10KL0025BS: ENGINEERING TECHNOLOGY AND MANAGEMENT FOR AGRICULTURAL SYSTEMS, BS

In Workflow

1. U Program Review (dforgacs@illinois.edu; eastuby@illinois.edu; aledward@illinois.edu)
2. 1741 Committee Chair (krausch@illinois.edu)
3. 1741 Head (ronaldom@illinois.edu; rsully@illinois.edu)
4. KL Committee Chair (npaulson@illinois.edu)
5. KL Dean (aball@illinois.edu)
6. University Librarian (jpwilkin@illinois.edu)
7. Provost (kmartens@illinois.edu)
8. Senate EPC (bjlehman@illinois.edu; moorhouz@illinois.edu; kmartens@illinois.edu)
9. Senate (jtempel@illinois.edu)
10. U Senate Conf (none)
11. Board of Trustees (none)
12. IBHE (none)
13. DMI (eastuby@illinois.edu; aledward@illinois.edu; dforgacs@illinois.edu)

Approval Path

1. Mon, 29 Mar 2021 15:31:32 GMT
   Deb Forgacs (dforgacs): Approved for U Program Review
2. Mon, 29 Mar 2021 15:36:51 GMT
   Kent Rausch (krausch): Approved for 1741 Committee Chair
3. Mon, 29 Mar 2021 16:42:43 GMT
   Ronaldo Maghirang (ronaldom): Approved for 1741 Head
4. Mon, 29 Mar 2021 18:00:02 GMT
   Nick Paulson (npaulson): Approved for KL Committee Chair
5. Mon, 29 Mar 2021 18:00:21 GMT
   Anna Ball (aball): Approved for KL Dean
6. Mon, 29 Mar 2021 18:08:10 GMT
   John Wilkin (jpwilkin): Approved for University Librarian
7. Mon, 29 Mar 2021 18:09:21 GMT
   Kathy Martensen (kmartens): Approved for Provost

Date Submitted:Mon, 29 Mar 2021 02:26:51 GMT

Viewing:10KL0025BS : Engineering Technology and Management for Agricultural Systems, BS

Changes proposed by: Anne Marie Boone

Proposal Type

Proposal Type:

Major (ex. Special Education)

This proposal is for a:

Revision

Proposal Title:

If this proposal is one piece of a multi-element change please include the other impacted programs here.*example: A BS revision with multiple concentration revisions*

A BS Revision to the Technical Systems Management major to Engineering Technology and Management for Agricultural Systems and the addition of four concentrations.

This program revision is related to
The Agricultural Production & Processing concentration proposal key: 1009
the Construction Management concentration proposal key: 1010
the Digital and Precision Agriculture concentration proposal key:1011
and the Energy and the Environment concentration key: 1012

EP Control Number

EP.21.077

Official Program Name

Engineering Technology and Management for Agricultural Systems, BS

Effective Catalog Term

Fall 2021

Sponsor College

Agr, Consumer, & Env Sciences

Sponsor Department

Agricultural & Biological Engr

Sponsor Name

Kent Rausch

Sponsor Email

krausch@illinois.edu

College Contact

Anna Ball

College Contact Email

aball@illinois.edu

Program Description and Justification

Justification for proposal change:

Feedback from faculty, staff, students, and alumni indicated the Technical Systems Management (TSM) program was in need of revision. In Fall 2019, ABE formed a Task Force (TSM Task Force) to assess needs and propose necessary changes to the program. The TSM Task Force collected feedback from faculty and staff as a starting point. In addition, surveys were distributed to all current TSM students and Agricultural Mechanization/ TSM alumni (1980-2019 graduation years). All feedback was carefully examined and considered and has strongly influenced this proposed curriculum revision. Information was also gathered from peer institutions with similar degree programs. Proposed changes intend to make the TSM program more appealing to a wider audience, and especially become more accessible to students with interests that align with the TSM program. Feedback strongly indicated the TSM name was confusing and difficult to explain to students, employers, and a general audience. Also based on this feedback, a new name of Engineering Technology and Management for Agricultural Systems is proposed.

