~~

**Chemical Principles I (CHM 220) and Chemical Principles II (CHM 250) may be taken instead of CHM 210, CHM 230, and CHM 371. If this option is elected, two additional credit hours of technical electives must be selected.

~~Instrumental Methods of Analysis (CHM 566); (3 credit hours) and Instrumental Analysis Laboratory (CHM 567); (1 credit hour) may be substituted for Chemical Analysis (CHM 371). However, prerequisites would require that these courses be taken following Organic Chemistry I (CHM 531).~~

‡Chemistry/biochemistry/biology electives: Chemistry: Possible selections include Organic Chemistry II (CHM 550), Instrumental Analysis (CHM 566), and Physical Chemistry I (CHM 585). Biochemistry: Possible selections include General Biochemistry (BIOCH 521), Physical Studies of Biomacromolecules (BIOCH 590), Biochemistry I (BIOCH 755), and Biochemistry II (BIOCH 765); Biology: BIOL 450 or above; some possible courses include Modern Genetics (BIOL 450), General Microbiology (BIOL 455), Plant Physiology (BIOL 500), Fundamentals of Ecology (BIOL 529) or Cell Biology (BIOL 541).

§The advanced laboratory experience is to be a 2-credit-hour laboratory course selected from the following courses: Organic Chemistry Laboratory (CHM 532), Physical Methods Laboratory (CHM 596), General Biochemistry Laboratory (BIOCH 522), or Biochemistry I Laboratory (BIOCH 756). ~~General Microbiology (BIOL 455) may be counted as a 2-credit-hour laboratory experience with the remaining 2 credit hours being applied towards chemistry/biochemistry/biology electives.~~

The departmental requirements below must be satisfied.
32 credit hours of electives are required, and they are to be selected in consultation with the student's advisor. All electives must be on the lists approved by the department or have the approval of the department head and must support the educational objectives of the chemical engineering program. Both the required and elective components of a student's overall program of study must meet UGE criteria. 17 credit hours of technical electives are required. These electives must include one chemistry/ biochemistry/biology (3 credit hours) course, an advanced laboratory experience (2 credit hours), and a chemical engineering elective (3 credit hours).

The remaining six (6) ~~9~~ credit hours of technical electives are to be ~~selected to enhance the student's professional development. A minimum of five (5) credit hours are to be~~ chosen from courses identified as engineering topics with at least one course selected from either analytical mechanics (both statics and dynamics must be represented) or circuits, fields, and electronics.

15 credit hours of social sciences and humanities electives are required. These courses are to be selected from the list approved by the College of Engineering. At least 6 hours of 300-level or higher UGE courses must be included within these 15 hours. All courses must be taken for a letter grade.

Three (3) credit hours of unrestricted elective are to be selected from courses numbered 100 or higher, excluding courses listed as a prerequisite to a required course.

General Engineering

FROM: DEN 330. ~~Basic Geometric Dimensioning and Tolerancing I.~~ (1) I, II, S. Basic mechanical two-dimensional engineering drawings. Topics include basic drawing elements (formats, title block, parts list, revision block, etc.), part views (multiview, auxiliary, and isometric), section views, general dimensions, tolerances, finish symbols, and welding symbols. For most modules, there are drawing assignments, a quiz, and supplementary information. A drawing packet is included as reference material that shows 5 detail drawings and an assembly drawing for the parts of a Trolley Wheel. The package includes flat and round parts and a casting. Intended for individuals working in design, drafting, quality, procurement, tooling, production, and manufacturing.

TO: DEN 330. Drawing Interpretation. (1) I, II, S. Basic mechanical two-dimensional engineering drawings. Topics include basic drawing elements (formats, title block, parts list, revision block, etc.), part views (multiview, auxiliary, and isometric), section views, general dimensions, tolerances, finish symbols, and welding symbols. For most modules, there are drawing assignments, a quiz, and supplementary information. A drawing packet is included as reference material that shows 5 detail drawings and an assembly drawing for the parts of a Trolley Wheel. The package includes flat and round parts and a casting. Intended for individuals working in design, drafting, quality, procurement, tooling, production, and manufacturing.

RATIONALE: The change reflects a request by the instructor and the current course name used by ASME. The name change assures that KSU and ASME use the same name for the course.

IMPACT: No impact outside the College of Engineering

EFFECTIVE: Fall 2008

FROM: DEN 431. ~~Intermediate~~ Geometric Dimensioning and Tolerancing ~~II.~~ (1) I, II, S. Geometric dimensioning controls used on mechanical engineering drawings. The theoretical and practical concepts of each of the geometric controls are explained relative to the areas of design, tooling, production, and inspection. All ten modules include a quiz. For most modules, there are drawing assignments and supplementary information. The parts of a directional-change gearbox are used as platforms for the geometric controls. The assembly includes shafts, gears, bearings, keys, lip seals, castings, and threaded fasteners. Intended for employees working in design, drafting, quality, procurement, tooling, production, and manufacturing~~. Pr.: DEN 330~~.

TO: DEN 431. Basic Geometric Dimensioning and Tolerancing. (1) I, II, S. Geometric dimensioning controls used on mechanical engineering drawings. The theoretical and practical concepts of each of the geometric controls are explained relative to the areas of design, tooling, production, and inspection. All ten modules include a quiz. For most modules, there are drawing assignments and supplementary information. The parts of a directional-change gearbox are used as platforms for the geometric controls. The assembly includes shafts, gears, bearings, keys, lip seals, castings, and threaded fasteners. Intended for employees working in design, drafting, quality, procurement, tooling, production, and manufacturing.

RATIONALE: The change reflects a request by the instructor and the current course name used by ASME. Changes in the course content remove the need for a prerequisite and simplifies the approval process for the nondegree-seeking students taking this course. The name change assures that KSU and ASME use the same name for the course.

