

MICHIGAN STATE UNIVERSITY

April 8, 2010

MEMORANDUM

TO: Dr. Douglas Estry, Associate Provost for Undergraduate Education
and Dean of Undergraduate Studies

FROM: Dr. Linda O. Stanford, Associate Provost for Academic Services

RE: Request to Lower the Total Credits Required for the Bachelor of Science
Degree in Applied Engineering Sciences from '128' to '120' and Require a
Combined Grade-Point Average in Computer Science and Engineering
231 and 260 for the Computer Science Concentration

For Transmittal to the University Committee on Academic Policy (UCAP)

The request referenced above is being sent to the University Committee on Academic Policy (UCAP) in accordance with the *Bylaws for Academic Governance*, 4.4.

UCAP Response Requested:

Please ask the UCAP to consider the request referenced above and provide consultative commentary prior to the April 29, 2010 Full Committee, UCC meeting at 1:30 p.m. Please mail the related materials referenced under the heading Attachments at the end of this memorandum to the UCAP members.

The academic program and course requests referenced above will be included on the agenda for the April 20, 2010 meeting of Subcommittee A, University Committee on Curriculum (UCC). Requests that are approved by Subcommittee A on April 20 will be before the Full Committee, UCC, for action on April 29, 2010. Requests that are approved by the Full Committee on April 29 will be included in the September, 2010, Report of the UCC to the Academic Council.

If you have any questions, please call Joy Speas, University Curriculum Administrator, at 5-8420.

Thank you.

Attachments:

1. Request for Changes in an Academic Program form dated March 3, 2010: Bachelor of Science Degree in Applied Engineering Sciences and attachments.

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UNIVERSITY
CURRICULUM
and CATALOG

Michigan State University
176 Administration Building
East Lansing, Michigan
48824-1046

PH: 517/355-8420
FAX: 517/353-1935

COLLEGE OF ENGINEERING

1. Request to change the requirements for the **Bachelor of Science** degree in **Applied Engineering Sciences** in the College of Engineering. The University Committee on Academic Policy (UCAP) will consider this request.

The concentrations in the Bachelor of Science degree in Applied Engineering Sciences will be noted on the student's academic record when the requirements for the degree have been completed.

- a. Under the heading **Requirements for the Bachelor of Science Degree in Applied Engineering Sciences** make the following changes:

- (1) In item 1. make the following changes:

(a) In paragraph one, change "128" to "120".

(b) Change paragraph two to the following:

The University's Tier II writing requirement for the Applied Engineering Sciences major is met by completing Engineering 410. This course is referenced in item 3. a. below.

- (2) Replace item 3. with the following:

The following requirements for the major:

- a. All of the following courses (46 credits):

ACC	230	Survey of Accounting Concepts	3
CE	221	Statics	3
CEM	161	Chemistry Laboratory I	1
COM	225	Introduction to Interpersonal Communication	3
EC	201	Introduction to Microeconomics	3
EC	202	Introduction to Macroeconomics	3
ECE	201	Circuits and Systems I	3
EGR	210	Global Systems: Economics, Engineering, Environment	3
EGR	310	Sustainable Systems Analysis	3
EGR	410	System Methodology	3
ME	201	Thermodynamics	3
ME	280	Graphic Communications	2
MGT	325	Management Skills and Processes	3
MKT	317	Quantitative Business Research Methods	3
MSE	250	Materials Science and Engineering	3
PHY	191	Physics Laboratory for Scientists, I	1
STT	315	Introduction to Probability and Statistics for Business	3

- b. One of the following courses (3 credits):

BE	230	Engineering Analysis of Biological Systems	3
CE	280	Principles of Environmental Engineering and Science	3

- c. **Concentration** (15 to 18 credits):

In consultation with their academic advisor, students must select one of the following concentrations: computer science, supply chain management, technical sales, or telecommunications. For students interested in computer science, the minimum criteria for acceptance is the completion of Computer Science and Engineering 231 and 260 with a combined grade-point average in those two courses of 3.0. The concentration will be noted on the student's academic record.