In recent years, demographics of the TSM program have shifted. The program is now drawing more students from urban areas with a strong interest in construction management. TSM currently offers a specialization in construction management, but students often do not discover this program until after being on campus. Therefore, in an attempt to better accommodate changing demographics, while maintaining our core strengths of agricultural production and processing, construction management, digital and precision agriculture, and energy and the environment, we are proposing the creation of these distinct concentrations within the TSM program.

To align with the requirement for Illinois college graduates to complete 40 credit hours of upper-level coursework, the proposed TSM curriculum now explicitly makes this a requirement for graduation.

Along with the aforementioned shift in academic interests of our students, it has become clear that some course requirements are no longer suited for ensuring success of our students and their long-term career goals. For instance, the historical requirement for TSM students to complete NRES 201 and CPSC 112 are of minimal benefit to students pursuing construction management. Therefore, the requirement to complete these two courses has been expanded to meet the needs of each concentration area, with each student required to complete two from a specified list for each concentration.

A TSM Capstone course is required in the proposed curriculum. The TSM Capstone course will be required in the spring of each student's final year in the program. The TSM Capstone course will be offered for the first time in Spring 2021 and is being submitted for formal approval parallel to this proposal. The capstone course is also a requirement for future accreditation by the Engineering Technology Accreditation Commission (ETAC) of ABET.

Students will be required to take either TSM 421 (Ag Safety-Injury Prevention) or 422 (Ag Health-Illnesses Prevention) in the proposed curriculum. Alumni feedback indicated this as a critical skill needed for typical TSM careers. In addition, many of our peer programs already require courses in health and safety.

A list of courses to satisfy the advanced composition requirement has been created to ensure all students are being trained in technical writing that is required to be successful in the TSM discipline.

A list of courses to satisfy the statistics requirement has been refined. STAT 100 (Statistics), PSYC 235 (Intro to Statistics), ACE 261 (Applied Statistical Methods), and SOC 280 (Intro to Social Statistics) will be removed from options to satisfy the statistics requirement. STAT 107 (Data Science Discovery) and ACE 262 (Applied Statistical Methods and Data Analytics I) will be added as options to ensure all students are receiving the necessary statistics education to be successful in upper-level TSM courses.

Students will be required to take CS 105 (Intro Computing: Non-Tech) instead of choosing between CS 105 and ACE 161 (Microcomputer Applications). Student and alumni feedback indicated a strong desire to strengthen the technology and computer-related skills offered in the TSM program.

The Life Sciences elective and requirement to complete ECON 103 (Macroeconomics Principles) have been removed from the curriculum. The elimination of these two courses will now allow students to take additional courses specific to their core area.

Students will be required to take TSM 339 (Optimization in Engineering Technology and Management) to learn applied numerical analysis using modern computer-based methods. TSM 339 is being proposed in parallel with this curriculum revision.

Students will take 6 credit hours of business electives from an approved list in place of being required to take either ACCY 200 (Fundamentals of Accounting) or ACCY 201 (Accounting and Accountancy I). Alumni feedback indicated a strong desire to offer more flexibility in the business courses required. The additional options and expanded number of business hours required will address this desire.

Corresponding Degree

BS Bachelor of Science

Is this program interdisciplinary?

No

Academic Level

Undergraduate

Will you admit to the concentration directly?

No

Is a concentration required for graduation?

Yes

CIP Code

140301 - Agricultural Engineering.

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

Yes

Describe the plans for seeking specialized accreditation:

Yes. Within the next 5 years, accreditation by the Engineering Technology Accreditation Commission (ETAC) of ABET will be sought.

Admission Requirements

Desired Effective Admissions Term

Fall 2021

Is this revision a change to the admission status of the program?

No

Provide a brief narrative description of the admission requirements for this program. Where relevant, include information about licensure requirements, student background checks, GRE and TOEFL scores, and admission requirements for transfer students.

Admission requirements are unchanged from the existing TSM curriculum.

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

We expect enrollment to increase from its current levels of about 200 students to 300 students 5 years after implementation.

Estimated Annual Number of Degrees Awarded

What is the matriculation term for this program?

Fall

What is the typical time to completion of this program?

4 years

What are the minimum Total Credit Hours required for this program?