IMPACT: No impact outside the College of Engineering

EFFECTIVE: Fall 2008

FROM: DEN 432. Advanced Geometric Dimensioning and Tolerancing ~~III.~~ (1) I, II, S. Most frequently used geometric dimensioning controls used on mechanical engineering drawings. The basic applications of position are explained in greater detail: fixed and floating fastener, zero tolerance, size feature datums, and composite versus two single segments. Several possibilities of how to control the size and location of non-size features with profile are explained. Coaxial relationships and control of rectangular features are also covered. All nine modules include a quiz. For most modules, there are drawing assignments and supplementary information. The parts of an Idler Wheel assembly are used as platforms for the geometric controls. The assembly includes a shaft, pulley, weldments, bushings, and threaded fasteners. Pr.: DEN 431.

TO: DEN 432. Advanced Geometric Dimensioning and Tolerancing. (1) I, II, S. Most frequently used geometric dimensioning controls used on mechanical engineering drawings. The basic applications of position are explained in greater detail: fixed and floating fastener, zero tolerance, size feature datums, and composite versus two single segments. Several possibilities of how to control the size and location of non-size features with profile are explained. Coaxial relationships and control of rectangular features are also covered. All nine modules include a quiz. For most modules, there are drawing assignments and supplementary information. The parts of an Idler Wheel assembly are used as platforms for the geometric controls. The assembly includes a shaft, pulley, weldments, bushings, and threaded fasteners. Pr.: DEN 431.

RATIONALE: The change reflects a request by the instructor and the current course name used by ASME. The name change assures that KSU and ASME use the same name for the course.

IMPACT: No impact outside the College of Engineering

EFFECTIVE: Fall 2008

FROM: ~~DEN 398~~. ~~**Problems/**~~Project Management For Engineers and Technical Professionals. (1) I, II, S. This online course will provide fundamental concepts of project management. The course will include a step-by-step process to plan, implement, and evaluate each project; will demonstrate how to assess other peoples abilities to complete their part of the project; will provide strategies for making other people able and communicating with them on progress; and will show how to steer a project around a lack of resources, wrong parameters and political maneuvering.

TO: DEN 310. Project Management For Engineers and Technical Professionals. (1) I, II, S. This online course will provide fundamental concepts of project management. The course will include a step-by-step process to plan, implement, and evaluate each project; will demonstrate how to assess other peoples abilities to complete their part of the project; will provide strategies for making other people able and communicating with them on progress; and will show how to steer a project around a lack of resources, wrong parameters and political maneuvering.

RATIONALE: To support the College of Engineering/American Society of Mechanical Engineers (ASME) partnership and professional practice certificate.

IMPACT: No impact outside the College of Engineering

EFFECTIVE: Fall 2008

Department
Electrical & Computer Engineering

Course Changes

From: EECE ~~510~~. Circuit Theory I. (3) I, II. An introduction to linear circuit theory: analysis of linear circuits containing resistance, inductance and capacitance. Mutual inductance and transformers. Three hours rec. a week. Pr.: ~~Math 222. PHYS 214~~ and EECE 210.

To: EECE 410. Circuit Theory I. (3) I, II. An introduction to linear circuit theory: analysis of linear circuits containing resistance, inductance and capacitance. Mutual inductance and transformers. Three hours rec. a week. Pr.: Math 221 and EECE 210.

Effective Date: Fall 2008

Rationale: This modification is to change the course number and the course prerequisites to reflect a repositioning of the course from the junior year to the sophomore year in the Electrical Engineering program. This positional change in the curriculum reduces the delay between this course and the prerequisite material covered in introductory courses while better reflecting the level at which the course is presently taught.

Impact: None outside the dept.

From: EECE ~~541~~. Design of Digital Systems. (3) I, II. Design of combinational and sequential systems and peripheral interfaces. Emphasis is placed on hardware description languages, computer-aided design tools and simulations. Three hours rec. a week. Pr. ~~EECE 431; EECE 510 or PHYS 214.~~

To: EECE 441. Design of Digital Systems. (3) I, II. Design of combinational and sequential systems and peripheral interfaces. Emphasis is placed on hardware description languages, computer-aided design tools and simulations. Three hours rec. a week. Pr. EECE 210 and EECE 241.

Effective Date: Fall 2008

Rationale: This modification is to change the course number and the course prerequisite to reflect a repositioning of the course from the junior year to the sophomore year in the Computer Engineering program. This positional change in the curriculum reduces the delay between this course and the prerequisite material covered in introductory courses while better reflecting the level at which the course is presently taught.

Impact: None outside the dept.

From: EECE 525. Electronics I. (3) I, II. Fundamentals of electronics components, devices, and circuits. Three hours rec. a week. Pr.: ~~STAT 510; EECE 510~~ or EECE 519.

To: EECE 525. Electronics I. (3) I, II. Fundamentals of electronics components, devices, and circuits. Three hours rec. a week. Pr.: EECE 410 or EECE 519.

Effective Date: Fall 2008

Rationale: This modification is to change the prerequisite requirement for this course. The material covered in STAT 510 is very minor importance to EECE 525 as the course is presently taught. Statistical concepts and methods are useful in other coursework within the curriculum and STAT 510 is (or will soon be) required as a prerequisite for other courses.

Impact: None

CHANGES TO THE COMPUTER ENGINEERING PROGRAM STRUCTURE

The department wishes to move EECE 441 (previously EECE 541) Design of Digital Systems from the first semester of the junior year to the first semester of the sophomore year in the Computer Engineering curriculum. Movement of this course has necessitated the repositioning of two other courses (ECON 110 and STAT 510) as indicated in the attached materials.

The proposed revision of the program structure also reflects a reordering of Math 222 Calculus 3 and Math 240 Differential Equations. An agreement has been reached with the mathematics department to allow EECE students to take the Differential Equations course prior to Calculus 3.