Computer Science (18 credits)

1. All of the following courses (12 credits):

CSE	231	Introduction to Programming I	4
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	CSE	232	Introduction to Programming II	4
	CSE	260	Discrete Structures in Computer Science	4
2.	One of the following courses (3 credits):			
	CSE	320	Computer Organization and Architecture	3
	CSE	331	Algorithms and Data Structures	3
	CSE	335	Object-oriented Software Design	3
3.	One of the following courses (3 credits):			
	CSE	410	Operating Systems	3
	CSE	420	Computer Architecture	3
	CSE	440	Introduction to Artificial Intelligence	3
	CSE	471	Media Processing and Multimedia Computing	3
	CSE	472	Computer Graphics	3
Supply Chain Management (15 credits)				
All of the following courses:				
	FI	320	Introduction to Finance	3
	MKT	327	Introduction to Marketing	3
	SCM	303	Introduction to Supply Chain Management	3
	SCM	371	Procurement and Supply Management	3
	SCM	372	Manufacturing Planning and Control	3
Technical Sales (18 credits)				
All of the following courses:				
	COM	360	Advanced Sales Communication	3
	COM	483	Practicum in Sales Communication	1
	FI	320	Introduction to Finance	3
	MKT	313	Personal Selling and Buying Processes	3
	MKT	327	Introduction to Marketing	3
	MKT	383	Sales Management	3
	SCM	474	Negotiations	2
Telecommunications (18 credits)				
All of the following courses:				
	TC	100	The Information Society	3
	TC	201	Introduction to Media and Communication Technology	3
	TC	210	Media and Communication Policy	3
	TC	300	Economics of Media	3
	TC	361	Information and Communication Technology Management	3
	TC	365	Introduction to Network Management	3

Effective Fall 2010

View a Program		Main Menu
Stephanie Smith, RO	Wednesday, 3/3/2010	
Program Name: Applied Engineering Sciences Degree: BS Sequence Number: 3	Program Request ID: 1703	
Effective Dates: Fall 2010 - Open Status: Interim Initial Action: Change		
Requested Date: 2/17/2010 4:01:03 PM		
<p>1. Department/School/College: 16256 College of Engineering</p> <p>2. Name of Program: Applied Engineering Sciences</p> <p>3. Name of Degree: BS</p> <p>4. Type of Program: Major</p> <p>5. Effective Start Semester: Fall 2010</p> <p>6. Target student audience for the program: College of Engineering undergraduate students</p> <p>7. Enrollment: What is the expected enrollment per year: 120 What is the minimum enrollment acceptable: 15</p> <p>8. Source of budget for the program: To align academic planning and curricular change, ALL requests for NEW funds must be included in the College's annual planning letter. Provost approval of new funds and the effective date for the new program must align. If funding is not approved, then the program request will not be forwarded to Academic Council. Internal reallocation If new funds, was this request included in the College's annual planning letter? Indicate yes or no. If no, then this is a department or college fund reallocation (If the program is implemented, no additional resources are required.).</p> <p>9. Projected Costs as compared to other programs in unit: Lower</p> <p>10. Staff requirement: How many additional staff will be required: 0 Who will provide the primary instruction. Describe any external linkages(industry, government, etc.): If there are external professional linkages, please explain how they support program</p>		

quality. a) Supply Chain Management department in College of Business, and Marketing department in College of Business. These departments are the major focus of the business core of AES. In addition, courses from these departments provide courses for the two business specializations of AES: Supply Chain and Technical Sales. b) Telecommunications department in the College of Communication Arts and Sciences. This department is the major focus of coursework for the Telecommunications Specialization of AES. Can the program be offered without these linkages? No. However in all cases there is a working agreement between AES and the indicated departments to support supplying seats to AES students.