126

Delivery Method

Is this program available on campus and online?

No

This program is available:

On Campus

Budget

Are there budgetary implications for this revision?

No

Will the program or revision require staffing (faculty, advisors, etc.) beyond what is currently available?

No

Resource Implications

Facilities

Will the program require new or additional facilities or significant improvements to already existing facilities?

No

Technology

Will the program need additional technology beyond what is currently available for the unit?

No

Non-Technical Resources

Will the program require additional supplies, services or equipment (non-technical)?

No

Resources

For each of these items, be sure to include in the response if the proposed new program or change will result in replacement of another program(s). If so, which program(s), what is the anticipated impact on faculty, students, and instructional resources? Please attach any letters of support/ acknowledgement from faculty, students, and/or other impacted units as appropriate.

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc. Describe how the unit will support student advising, including job placement and/or admission to advanced studies.

The proposal does not necessitate the hiring of additional instructors or faculty, nor does it require additional resources with regard to equipment of instructional facilities. All of the courses being added to the TSM core or the concentrations already have capacity to accommodate any additional students that may take them as a result of the proposed changes. Thus, ABE department will not need to create additional capacity to resource the proposed program, nor will it need to cease support of other functions or programs.

This curriculum revision should not have any significant impact on the enrollment in other units.

Library Resources

Describe your proposal's impact on the University Library's resources, collections, and services. If necessary please consult with the appropriate disciplinary specialist within the University Library.

No impact is anticipated.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

Does the program include other courses/subjects impacted by the creation/revision of this program?

No

Financial Resources

How does the unit intend to financially support this proposal?

There will be no budgetary obligations due to this curriculum revision for the revised TSM program. The curriculum revision will be carried out with existing resources.

Will the unit need to seek campus or other external resources?

No

Attach letters of support

Letter of Support - ACES TSM - Dan Turner DGS.pdf
TSM Letter of Support edt - Jean Drasgow.pdf

Are you seeking a change in the tuition rate or differential for this program?

No

Program Regulation and Assessment

Briefly describe the plan to assess and improve student learning, including the program's learning objectives; when, how, and where these learning objectives will be assessed; what metrics will be used to signify student's achievement of the stated learning objectives; and the process to ensure assessment results are used to improve student learning. (Describe how the program is aligned with or meets licensure, certification, and/or entitlement requirements, if applicable).

The Engineering Technology and Management for Agricultural Systems (formerly Technical Systems Management) program is designed to prepare graduates for careers in management, marketing, operations, maintenance, and application of agricultural and biological engineering technologies within the realms of agriculture, food, energy, water, and the environment. Graduates are expected to understand problems and concerns in engineering technologies from production to processing through distribution and their social and cultural implications. Specific program learning objectives are:

Objective 1: Provide academic and technical knowledge and experiences needed for success in an increasingly technological agricultural industry and world.

Objective 2: Enhance students' abilities to formulate questions and find solutions both individually and as a part of a team.

Objective 3: Improve students' abilities to communication both written and oral forms.

Objective 4: Enhance the use and understanding of mathematics and calculation for analysis in technology and business.

Objective 5: Provide opportunities to learn and enhance professional and ethical values and leadership skills.

Objective 6: Understand their role in society and the social and cultural implications of practice in their profession.

Objective 7: Recognize the need for and develop the abilities to engage in life-long learning.

Objective 8: Understand the global nature of agriculture and business.

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

“Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses” (source: https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf). For proposals for new bachelor’s degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

Revised programs

TSM Task Force Final Report 20201002.docx
Copy of Proposed TSM curriculum - with Senate Ed Policy updates v3.xlsx

Attach a side-by-side comparison with the existing program AND, if the revision references or adds “chose-from” lists of courses students can select from to fulfill requirements, a listing of these courses, including the course rubric, number, title, and number of credit hours.

Catalog Page Text

Catalog Page Text: Description of program for the catalog page. This is not official content, it is used to help build the catalog pages for the program. Can be edited in the catalog by the college or department.