RATIONALE: This positional change in the curriculum reduces the delay between this course and the prerequisite material covered in introductory courses while better reflecting the level at which the course is presently taught.

IMPACT: No impact on other departments beyond that indicated in the agreement reached with the mathematics department as described above.

EFFECTIVE: Fall 2008

4. COMPUTER ENGINEERING
Curriculum for Bachelor of Science in Computer Engineering
(129 hours total)
Effective Spring 2006

First Semester Course		Sem Hrs		Second Semester Course		Sem Hrs
			FRESHMAN			
ENGL	100 Exposit Writing 1	3		PHYS	213 Engg Physics 1	5
SPCH	105 Public Speaking 1A	2		MATH	221 Anal Geom Calc 2	4
CHM	210 Chemistry 1	4		CIS	200 Fund Comp Prog	4
MATH	220 Anal Geom Calc 1	4		EECE	210 Intro to Electrical Engg	3
EECE	241 Intro to Computer Engg	3		EECE	015 New Student Assembly	0
EECE	015 New Student Assembly	0				
DEN	015 New Student Orient	0				
	TOTAL	16			TOTAL	16
			SOPHOMORE			
ECON	110 Prin Macroecon	3		MATH	240 Elem Diff Equations	4
PHYS	214 Engg Physics 2	5		MATH	510 Discrete Math	3
MATH	222 Anal Geom Calc 3	4		STAT	510 Intro to Prob & Stat	3
CIS	300 Data/Program Structures	3		CIS	308 C/C++ Language Lab	1
DEN	325 Intro to Per & Prof Dev	1		EECE	431 Microcontrollers	3
				EECE	510 Circuit Theory 1	3
	TOTAL	16			TOTAL	17
			JUNIOR			
CIS	501 Sft Arch & Design	3		EECE	512 Linear Systems	3
EECE	511 Circuit Theory 2	3		EECE	557 Electromagnetics	3
EECE	525 Electronics 1	3		EECE	649 Computer Design 1	3
EECE	541 Des Dig Sys	3		UGE Hum or UGE Social Sci Elective		3
UGE Hum or UGE Social Sci Elective		3		Technical Electives		3
Technical Electives		3				
	TOTAL	18			TOTAL	15
			SENIOR			
CIS	543 Software Eng Dsgn Proj *	3		EECE	645 Digital Electronics	3
ENGL	415 Writ Comm Engr	3		EECE	590 Seminar	1
EECE	643 Comp Engg Des Lab	3		UGE Hum or UGE Social Sci Elective		3
UGE Hum or UGE Social Sci Elective		3		Technical Electives		9
Technical Electives		3				
	TOTAL	15			TOTAL	16

* Offered only semester shown in curriculum

Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only three hours of ENGL 415 prerequisite credits toward degree requirements.
Humanities and Social Science (H & SS) electives must be from the official College of Engineering, University General Education (UGE) H & SS list. At least one course must be in Humanities. Students may transfer up to 6 hours of H & SS courses if not needed to meet UGE requirements.

Technical Electives must be selected to complete one of the areas of specialization. 6/0

4. COMPUTER ENGINEERING

Proposed/New Curriculum for Bachelor of Science in Computer Engineering

(129 hours total)

Effective Fall 2008

First Semester Course		Sem Hrs	Second Semester Course		Sem Hrs
		FRESHMAN			
ENGL	100 Exposit Writing 1	3	PHYS	213 Engg Physics 1	5
SPCH	105 Public Speaking 1A	2	MATH	221 Anal Geom Calc 2	4
CHM	210 Chemistry 1	4	CIS	200 Fund Comp Prog	4
MATH	220 Anal Geom Calc 1	4	EECE	210 Intro to Electrical Engg	3
EECE	241 Intro to Computer Engg	3	EECE	015 New Student Assembly	0
EECE	015 New Student Assembly	0			
	TOTAL	16		TOTAL	16
		SOPHOMORE			
EECE	441 Des Dig Sys	3	MATH	222 Anal Geom Calc 3	4
PHYS	214 Engg Physics 2	5	MATH	510 Discrete Math	3
MATH	240 Elem Diff Equations	4	ECON	110 Prin Macroecon	3
CIS	300 Data/Program Structures	3	CIS	308 C/C++ Language Lab	1
DEN	325 Intro to Per & Prof Dev	1	EECE	431 Microcontrollers	3
			EECE	410 Circuit Theory 1	3
	TOTAL	16		TOTAL	17
		JUNIOR			
CIS	501 Sft Arch & Design	3	EECE	512 Linear Systems	3
EECE	511 Circuit Theory 2	3	EECE	557 Electromagnetics	3
EECE	525 Electronics 1	3	EECE	649 Computer Design 1	3
STAT	510 Intro to Prob & Stat	3	UGE Hum or UGE Social Sci Elective		3
UGE Hum or UGE Social Sci Elective		3	Technical Electives		3
Technical Electives		3			
	TOTAL	18		TOTAL	15
		SENIOR			
CIS	543 Software Eng Dsgn Proj *	3	EECE	645 Digital Electronics	3
ENGL	415 Writ Comm Engr	3	EECE	590 Seminar	1
EECE	643 Comp Engg Des Lab	3	UGE Hum or UGE Social Sci Elective		3
UGE Hum or UGE Social Sci Elective		3	Technical Electives		9
Technical Electives		3			
	TOTAL	15		TOTAL	16

* Offered only semester shown in curriculum

Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only three hours of ENGL 415 prerequisite credits toward degree requirements.

General Education (UGE) H & SS list. At least one course must be in Humanities. Students may transfer up to 6 hours of H & SS courses if not needed to meet UGE requirements.

6/06

Technical Electives must be selected to complete one of the areas of specialization.