11. Will additional equipment be required:

Approximate cost: 0

Source of funding:

12. Will additional library materials be required:

Approximate cost: 0

Source of funding: n/a

13. Will additional space be required:

Type:

Approximate amount:

14. If the program requirements contain a named concentration, do you wish for the concentration to be noted on the student's transcript?:

No YES

15. Detailed Description:

Please strike the entire current catalog description and add the following:

The Applied Engineering Sciences (AES) major provides undergraduate opportunities leading to the bachelor of science degree. The core goal of AES is to prepare technically competent, broad-based engineering graduates who have a systems perspective to problem solving and who have business expertise. AES develops a broad foundation in science and mathematics, engineering, and business management. The program is designed to develop graduates who can apply the rigor of their technical education to a diverse set of problems and settings; are effective as managers in technical areas; are aware of contemporary technical issues and can facilitate effective deployment of new technologies; are effective in resolving ethical dilemmas typical in the workplace; are effective communicators across technical disciplines both in oral and written communications; and are lifelong learners.

On the broad AES foundation, a student completes the AES degree by completing a specialization selected by the student. The specializations cover areas such as technical sales, supply chain management, and telecommunications.

Requirements for the Bachelor of Science Degree in Applied Engineering Sciences

1. The University requirements for bachelor's degrees as described in the

Undergraduate Education section of this catalog; 120 credits, including general elective credits, are required for the Bachelor of Science degree in Applied Engineering Sciences.

The University's Tier II writing requirement for the Applied Engineering Sciences major is met by completing Engineering 310 and 410. Those courses are referenced in item 3. a. below.

Students who are enrolled in the College of Engineering may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading Graduation Requirements for All Majors in the College statement. Certain courses referenced in requirement 3. below may be used to satisfy the alternative track.

2. The requirements of the College of Engineering for the Bachelor of Science degree.

The credits earned in certain courses referenced in requirement 3 below may be counted toward College requirements as appropriate.

3. The following requirements for the major:

a. All of the following courses (46 credits):

- ACC 230 - Survey of Accounting Concepts (3 credits)
- CE 221 - Statics (3 credits)
- CEM 161 - Chemistry Laboratory 1 (1 credits)
- COM 225 - Introduction to Interpersonal Communication (3 credits)
- EC 201 - Introduction to Microeconomics (3 credits)
- EC 202 - Introduction to Macroeconomics (3 credits)
- ECE 201 - Circuits and Systems I (3 credits)
- EGR 210 - Global Systems (3 credits)
- EGR 310 - Sustainable Systems Analysis (3 credits)
- EGR 410 - Senior Capstone Project (3 credits)
- ME 201 - Thermodynamics (3 credits)
- ME 280 - Graphic Communications (2 credits)
- MGT 325 - Management Skills and Processes (3 credits)
- MKT 317 - Quantitative Business Research Methods (3 credits)
- MSE 250 - Materials Science and Engineering (3 credits)
- PHY 191 - Physics Laboratory for Scientists, I (1 credits)
- STT 315 - Introduction to Probability and Statistics for Business (3 credits)

b. One of the following courses (3 credits):

- BE 230 - Engineering Analysis of Biological Systems (3 credits)
- CE 280 - Principles of Environmental Engineering and Science (3 credits)

c. Concentrations (15-18 credits)

Concentrations in Business-Supply Chain Management, Technical Sales, Telecommunication, and Computer Science are available to majors in Applied Engineering Sciences. Students should consult with their advisor prior to their selection of a concentrations. Students must select one of the following concentrations. Selected concentrations will be noted on the student's transcript. ~~The CSE Department sets criteria for entrance in the minor in Computer Science.~~ The same criteria will be applied for entrance into the AES Concentration in Computer Science.

parallels what UCAP approved for the minor.