The major in Engineering Technology and Management for Agricultural Systems is designed to prepare students as problem solvers for systems involving the application, management, and/or marketing of engineering technologies. Students are instructed in engineering and business principles in preparation as technically competent business persons for professional careers as entrepreneurs, marketing representatives, or plant managers working with service organizations, manufacturers, corporate farms, retail dealers, power suppliers, contractors, or management companies from production through processing and distribution. Students will select a concentration in Agricultural Production and Processing, Construction Management, Digital and Precision Agriculture, or Energy and the Environment.

Statement for Programs of Study Catalog

Prescribed Courses including Campus General Education

Code	Title	Hours
Composition I and Speech		
Select one of the following:		6-7
RHET 105 & CMN 101	Writing and Research and Public Speaking(or equivalent (see college Composition I requirement))	
CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	
Advanced Composition		**3-4**
Select from campus approved list.		3-4
Select from the below list of campus approved courses.		
AGCM 220	Communicating Agriculture	
BADM 340	Ethical Dilemmas of Business	
BTW 250	Principles Bus Comm	
BTW 261	Principles Tech Comm	
BTW 271	Persuasive Writing	
CEE 330	Environmental Engineering	
CEE 421	Construction Planning	
CEE 422	Construction Cost Analysis	

CPSC 226	Course CPSC 226 Not Found	
CPSC 414	Forage Crops & Pasture Ecology	
CPSC 418	Crop Growth and Management	
ENVS 336	Tomorrow's Environment	
ECE 316	Ethics and Engineering	
ESE 360	Environmental Writing	
LEAD 230	Leadership Communications	
NRES 419	Env and Plant Ecosystems	
NRES 474	Soil and Water Conservation	
NRES 488	Soil Fertility and Fertilizers	
PLPA 200	Plants, Pathogens, and People	
TSM 311	Humanity in the Food Web	
Cultural Studies		**9**
Select one course from Western culture, one from non-Western culture, and one from U.S. minority culture from campus approved lists.		
Foreign Language		
Coursework at or above the third level is required for graduation.		
Quantitative Reasoning I		
MATH 234	Calculus for Business I (or equivalent)	4
Quantitative Reasoning II		**3 or 4**
Select one of the following:		
ACE 261	Applied Statistical Methods	
ACE 262	Applied Statistical Methods and Data Analytics I	
CPSC 241	Intro to Applied Statistics	
ECON 202	Economic Statistics I	
PSYC 235	Intro to Statistics	
SOC 280	Intro to Social Statistics	
STAT 100	Statistics	
STAT 107	Data Science Discovery	
Natural Sciences and Technology		
CHEM 102 & CHEM 103	General Chemistry I and General Chemistry Lab I	4
PHYS 101	College Physics: Mech & Heat	5
Select one of the following:		4-5
CHEM 104 & CHEM 105	General Chemistry II and General Chemistry Lab II	
Biological sciences (see campus approved list)		3-5
OR		
PHYS 102	College Physics: E&M & Modern	
Humanities and the Arts		
Select from campus approved list.		6
Social and Behavioral Sciences		
ACE 100	Introduction to Applied Microeconomics	3-4
or ECON 102	Microeconomic Principles	
ECON 103	Macroeconomic Principles	3
Social and behavioral sciences. Select from campus approved list.		3 or 4
ACES Prescribed		
ACES 101	Contemporary Issues in ACES	2
TSM Required		
ACE 161	Microcomputer Applications (or equivalent)	3
CS 105	Intro Computing: Non-Tech	3
TSM 100	Technical Systems in Agr	3
TSM 339	Optimization in Engineering Technology and Management	3