Industrial and Manufacturing Systems Engineering
IMSE Course Changes – Industrial Engineering Program

FROM: **IMSE 201. Introduction of Industrial Engineering.** (3) I. Introduction to the major functions of industrial engineers with emphasis on the analysis, design, and control of production systems. Two hours lec. and two hours lab week.

TO: **IMSE 201. Introduction of Industrial Engineering.** (3) I. Introduction to the core areas of Industrial Engineering including ergonomics, operations research, quality control, management, engineering economics, resource management, production systems and inventory control. Both engineering ethics and careers in industrial engineering will be discussed. Two hours lec. and two hours lab week.

RATIONALE: The catalog description of this course will be changed to more properly reflect the content of this course.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 541. Statistical Quality Control.** (3) I~~, II~~. Normal, binomial, and frequency distributions. Seven process improvement tools. Control charts on means and variances for variables and attributes. Design of experiments for process and product design. Acceptance sampling plans. Two hours rec. and two hours lab. a week. Pr.: STAT 511.

TO: **IMSE 541. Statistical Quality Control.** (3) I. Normal, binomial, and frequency distributions. Seven process improvement tools. Control charts on means and variances for variables and attributes. Design of experiments for process and product design. Acceptance sampling plans. Two hours rec. and two hours lab. a week. Pr.: STAT 511.

RATIONALE: This course is offered during the fall semester only.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 555. Industrial Facilities Layout and Design.** (3) ~~I,~~ II. Design of industrial facilities with emphasis on manufacturing engineering and material handling. Two hours rec. and two hours lab a week. Pr.: IMSE 530 and 623.

TO: **IMSE 555. Industrial Facilities Layout and Design.** (3) II. Design of industrial facilities with emphasis on manufacturing engineering and material handling. Two hours rec. and two hours lab a week. Pr.: IMSE 530 and 623.

RATIONALE: This course is only offered in the spring semester.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 563. Manufacturing Processes Engineering.** (3) II. The effects of operating variables on manufacturing processes such as machining, metal forming, casting, welding, plastics, etc. Emphases are on manufacturing process theory, process variables measurement, and the technical inferences of collected data. Strength of materials, manufacturing process theory, instrumentation, computer data acquisition, and data analysis concepts are included. Laboratory testing of manufacturing processes and the engineering design of experiments for process variable measurements are used to develop efficient manufacturing processes. Two hours rec. and two hours lab a week. Pr.: IMSE ~~250 and~~ 251, CHE 352, CE 530 ~~or statics equiv~~.

TO: **IMSE 563. Manufacturing Processes Engineering.** (3) II <u>(odd years).</u> The effects of operating variables on manufacturing processes such as machining, metal forming, casting, welding, plastics, etc. Emphases are on manufacturing process theory, process variables measurement, and the technical inferences of collected data. Strength of materials, manufacturing process theory, instrumentation, computer data acquisition, and data analysis concepts are included. Laboratory testing of manufacturing processes and the engineering design of experiments for process variable measurements are used to develop efficient manufacturing processes. Two hours rec. and two hours lab a week. Pr.: IMSE 251, CHE 352, and CE 530.

RATIONALE: The elimination of IMSE 250 is due to the fact that it is the prerequisite of IMSE 251 already. The elimination of "statics equiv" provides a more consistent format of prerequisite requirement in class catalog. This course is offered every two years.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 605.** Advanced Industrial Management. (3) I. Managing groups of employees in engineering settings, theory of organization design; designing engineering and technological organizations; professionalism and ethical considerations in engineering. Three hours lec. a week. Pr.: IMSE 501.

TO: **IMSE 605.** Advanced Industrial Management. (3) I. Contemporary management philosophies and their impact on engineers and engineering managers. Topics include planning, organizing, leading and controlling. Three hours lec. a week. Pr.: IMSE 501 or MANGT 420.

RATIONALE: The course description changes reflect the proper content being taught.

Effective Date: Fall 2008

IMPACT: Department of Management has been contacted. Dr. Niehoff did not object to the changes.

FROM: **IMSE 610. Occupational Safety Engineering**. (3) II. An overview of factors affecting safety in organizations, emphasizing analysis techniques and design strategies. Topics include occupational safety, accidents , fire protection, industrial hygiene, hazardous waste, toxicology, radiation safety, product liability, and federal standards. A project involving a hazard analysis and the design of solutions for a field location is required. Three hours lec. a week. Pr.: IMSE ~~250 and~~ 251.

TO: **IMSE 610. Occupational Safety Engineering**. (3) II. Even years. An overview of factors affecting safety in organizations, emphasizing analysis techniques and design strategies. Topics include occupational safety, accidents , fire protection, industrial hygiene, hazardous waste, toxicology, radiation safety, product liability, and federal standards. A project involving a hazard analysis and the design of solutions for a field location is required. Three hours lec. a week. Pr.: IMSE 251.

RATIONALE: This course is only offered every second year in the spring semester. The elimination of IMSE 250 is due to the fact that it is the prerequisite of IMSE 251 already.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 625. Work Environments**. (3) II. Basic Structure and performance of the human, viewed as a component in information processing and control systems. Effect of visual, auditory, toxic, and thermal environments. Two hours rec. and two hours lab a week. Pr.: ~~IMSE 250 and~~ IMSE 251.

FROM: **IMSE 625. Work Environments**. (3) II. Alternate years. Basic Structure and performance of the human, viewed as a component in information processing and contriol systems. Effect of visual, auditory, toxic, and thermal environments. Two hours rec. and two hours lab a week. Pr.: IMSE 251.

RATIONALE: This course is only offered every second year in the spring semester. The elimination of IMSE 250 is due to the fact that it is the prerequisite of IMSE 251 already.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 633. Production Planning and Inventory Control**. (3) I, ~~II~~. Principles, techniques, and applications of production planning and inventory control. Design of control systems. Three hours rec. Pr.: IMSE 250. Pr. or conc.: IMSE 560.