i) Supply Chain Management (15 credits)**FI 320 - Introduction to Finance (3 credits)****MKT 327 - Introduction to Marketing (3 credits)****SCM 303 - Introduction to Supply Chain Management (3 credits)****SCM 371 - Procurement and Supply Management (3 credits)****SCM 372 - Manufacturing Planning and Control (3 credits)****ii) Technical Sales (18 credits)****COM 360 - Advanced Sales (3 credits)****COM 483 - Practicum in Sales Communication (1 credits)****FI 320 - Introduction to Finance (3 credits)****MKT 313 - Personal Selling (3 credits)****MKT 327 - Introduction to Marketing (3 credits)****MKT 383 - Sales Management (3 credits)****SCM 474 - Negotiations (2 credits)****iii) Telecommunications (18 credits)****TC 100 - The Information Society (3 credits)****TC 201 - Intro to Media & Communication Technology (3 credits)****TC 210 - Media & Communication Policy (3 credits)****TC 300 - Economics of Media (3 credits)****TC 361 - Infor & Comm Technology Management (3 credits)****TC 365 - Intro to Network Management (3 credits)****iv) Computer Science (18 credits)****a. All of the following (12 credits)****CSE 231 - Introduction to Programming I (4 credits)****CSE 232 - Introduction to Programming II (4 credits)****CSE 260 - Discrete Structures (4 credits)****b. One of the following (3 credits)****CSE 320 - Computer Organization and Architecture (3 credits)****CSE 331 - Algorithms and Data Structures (3 credits)****CSE 335 - Object Oriented Software Design (3 credits)****c. One of the following (3 credits)****CSE 410 - Operating Systems (3 credits)****CSE 420 - Computer Architecture (3 credits)****CSE 440 - Introduction to Artificial Intelligence (3 credits)****CSE 471 - Media Processing and Multimedia Computing (3 credits)****CSE 472 - Computer Graphics (3 credits)**

Grade or grade-point average requirements and if so in which course(s), portfolio requirement, audition, essay, etc. If there are not admission requirements other than those required by the University policy indicate "none".

Same as the College of Engineering

17. Type(s) of change(s):

?

18. Students who will be affected by the proposed changes:

AES students.

19. Will the proposed change(s) have a negative impact on students? If so, which ones?:

Describe impact and explain what accommodations will be made:

20. Reason(s) for change(s):

The AES program has not seen a comprehensive review and update for a decade. Circumstances in the engineering marketplace put increasing importance on the development of engineering graduates who apply a systems viewpoint to consideration of complex engineered systems and to management of engineering firms. Moreover, as the pace of *nimble* innovation in engineering quickens there is increasing need to develop *nibble* programs that have a slowly evolving core of fundamental technical and business courses and a more rapidly evolving "finishing area" to provide depth and focus for initial student entry into the marketplace. We have revised the AES program with these points as driving motivations. A second and also major motivation for the change is to strengthen the AES specific courses of the program. Formerly the program included two 2-credit hour courses. In this program revision, we strengthen that core are of the program to include three 3-credit hour courses emphasizing a system viewpoint.

DEPARTMENT LEVEL APPROVAL STATUS

Approved: College of Engineering
2/18/2010 12:43:51 PM by Jamie Ramos for Thomas F. Wolff, Associate Dean

SIGNOFFS STATUS

Signed Off: Department of Communication
2/18/2010 4:22:47 PM by Charles Atkin for Charles K. Atkin, Chairperson

Signed Off: Department of Finance
2/19/2010 9:05:34 AM by Celeste Shoulders for G. Geoffrey Booth, Chairperson

Signed Off: Department of Management
3/3/2010 9:15:08 AM by Donald Conlon for Donald E. Conlon, Chairperson

Comments: Approved per the terms in the e-mail discussions with Jon Stickler on March 2-3, 2010.

Signed Off: Department of Marketing
2/19/2010 1:40:14 AM by Roger Calantone for Roger Calatone, Chairperson

Comments: #20 on form "nibble" understood as "nimble"

Signed Off: Department of Physics and Astronomy
2/26/2010 9:12:26 AM by Dan Stump for Wolfgang Bauer, Chairperson

Signed Off: Department of Statistics and Probability
2/24/2010 3:52:10 PM by Cathy Sparks for Hira L. Koul, Chairperson

Signed Off: Department of Supply Chain Management
3/2/2010 8:42:50 PM by David Closs for David Closs, Chairperson

Signed Off: Department of Telecommunication, Information Studies and Media
2/25/2010 8:28:02 AM by Chip Steinfield for Charles Steinfield, Chairperson