TSM 421	Ag Safety-Injury Prevention	3
or TSM 422	Ag Health-Illnesses Prevention	
TSM 430	Project Management	2
TSM 439	Capstone Experience	4
Business electives		**6**
A total of 6 hours from the Business Electives list which do not satisfy any other requirements.		
ACCY 200	Fundamentals of Accounting	3
CPSC 112	Introduction to Crop Sciences	4
NRES 201	Introductory Soils	4
ACCY 201	Accounting and Accountancy I	3
ACCY 202	Accounting and Accountancy II	3
ACCY 211	Understanding Financial Statements	3
ACCY 212	Understanding Accounting for Business Decisions	3
ACE 210	Environmental Economics	3
ACE 222	Agricultural Marketing	
ACE 231	Food and Agribusiness Mgt	
ACE 232	Farm Management	
ACE 240	Personal Financial Planning	3
ACE 310	Natural Resource Economics	3
ACE 345	Finan Decision Indiv Sm Bus	3
ACE 403	Agricultural Law	
ACE 406	Environmental Law	
ACE 428	Commodity Futures and Options	
ACE 346	Tax Policy and Finan Planning	3
ACE 432	Farm Management	3 or 4
ACE 448	Rural Real Estate Appraisal	
ACE 456	Agr and Food Policies	
ACE 435	Global Agribusiness Management	3
AGCM 270	Ag Sales and Persuasive Communication	3
AGED 260	Course AGED 260 Not Found	
ANSC 201	Principles of Dairy Production	
ANSC 223	Animal Nutrition	
ANSC 400	Dairy Herd Management	
ANSC 401	Beef Production	
ANSC 402	Sheep and Goat Production	
ANSC 403	Pork Production	
ANSC 404	Poultry Science	
ANSC 405	Advanced Dairy Management	
ANSC 467	Applied Animal Ecology	
BADM 300	The Legal Environment of Bus	3
BADM 310	Mgmt and Organizational Beh	3
BADM 311	Leading Individuals and Teams	3
BADM 312	Designing and Managing Orgs	3
BADM 313	Strategic Human Resource Management	3
BADM 314	Leading Negotiations	3
BADM 320	Principles of Marketing	3
BADM 322	Marketing Research	3
BADM 323	Marketing Communications	3
BADM 326	Pricing Strategy	3
FIN 221	Corporate Finance	3
FIN 241	Fundamentals of Real Estate	
HORT 360	Vegetable Crop Production	

FIN 230	Introduction to Insurance	3
LER 290	Introduction to Employment Law	3
LEAD 140	Harnessing Your Interpersonal Intelligence	2
LEAD 260	Foundations of Leadership	3
LEAD 340	Leadership Ethics & Society: Addressing Contemporary Challenges	3
LEAD 380	Leadership in Groups and Teams	3
LEAD 440	Interpersonal Intelligence for Professional Success	2
SE 361	Emotional Intelligence Skills	3
SE 400	Engineering Law	3 or 4
TE 230	Design Thinking/Need-Finding	3
TE 250	From Idea to Enterprise	2
TE 333	Creativity, Innovation, Vision	4
TE 360	Lectures in Engineering Entrepreneurship	1
TE 450	Startups: Incorporation, Funding, Contracts, & Intellectual Property	3
Introductory Related Courses		
Select 15 hours from the following:		15
Select 2 courses from the list for your concentration.		6-8
TSM Electives		
A total of 20 hours from the list for your concentration with a minimum of 11 hours at the advanced level.		20
Concentration Electives		
Select 18 hours from the list for your concentration, which do not satisfy any other requirements, with a minimum of 12 hours at the advanced level.		18
TSM 199	Undergraduate Open Seminar	
TSM 232	Materials and Construction Sys	
TSM 233	Metallurgy & Welding Process	
TSM 234	Wiring, Motors and Control Sys	
TSM 262	Off-Road Equipment Management	
TSM 295	Undergrad Research or Thesis	
TSM 352	Land and Water Mgt Systems	
TSM 363	Fluid Power Systems	
TSM 371	Residential Housing Design	
TSM 372	Environ Control & HVAC Systems	
TSM 381	Grain Drying & Storage Systems	
TSM 396	UG Honors Research or Thesis	
TSM 435	Elec Computer Ctrl Sys	
TSM 464	Engine and Tractor Power	
TSM 465	Chemical Applications Systems	
TSM 496	Independent Study	
TSM 499	Seminar	
Total Hours		**126**

ETMAS majors will need 40 hours of upper-level courses (300- and 400-level) to satisfy the campus minimum requirement of 40 hours of advanced coursework.