TO: **IMSE 633. Production Planning and Inventory Control.** (3) I. Principles, techniques and applications of production planning and inventory control. The course covers strategic planning tools such as forecasting and aggregate planning as well as tactical tools such as inventory management and scheduling. Three hours rec. Pr.: IMSE 250. Pr. or conc.: IMSE 560.

RATIONALE: The course description changes reflect the proper content being taught. This course is offered only in the Fall semester.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 641. Statistical Process Control in Manufacturing.** (3) II. An introduction to the modern practice of quality engineering concepts, systems, strategies, and tools. Topics include advanced techniques related to statistical process control, international quality standards, quality data management, and automatic inspection. Three hours lec. a week. Pr.: STAT 511.

TO: **IMSE 641. Quality Engineering.** (3) II. An introduction to the modern practice of quality engineering concepts, systems, strategies, and tools to both manufacturing and service industries. Topics include advanced techniques related to statistical process control, international quality standards, quality data management, and automatic inspection. Three hours lec. a week. Pr.: STAT 511.

RATIONALE: This title change better reflects the content of this course better. The minor change in course description clarifies the application areas better as well.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 580. Manufacturing Systems Design and Analysis.** (4) II. Comprehensive design and analysis of a manufacturing system: integration of the undergraduate industrial engineering and manufacturing engineering courses. Two hours rec. and four hours lab a week. Pr. or conc.: ~~IMSE 623, 633~~.

TO: **IMSE 580. Manufacturing Systems Design and Analysis**. (4) II. Comprehensive design and analysis of a manufacturing system: integration of the undergraduate industrial engineering and manufacturing engineering courses. Two hours rec. and four hours lab a week. Pr. or Conc. : 24 credit hours of IMSE 500 level and above courses.

RATIONALE: The prerequisite change reflects the need to accommodate diverse topics that IMSE students can work on in this class. Students do not necessary need to have a uniform set of prerequisites to take this course. However, the new prerequisite and concurrent criterion would guarantee that they have the fundamental IMSE knowledge in IMSE experience to complete this course.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 591. Senior Design Project I.** (2) I, II. Students organize themselves in teams, not exceeding five students in each team. Each team is responsible to establish a client. The teams select a general subject agreeable to the client, formulate a specific design project, and gather data and resources needed to support the project. Two hours rec. a week. Pr. or conc.: ~~IMSE 530, 541, 623, and 633~~.

TO: **IMSE 591. Senior Design Project I.** (2) I, II. Students organize themselves in teams, not exceeding five students in each team. Each team is responsible to establish a client. The teams select a general subject agreeable to the client, formulate a specific design project, and gather data and resources needed to support the project. Two hours rec. a week. Pr. or Conc. : 24 credit hours of IMSE 500 level and above courses.

RATIONALE: The rationale is the same as those in IMSE 580. IMSE 591 is another course for IMSE capstone design. Students can select projects other than manufacturing. Since IMSE has formed its current curriculum to allow students to choose their own focused area through technical, professional, and IMSE electives, removing the prerequisites in just a few specific IMSE courses would allow students to work on projects of their focused area.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 592. Senior Design Project II.** (2) I, II. Continuation of IMSE 591 in which student teams complete engineering design projects formulated and approved in IMSE 591. Two hours rec. a week. Pr. IMSE 591. ~~Pr. or conc. IMSE 555 and 643.~~

TO: **IMSE 592. Senior Design Project II.** (2) I, II. Continuation of IMSE 591 in which student teams complete engineering design projects formulated and approved in IMSE 591. Two hours rec. a week. Pr. IMSE 591.

RATIONALE: IMSE 592 is the 2nd part of the course for IMSE senior design. Students should already have enough technical background to take IMSE 591. This course is a continuation of IMSE 591. Following the logic to allow students to choose their own focused area, IMSE faculty feel that removing the prerequisites in just a few specific IMSE courses would provide flexibility to allow students to work on projects of their focused area.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 643. Industrial Simulation.** (3) I, II. Basic concepts of computer simulation modeling of manufacturing, production, service, and other systems. Use of a commercial simulation software environment to build, analyze, verify, and validate models. Use of models as a system design tool. Three hours rec. per week. ~~Pr.: IMSE 560.~~ Pr. or conc.: STAT 511.

TO: **IMSE 643. Industrial Simulation.** (3) I, II. Basic concepts of computer simulation modeling of manufacturing, production, service and other stochastic systems. Use of a commercial simulation software environment to build, analyze, verify, and validate models. Use of models as a system design tool through statistical and optimization techniques. Three hours rec. per week. Pr. or conc.: STAT 511, IMSE 660.

RATIONALE: The prerequisites changes reflect the new topics frequently introduced in the course contents, including healthcare and finance systems, stochastic sampling, applications in new optimization techniques, and modeling of natural disaster/epidemic phenomena. The minor change in course description clarifies the emphasized technical areas better also leaves room for the instructors to enhance the course by introducing variety of application domains.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 662. Computer Aided Manufacturing.** (3) I. Concepts in CAM, integrated control of machine tools and transport devices with production control. Concepts of CAM and automated assembly in small lot production environment. Two hours lec. and three hours lab a week. Pr.: ~~IMSE 250 and~~ IMSE 251 and CIS 209 ~~or equiv.~~

TO: **IMSE 662. Computer Aided Manufacturing.** (3) I. Concepts in CAM, integrated control of machine tools and transport devices with production control. Concepts of CAM and automated assembly in small lot production environment. Two hours lec. and three hours lab a week. Pr.: IMSE 251 and CIS 209, or 200, or ME 400.