COLLEGE LEVEL APPROVAL STATUS

Approved: College of Engineering
3/3/2010 9:19:51 AM by Jamie Ramos for Thomas F. Wolff, Associate Dean

Comments: Please note: #20 on form "nibble" should be "nimble"

APPLIED ENGINEERING SCIENCES

Insert ①

It is the intent of the Applied Engineering Sciences major to provide educational opportunities for the undergraduate student who wishes to gain a broad foundation in the engineering sciences, core engineering disciplines, and their applications. The program is designed to develop individuals who bring (to the workplace) a knowledge of business, management, and logistics with a solid foundation in calculus, basic sciences, and engineering sciences; can apply the rigor of their education and training to a diverse set of problems; are prepared to work in the areas where planning, design, production, and procurement interface with marketing, distribution, sales, and management; can effectively communicate across diverse professional disciplines; and are knowledgeable of contemporary technological and societal issues and can facilitate the effective deployment of new technologies.

This program is designed to develop a uniquely qualified individual capable of functioning in a variety of employment contexts using technical competencies combined with applied knowledge from a cognate area. A few of the cross-disciplinary employment areas include: technical sales, technical journalism, communications, telecommunications, industrial management, operations management, procurement, sourcing, and logistics management, as well as public administration, urban applications, environmental issues, political analysis, and law.

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1. The University requirements for bachelor's degrees as described in the *Undergraduate Education* section of this catalog; ~~120~~ 120 credits, including general elective credits, are required for the Bachelor of Science degree in Applied Engineering Sciences.

The University's Tier II writing requirement for the Applied Engineering Sciences major is met by completing Engineering 300 and 410. These courses are referenced in item 3. a. below.

Students who are enrolled in the College of Engineering may complete the alternative track to Integrative Studies in Biological and Physical Sciences that is described in item 1. under the heading **Graduation Requirements for All Majors** in the College statement. Certain courses referenced in requirement 3. below may be used to satisfy the alternative track.

2. The requirements of the College of Engineering for the Bachelor of Science degree. The credits earned in certain courses referenced in requirement 3. below may be counted toward College requirements as appropriate.

3. The following requirements for the major:

a. All of the following courses:

CE	221	Statics	1
CEM	161	Chemistry Laboratory I	1
EGR	300	Technology, Society and Public Policy	2
EGR	410	System Methodology	2
ME	180	Engineering Graphics Communications	3
ME	222	Mechanics of Deformable Solids	4
MGT	325	Management Skills and Processes	3
MSE	250	Materials Science and Engineering	3
PSY	101	Introductory Psychology	4
PSY	255	Industrial and Organizational Psychology	3
STT	351	Probability and Statistics for Engineering	3

CREDITS
~~31~~ 46

Insert ②

b. One of the following courses:

ECE	201	Circuits and Systems I	3
ECE	230	Digital Logic Fundamentals	3
ECE	245	Electronic Instrumentation and Systems	3

b. One of the following courses:

BE	230	Engineering Analysis of Biological Systems	3
CE	280	Principles of Environmental Engineering and Science	3
CHE	201	Material and Energy Balances	3

c. One of the following courses:

ME	201	Thermodynamics	3
MSE	310	Phase Equilibria in Materials	3

~~27 or 30~~ 15 to 18

Insert ③

Cognates in Business Supply Chain Management and Telecommunication are available to majors in Applied Engineering Sciences. Students should consult with their advisor prior to their selection of a cognate. Students must select one of the following cognates.

Business-Supply Chain Management 27

a. All of the following courses:

ACC	201	Principles of Financial Accounting	3
ACC	202	Principles of Management Accounting	3
EC	210	Economics Principles Using Calculus	3
FI	320	Introduction to Finance	3
GBL	323	Introduction to Business Law	3

The Applied Engineering Sciences major provides undergraduate opportunities leading to the Bachelor of Science degree. The core goal of applied engineering sciences is to prepare technically competent, broad-based engineering graduates who have acquired a systems perspective for problem-solving and business expertise. The program provides a broad foundation in science and mathematics, engineering, and business management and is designed to develop graduates who can apply the rigor of their technical education to diverse problems and settings. The program is structured to establish skills in areas such as effective management, contemporary technical issues, deployment of new technologies, resolving ethical dilemmas, effective communication across technical disciplines both in oral and written communication, and lifelong learning.