EP Documentation

Attach Rollback/Approval Notices

Grainger letter of support for ETMAS proposals.pdf
RE_ ETMAS proposal to Senate Ed Policy - request for a letter.pdf
EngineeringTechnology Management_ Agricultural Production ProcessingBS University of Illinois_32521.pdf

DMI Documentation

Banner/Codebook Name

BS: Technical Syst Mgt -- UIUC

Program Code:

10KL0025BS

Degree Code

BS

Major Code

0025

Program Reviewer Comments

Deb Forgacs (dforgacs) (Tue, 06 Oct 2020 21:25:17 GMT): Rollback: requested.
Brianna Gregg (bjgray2) (Wed, 10 Feb 2021 15:26:06 GMT): Grainger is in support of the name change to include 'Engineering' in the title.
Kathy Martensen (kmartens) (Thu, 25 Mar 2021 13:33:15 GMT): Rollback: Senate EPC subcommittee review: Please clarify the program of study and ensure this table is consistent with the attached excel spreadsheet. Subcommittee chair Nolan Miller will be in touch with the sponsor with further details via email.
Kathy Martensen (kmartens) (Thu, 25 Mar 2021 14:37:31 GMT): Rollback: See email.
Deb Forgacs (dforgacs) (Fri, 26 Mar 2021 20:04:02 GMT): Rollback: requested Anne Boone.

Key: 73

Engineering Technology & Management: Agricultural Production & Processing, BS

for the degree of Bachelor of Science Major in Engineering Technology & Management concentration in Agricultural Production & Processing

department website: https://abe.illinois.edu/undergraduate/
department faculty: https://abe.illinois.edu/directory/faculty

overview of college admissions & requirements: Agricultural, Consumer & Environmental Sciences
college website: https://aces.illinois.edu/

This major in Technical Systems Management is designed to prepare students as problem solvers for systems involving the application, management, and/or marketing of agricultural engineering technologies. Students are instructed in engineering and business principles in preparation as technically competent business persons for professional careers as entrepreneurs, marketing representatives, or plant managers working with service organizations, manufacturers, corporate farms, retail dealers, power suppliers, contractors, or management companies from production through processing and distribution. Students can specialize in Construction Systems Management; Environmental Systems Management; Mechanization, Marketing, and Technology Management Systems; Production Systems; or Renewable Energy Systems.

for the degree of Bachelor of Science Major in Engineering Technology & Management concentration in Agricultural Production & Processing

Prescribed Courses including Campus General Education

Composition I and Speech		
Select one of the following:		6-7
RHET 105 & CMN 101	Writing and Research and Public Speaking (or equivalent (see college Composition I requirement))	
CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	
Advanced Composition		3-4
Select from the below list of campus approved courses.		
AGCM 220	Communicating Agriculture	
BADM 340	Ethical Dilemmas of Business	
BTW 250	Principles Bus Comm	
BTW 261	Principles Tech Comm	
ECE 316	Ethics and Engineering	
ESE 360	Environmental Writing	
LEAD 230	Leadership Communications	
NRES 419	Env and Plant Ecosystems	
PLPA 200	Plants, Pathogens, and People	
TSM 311	Humanity in the Food Web	
Cultural Studies		9
Select one course from Western culture, one from non-Western culture, and one from U.S. minority culture from campus approved lists.		
Foreign Language		?
Coursework at or above the third level is required for graduation.		
Quantitative Reasoning I		
MATH 234	Calculus for Business I (or equivalent)	4
Quantitative Reasoning II		**3 or 4**
Select one of the following:		3-4
ACE 262	Applied Statistical Methods and Data Analytics I	