RATIONALE: The elimination of IMSE 250 is due to the fact that it is the prerequisite of IMSE 251 already. The elimination of "or equiv" provides a more consistent format of prerequisite requirement in class catalog.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 760. Stochastic Calculus Financial Engineering.** (3). I. This course will serve as an introduction to the basic concepts and computing techniques of financial engineering and its real-life applications. These basics can be applied in many other aspects of Industrial Engineering used throughout stochastic processes, probability theory, system simulation, portfolio/risk management, and supply chain optimization. Pr.: CIS 209 ~~or equivalent~~, IMSE 530, ~~and IMSE~~ 660.

TO: **IMSE 760. Stochastic Calculus Financial Engineering.** (3). I. This course will serve as an introduction to the basic concepts and computing techniques of financial engineering and its real-life applications. These basics can be applied in many other aspects of Industrial Engineering used throughout stochastic processes, probability theory, system simulation, portfolio/risk management, and supply chain optimization. Pr.: IMSE 530; IMSE 660; and CIS 209, or 200, or ME 400.

RATIONALE: The elimination of "or equivalent" provides a more consistent format of prerequisite requirement in class catalog. Instead, all courses suitable for the programming prerequisite are listed.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 805. Management of Research and Engineering.** (3) I. Engineering administration; organization factors in decision-making. Three hours rec. a week. Pr.: IMSE 501.

TO: **IMSE 805. Management of Research and Engineering.** (3) I. Engineering administration; organization factors in decision-making. Three hours rec. a week. Pr.: IMSE 501 or MANGT 420.

RATIONALE: MANGT 420 can substitute for IMSE 501. This addition in category will provide better information for students.

Effective Date: Fall 2008

IMPACT: Department of Management has been contacted. Dr. Niehoff did not object to the changes.

FROM: **IMSE 806. Engineering Project Management.** (3) II. Planning, scheduling, and controlling engineering projects. Includes determination of appropriate project team, cost/benefit analysis, PERT and CPM scheduling techniques, reporting, and use of computerized project management tools. Three hours lec. a week. Pr.: IMSE 501 and IMSE 530.

TO: **IMSE 806. Engineering Project Management.** (3) II. On sufficient demand. Planning, scheduling, and controlling engineering projects. Includes determination of appropriate project team, cost/benefit analysis, PERT and CPM scheduling techniques, reporting, and use of computerized project management tools. Three hours lec. a week. Pr.: IMSE 530 and IMSE 501 or MANGT 420.

RATIONALE: MANGT 420 can substitute for IMSE 501. This addition in category will provide better information for students.

Effective Date: Spring 2009

IMPACT: Department of Management has been contacted. Dr. Niehoff did not object to the changes.

FROM: **IMSE 841. Advanced Topics in Quality Engineering.** (3) I. A survey of current advances in quality engineering. Includes both off-line and on-line quality engineering. Three hours lec. a week. Pr.: STAT 704, 705 and IMSE 641 and ~~knowledge of Lotus 123 and (Fortran, Pascal or C)~~.

TO: **IMSE 841. Advanced Topics in Quality Engineering.** (3) I. A survey of current advances in quality engineering. Includes both off-line and on-line quality engineering. Three hours lec. a week. Pr.: STAT 704; STAT 705; IMSE 641 and CIS 209, or 200, or ME 400.

RATIONALE: The change of prerequisite reflects the advances in programming languages.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 842. Reliability Theory ~~I.~~** (3) I. The mathematics of reliability theory. The hazard function. Calculation of failure density and mean life for series, parallel systems, and various types of standby systems. Hypotheses tests on mean life. ~~Left~~ testing with censoring. Three hours rec. a week. Pr.: STAT 511 ~~or equiv~~.

TO: **IMSE 842. Reliability Theory.** (3) I. The mathematics of reliability theory. The hazard function. Calculation of failure density and mean life for series, parallel systems, and various types of standby systems. Hypotheses tests on mean life. Life testing with censoring. Three hours rec. a week. Pr.: STAT 511.

RATIONALE: This course is the only Reliability Theory course in the IMSE curriculum. Prerequisite wording change is to maintain consistence of the class catalog format. A typo is found in the original course description.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

DROP: **IMSE 820. Intelligent Manufacturing Systems.** (3) II. Concepts and applications of machine intelligence to manufacturing process and systems. Each student will develop a prototype system which demonstrates the appropriate application of machine intelligence to solve a practical integrated manufacturing systems problem. Two hours rec. and three hours lab a week. Pr.: IMSE 671 or equiv.

RATIONALE: This course has not been offered in recent years. There is no plan to offer it again.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 850. Ergonomics (Human Factors) Engineering ~~I~~.** (3) I. The design and analysis of applied experimental research on human behavior as applied to engineering systems. An experimental project. Two hours rec. and three hours lab a week. Pr.: STAT 702 or 703.

TO: **IMSE 850. Ergonomics (Human Factors) Engineering.** (3) I. The design and analysis of applied experimental research on human behavior as applied to engineering systems. An experimental project. Two hours rec. and three hours lab a week. Pr.: STAT 702 or 703.

RATIONALE: This course is the only advanced Ergonomics course.

Effective Date: Spring 2009

IMPACT: No other department will be affected by this change.

FROM: **IMSE 822. Advanced Engineering Economy.** (3) (alternate years). This course expands on the principles of the fundamental engineering economics analysis. Emphasis is placed on quantification and evaluation of risk and uncertainty factors, capital allocation and budgeting concerns, the effects of inflation, economics consequence estimating models, engineering capital equipment replacement analyses and decision-tree and multi-attribute decision models in the context of engineering economics analysis of engineering problems~~. Lecture style with mini-projects, spreadsheet applications and group discussions to enhance learning.~~ Three hours lec. a week. Pr.: IMSE 530, or ME 560, or CE 680~~, or equivalent~~.