Students in this major must meet the requirements for one concentration by selecting an area such as computer science, supply chain management, technical sales, or telecommunications.

Insert 2

ACC	230	Survey of Accounting Concepts	3
CE	221	Statics	3
CEM	161	Chemistry Laboratory I	1
COM	225	Introduction to Interpersonal Communication	3
EC	201	Introduction to Microeconomics	3
EC	202	Introduction to Macroeconomics	3
ECE	201	Circuits and Systems I	3
EGR	210	Global Systems: Economics, Engineering, Environment	3
EGR	310	Sustainable Systems Analysis	3
EGR	410	System Methodology	3
ME	201	Thermodynamics	3
ME	280	Graphic Communications	2
MGT	325	Management Skills and Processes	3
MKT	317	Quantitative Business Research Methods	3
MSE	250	Materials Science and Engineering	3
PHY	191	Physics Laboratory for Scientists, I	1
STT	315	Introduction to Probability and Statistics for Business	3

Insert 3

In consultation with their academic advisor, students must select one of the following concentrations: computer science, supply chain management, technical sales, or telecommunications. For students interested in computer science, the minimum criteria for acceptance is the completion of Computer Science and Engineering 231 and 260 with a combined grade-point average in those two courses of 3.0. The concentration will be noted on the student's academic record.

Computer Science (18 credits)

1. All of the following courses (12 credits):

CSE	231	Introduction to Programming I	4
CSE	232	Introduction to Programming II	4
CSE	260	Discrete Structures in Computer Science	4
2. One of the following courses (3 credits):

CSE	320	Computer Organization and Architecture	3
CSE	331	Algorithms and Data Structures	3
CSE	335	Object-oriented Software Design	3
3. One of the following courses (3 credits):

CSE	410	Operating Systems	3
CSE	420	Computer Architecture	3
CSE	440	Introduction to Artificial Intelligence	3
CSE	471	Media Processing and Multimedia Computing	3
CSE	472	Computer Graphics	3

Supply Chain Management (15 credits)

All of the following courses:

FI	320	Introduction to Finance	3
MKT	327	Introduction to Marketing	3
SCM	303	Introduction to Supply Chain Management	3
SCM	371	Procurement and Supply Management	3
SCM	372	Manufacturing Planning and Control	3

Technical Sales (18 credits)

All of the following courses:

COM	360	Advanced Sales Communication	3
COM	483	Practicum in Sales Communication	1
FI	320	Introduction to Finance	3
MKT	313	Personal Selling and Buying Processes	3
MKT	327	Introduction to Marketing	3
MKT	383	Sales Management	3
SCM	474	Negotiations	2

Telecommunications (18 credits)

All of the following courses:

TC	100	The Information Society	3
TC	201	Introduction to Media and Communication Technology	3
TC	210	Media and Communication Policy	3
TC	300	Economics of Media	3
TC	361	Information and Communication Technology Management	3
TC	365	Introduction to Network Management	3

MSC 303	Introduction to Supply Chain Management	3
MSC 327	Introduction to Marketing	3
MSC 372	Manufacturing Planning and Control	3
b.	One of the following courses:	
BE 431	Bio-resource Optimization	3
ME 477	Manufacturing Processes	3
ME 497	Biomechanical Design	3
MSE 425	Biomaterials and Biocompatibility	3
MSE 426	Introduction to Composite Materials	3
STT 471	Statistics for Quality and Productivity	3
Telecommunication		
ACC 230	Survey of Accounting Concepts	3
EC 201	Introduction to Microeconomics	3
TC 100	The Information Society	3
TC 200	History and Economics of Telecommunication	4
TC 201	Introduction to Telecommunication Technology	4
TC 310	Basic Telecommunication Policy	4
TC 361	Data Communication	3
TC 463	Network Design and Implementation I	3
TC 465	Network Design and Implementation II (W)	3

30