CPSC 241	Intro to Applied Statistics	
ECON 202	Economic Statistics I	
STAT 107	Data Science Discovery	
Natural Sciences and Technology		
CHEM 102 & CHEM 103	General Chemistry I and General Chemistry Lab I	4
PHYS 101	College Physics: Mech & Heat	5
Select one of the following:		4-5
CHEM 104 & CHEM 105	General Chemistry II and General Chemistry Lab II	
OR		
PHYS 102	College Physics: E&M & Modern	
Humanities and the Arts		
Select from campus approved list.		6
Social and Behavioral Sciences		
ACE 100	Introduction to Applied Microeconomics	3-4
or ECON 102	Microeconomic Principles	
Social and behavioral sciences. Select from campus approved list.		3 or 4
ACES Prescribed		
ACES 101	Contemporary Issues in ACES	2
TSM Required		
CS 105	Intro Computing: Non-Tech	3
TSM 100	Technical Systems in Agr	3
TSM 339	Optimization in Engineering Technology and Management	3
TSM 421	Ag Safety-Injury Prevention	3
or TSM 422	Ag Health-Illnesses Prevention	
TSM 430	Project Management	2
TSM 439	Capstone Experience	4
Business electives		**6**
A total of 6 hours from the Business Electives list which do not satisfy any other requirements.		6
Introductory Related Courses		~~18~~
Select 2 courses from the list for your concentration.		6-8
TSM Electives		
A total of 20 hours from the list for your concentration with a minimum of 11 hours at the advanced level.		20
Concentration Electives		
Select 18 hours from the list for your concentration, which do not satisfy any other requirements, with a minimum of 12 hours at the advanced level.		18
Advanced Hours		**40**
Total Hours		**126**

Select 18 hours from the lists below with a minimum of 12 hours at the advanced level		
ACE 222	Agricultural Marketing	3
ACE 231	Food and Agribusiness Mgt	3
ACE 232	Farm Management	3
ACE 306	Food Law	3
ACE 403	Agricultural Law	3 to 4
ACE 427	Commodity Price Analysis	3
ACE 428	Commodity Futures and Options	3
ACE 430	Food Marketing	3

don't list twice

delete 18

include as note

What is this list?

ACE 431	Agri-food Strategic Management	3
ACE 432	Farm Management	3 or 4
ACE 435	Global Agribusiness Management	3
Pick four classes from no more than two of these categories:		
Animal Production & Processing		
ANSC 219	Meat Technology	
ANSC 223	Animal Nutrition	
ANSC 301	Food Animal Production, Management, and Evaluation	
ANSC 310	Meat Selection and Grading	
ANSC 322	Livestock Feeds and Feeding	
ANSC 400	Dairy Herd Management	
ANSC 401	Beef Production	
ANSC 402	Sheep and Goat Production	
ANSC 403	Pork Production	
ANSC 404	Poultry Science	
ANSC 424	Pet Food & Feed Manufacturing	
Food Production & Processing		
FSHN 232	Science of Food Preparation	
FSHN 260	Raw Materials for Processing	
FSHN 345	Strategic Operations Management	
FSHN 460	Food Processing Engineering	
FSHN 465	Principles of Food Technology	
FSHN 469	Package Engineering	
FSHN 471	Food & Industrial Microbiology	
FSHN 472	Applied Food Microbiology	
Horticultural Production & Processing		
HORT 205	Local Food Networks	
HORT 341	Greenhouse Mgmt and Production	
HORT 360	Vegetable Crop Production	
HORT 361	Small Fruit Production	
HORT 363	Postharvest Handling Hort Crop	
HORT 435	Urban Food Production	
PLPA 405	Plant Disease Diagnosis & Mgmt	
Crop Production & Processing		
CPSC 212	Introduction to Plant Protection	
CPSC 270	Applied Entomology	
CPSC 408	Integrated Pest Management	
CPSC 412	Principles of Crop Production	
CPSC 414	Forage Crops & Pasture Ecology	
CPSC 415	Bioenergy Crops	
CPSC 418	Crop Growth and Management	
CPSC 426	Weed Mgt in Agronomic Crops	
CPSC 473	Mgmt of Field Crop Insects	
NRES 474	Soil and Water Conservation	
NRES 488	Soil Fertility and Fertilizers	
PLPA 405	Plant Disease Diagnosis & Mgmt	

From:	Miller, Nolan H
To:	Gregg, Brianna J
Cc:	Rausch, Kent D; Ball, Anna Leigh; Davidson, Paul Curtis; Martensen, Kathy
Subject:	RE: ETMAS proposal to Senate Ed Policy - request for a letter
Date:	Thursday, March 25, 2021 8:28:57 AM
Attachments:	Engineering Technology & Management_ Agricultural Production & Processing, BS_ University of Illinois.pdf image004.png image005.png image006.png image007.png

---

Hi all,

I've been looking at the proposal and discussing it with some of the EPC people, and I think the best thing to do is to roll it back to you so you can make sure the program of study is clear and consistent across the proposal. In particular, the program of study is discussed in three places: the table in CIM-P, the excel spreadsheet you have attached, "Proposed TSM Curriculum," and the TSM Task Force Final Report. I'm less concerned with the TSM Task Force Report, since the program of study you propose doesn't necessarily have to match the one in that report. But, there are some inconsistencies between the table in CIM-P and the attached spreadsheet that should be fixed.