TO: **IMSE 822. Advanced Engineering Economy.** (3) I. On sufficient demand. This course expands on the principles of the fundamental engineering economics analysis. Emphasis is placed on the quantification and evaluation of risk and uncertainty factors, effects of inflation and taxes, economic consequences of estimating models, utility theory, engineering capital equipment replacement analysis and decision-tree and multi-attribute decision models. Three hours lec. a week. Pr.: IMSE 530, or ME 560, or CE 680

RATIONALE: The catalog description of this course will be changed to more properly reflect the content of this course.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

FROM: **IMSE 890 Applied Methods in Industrial Engineering II.** (2) I, II. This class requires students to have at least 12 weeks of full-time work experience in a job related to Industrial Engineering. This course can be taken only once by a graduate student. Pr. Approval of major professor and department head.

TO: **IMSE 890 Applied Methods in Industrial Engineering II.** (2) I, II, S. This class requires students to have at least 12 weeks of full-time work experience in a job related to Industrial Engineering. This course can be taken only once by a graduate student. Pr. Approval of major professor and department head.

RATIONALE: This course is also available in summer now.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

IMSE Curriculum Changes – Concurrent B.S./M.S.I.E. Degree

Drop: The student must complete 124 undergraduate credit hours. This will require taking some hours of unrestricted electives that must be approved by the advisor.

Rationale: This is just an unnecessary requirement by the program. We incorrectly interpreted a Regent's rule that required all B.S. degrees to have 124 hours. Concurrent B.S./M.S. programs allow 9 hours of graduate credits to count toward the undergraduate degree. We wanted our students to have the full benefit of this rule.

Effective Date: Fall 2008

IMPACT: No other department will be affected by this change.

Effective Date: Spring 07

Concurrent B.S./M.S. Industrial Engineering Degree

A student that successfully completes this program will receive both a B.S.I.E. and an M.S.I.E degree from the Industrial and Manufacturing Systems Engineering Department (IMSE). This program has both a thesis and a coursework only format.

Admission Requirements: A student must petition Kansas State University's Graduate School to be admitted into this program. The following requirements must be met before an individual can be admitted into this program.

- The student must be seeking a B.S.I.E. degree from IMSE.
- The student must have completed at least 80 credit hours of his/her undergraduate degree.
- The student's cumulative undergraduate GPA must be at least 3.25.
- The student must have a member of KSU's Graduate Faculty in the IMSE department agree to be his/her major professor (this professor can be changed in accordance to KSU's policies.)
- The student must apply for this program before receiving his/her B.S.I.E degree.

Program Formats and Guidelines: Since there is some overlap between undergraduate and graduate study, some graduate courses will satisfy the degree requirements for the undergraduate degree. A maximum of 9 graduate credit hours from the M.S.I.E. degree can be counted toward the B.S.I.E. degree. Some additional conditions are:

The student must complete all B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.

- The student must complete 30 graduate credit hours with a graduate GPA of at least 3.0.
- The student must complete all B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.
- ~~The student must complete 124 undergraduate credit. This will require taking some hours of unrestricted electives that must be approved by the advisor.~~
- The student must take IMSE 641 and IMSE 666 at the graduate level. (This satisfies two of the core course requirements of the M.S.I.E. degree.)
- At least 60% of the graduate credit hours on the Graduate Program of Study must be in classes at the 700 level or above. (Note that a student can take at most 4 graduate classes at the 600 level.)
- Once a student applies for this program, he/she must be continuously enrolled to complete this program. If a student is not enrolled for a fall or spring semester, this student loses the ability to count graduate credit hours toward his/her undergraduate degree.
- All students must take core course IMSE 811 and also take IMSE 888 if pursuing a coursework only option.
- No more than one C will be allowed in any of the core classes (IMSE 641, IMSE 666, IMSE 811 and IMSE 888 (for course work only students)). This may require repeating some classes.
- At most 6 hours of graduate courses can be taken from a department other than IMSE.
- A student pursuing a thesis format, must complete at least 6 credit hours of Masters Thesis (IMSE 899).

Once an individual is admitted to the concurrent B.S./M.S.I.E. degree program, the student should consult the graduate handbook for policies and procedures for graduate degrees, which include: supervisory committee, final examination, thesis defense, etc. The student's supervisory committee must approve the program of study, which is that student's graduation requirements.

Once a student has completed all of the graduation requirements, he/she will graduate with both a B.S.I.E. and an M.S.I.E. degree in the same semester. In the event that a student begins this program, but does not wish to finish it, he/she must change the nine credit hours of his/her graduate classes to undergraduate credit and then he/she will receive a B.S.I.E. degree. Once the student has completed 127 credit hours, the IMSE Graduate Committee will evaluate whether or not the student will be allowed to continue the concurrent B.S./M.S.I.E. program based upon KSU Graduate School policies. If the committee doesn't allow the student to continue with the program, then, upon completion of the B.S.I.E. requirements, the student will graduate with a B.S.I.E. degree. In either of these two cases, the student has lost the ability to count courses toward both his/her undergraduate and graduate degree requirements.

Additional Procedures: Each semester a student in this program must enroll in either IMSE 892 (Graduate Seminar) or IMSE 015 (Engineering Assembly). For at least one year, the student must be enrolled in IMSE 892.

KANSAS STATE UNIVERSITY

DEPARTMENT OF INDUSTRIAL & MANUFACTURING SYSTEMS ENGINEERING

Concurrent Bachelor of Science and Master of Science - INDUSTRIAL ENGINEERING

Program Format and Minimum Requirements*

An entering student must be pursuing a B.S.I.E. and have at least a 3.25 GPA. The student must enroll in this program after completing 80 undergraduate credit hours, but before his/her B.S. degree is awarded.

The formats for this program are as follows. *

	Thesis	Course Work Only
Core Courses	9	12†
Other IMSE Courses and Electives	15	18
Thesis	6	0
IE Seminar	0	0
TOTAL GRADUATE CREDITS	30	30

Core Courses and Policies

IMSE 666 - Operations Research III (for graduate credit)

IMSE 811 - Advanced Production & Inventory Control

† **IMSE 888 - Industrial Engineering Research Methods**

To graduate, a student may receive at most one C in all of the core courses (no D's or F's are allowed). This may require some students to retake core courses.

IMSE 641 - Statistical Process Control in Manufacturing (for graduate credit)

* Actual degree requirements will be summarized on an approved plan of study. Some general guidelines include:

The student must complete all of the B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.

The student must complete at least 30 graduate credit hours and 124 undergraduate credit hours.

At least 60 percent of graduate courses must be above the 700 level.

No more than 6 graduate hours can be taken from an outside department without prior permission.

Graduate courses in the IMSE department must be above the 600 level.

Graduate courses outside the department must be above the 500 level.

Continuous enrollment required.

Each semester a student must enroll in either IMSE 015 or IMSE 892 and complete at least 2 semester of IMSE 892.

Concurrent B.S./M.S. Industrial Engineering Degree

A student that successfully completes this program will receive both a B.S.I.E. and an M.S.I.E degree from the Industrial and Manufacturing Systems Engineering Department (IMSE). This program has both a thesis and a coursework only format.

Admission Requirements: A student must petition Kansas State University's Graduate School to be admitted into this program. The following requirements must be met before an individual can be admitted into this program.

- The student must be seeking a B.S.I.E. degree from IMSE.
- The student must have completed at least 80 credit hours of his/her undergraduate degree.
- The student's cumulative undergraduate GPA must be at least 3.25.
- The student must have a member of KSU's Graduate Faculty in the IMSE department agree to be his/her major professor (this professor can be changed in accordance to KSU's policies.)
- The student must apply for this program before receiving his/her B.S.I.E degree.

Program Formats and Guidelines: Since there is some overlap between undergraduate and graduate study, some graduate courses will satisfy the degree requirements for the undergraduate degree. A maximum of 9 graduate credit hours from the M.S.I.E. degree can be counted toward the B.S.I.E. degree. Some additional conditions are:

The student must complete all B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.

- The student must complete 30 graduate credit hours with a graduate GPA of at least 3.0.
- The student must complete all B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.
- The student must take IMSE 641 and IMSE 666 at the graduate level. (This satisfies two of the core course requirements of the M.S.I.E. degree.)
- At least 60% of the graduate credit hours on the Graduate Program of Study must be in classes at the 700 level or above. (Note that a student can take at most 4 graduate classes at the 600 level.)
- Once a student applies for this program, he/she must be continuously enrolled to complete this program. If a student is not enrolled for a fall or spring semester, this student loses the ability to count graduate credit hours toward his/her undergraduate degree.
- All students must take core course IMSE 811 and also take IMSE 888 if pursuing a coursework only option.
- No more than one C will be allowed in any of the core classes (IMSE 641, IMSE 666, IMSE 811 and IMSE 888 (for course work only students)). This may require repeating some classes.
- At most 6 hours of graduate courses can be taken from a department other than IMSE.
- A student pursuing a thesis format, must complete at least 6 credit hours of Masters Thesis (IMSE 899).

Once an individual is admitted to the concurrent B.S./M.S.I.E. degree program, the student should consult the graduate handbook for policies and procedures for graduate degrees, which include: supervisory committee, final examination, thesis defense, etc. The student's supervisory committee must approve the program of study, which is that student's graduation requirements.

Once a student has completed all of the graduation requirements, he/she will graduate with both a B.S.I.E. and an M.S.I.E. degree in the same semester. In the event that a student begins this program, but does not wish to finish it, he/she must change the nine credit hours of his/her graduate classes to undergraduate credit and then he/she will receive a B.S.I.E. degree. Once the student has completed 127 credit hours, the IMSE Graduate Committee will evaluate whether or not the student will be allowed to continue the concurrent B.S./M.S.I.E. program based upon KSU Graduate School policies. If the committee doesn't allow the student to continue with the program, then, upon completion of the B.S.I.E. requirements, the student will graduate with a B.S.I.E. degree. In either of these two cases, the student has lost the ability to count courses toward both his/her undergraduate and graduate degree requirements.

Additional Procedures: Each semester a student in this program must enroll in either IMSE 892 (Graduate Seminar) or IMSE 015 (Engineering Assembly). For at least one year, the student must be enrolled in IMSE 892.

KANSAS STATE UNIVERSITY

DEPARTMENT OF INDUSTRIAL & MANUFACTURING SYSTEMS ENGINEERING

Concurrent Bachelor of Science and Master of Science - INDUSTRIAL ENGINEERING

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† **IMSE 888 - Industrial Engineering Research Methods**

To graduate, a student may receive at most one C in all of the core courses (no D's or F's are allowed). This may require some students to retake core courses.

IMSE 641 - Statistical Process Control in Manufacturing (for graduate credit)

* Actual degree requirements will be summarized on an approved plan of study. Some general guidelines include:

The student must complete all of the B.S.I.E. undergraduate requirements with the exception that up to 9 credit hours of IMSE 600 level classes taken for graduate credit can also count toward his/her undergraduate degree requirements.

The student must complete at least 30 graduate credit hours

At least 60 percent of graduate courses must be above the 700 level.

No more than 6 graduate hours can be taken from an outside department without prior permission.

Graduate courses in the IMSE department must be above the 600 level.

Graduate courses outside the department must be above the 500 level.

Continuous enrollment required.

Each semester a student must enroll in either IMSE 015 or IMSE 892 and complete at least 2 semester of IMSE 892.