In addition, I think the proposed curriculum that shows up on this page: https://nextcourses.illinois.edu/undergraduate/eng_aces/engineering-technology-management-bs/agricultural-production-processing/index.html is difficult to follow. In addition to the points below, I have gone through and marked up a pdf with issues I think should be clarified. See attached.

Let me say that, as far as I know, the members of the committee support the substance of the proposal. But, part of what we do is make sure that the requirements will be clear to students who read the program of study and future people who have to implement them. As they stand now, I don't think that's the case. But, since I think you do know what you intend, it should hopefully be a quick fix. (I know that CIM-P is not easy to work with. If you need help editing it, please let me know and I'll connect you with someone who can help.)

If you can get everything squared away and start rolling the proposal back up to the Senate before Monday morning, I'll try to get it passed (or at least discussed in committee) on Monday. If that doesn't work, there is one more meeting of the Senate on April 26. Last year, items from that meeting were sent to the Board of Trustees for their May meeting (and the name change has to be approved by BoT). So, it is likely this can still be passed in time for next year even if we are delayed to April 26. But, to be on the safe side I'd suggest putting a rush on this and trying to get it passed on Monday.

I'm happy to chat as you make the changes if you have any questions.

Nolan

_____

NOLAN H MILLER
Daniel and Cynthia Mah Helle Professor in Finance | Department of Finance
Director, Center for Business and Public Policy
Gies College of Business | University of Illinois at Urbana-Champaign
217.244.2847 | nmiller@illinois.edu | http://www.business.illinois.edu/nmiller

---

From: Gregg, Brianna J <bjgray2@illinois.edu>
Sent: Wednesday, March 24, 2021 2:44 PM
To: Miller, Nolan H <nmiller@illinois.edu>
Cc: Rausch, Kent D <krausch@illinois.edu>; Ball, Anna Leigh <aball@illinois.edu>; Davidson, Paul Curtis <pdavidso@illinois.edu>
Subject: Re: ETMAS proposal to Senate Ed Policy - request for a letter

Hi Dr. Miller-

Thanks for your email. I've copied in Dr. Paul Davidson as well in hopes he can help get a quick response back to you. I've highlighted some notes below to help the discussion.

Thanks-

Brianna

From: "Miller, Nolan H" <nmiller@illinois.edu>
Date: Monday, March 22, 2021 at 12:00 PM
To: Brianna Gregg <bjgray2@illinois.edu>
Cc: "Rausch, Kent D" <krausch@illinois.edu>, "Ball, Anna Leigh" <aball@illinois.edu>
Subject: RE: ETMAS proposal to Senate Ed Policy - request for a letter

Hello,

Some questions have arisen regarding inconsistencies between the requirements as stated in the proposed program of study and the attached excel spreadsheet. These include:

The QRII courses listed in the proposed program of study page, https://nextcourses.illinois.edu/undergraduate/eng_aces/engineering-technology-management-bs/agricultural-production-processing/index.html, do not match the courses listed in the excel sheet attached to the program.

There was a typo in the hours for the proposed program of study in the excel sheet (128) when the program of study lists 126 – both should say 126. Origianally they were going to do 128, but decided

to stick with the College of ACES typical minimum of 126. Sorry for missing the second updated area.

There are no hours listed for the Cultural Studies Gen Eds – this should be 9 – 3 in each sub category

The "introductory related courses" in the proposed catalog copy lists 18 hours. This is probably a typo and should be 6-8.

The way the 40 hours of advanced courses is included in the table is somewhat confusing. The way this is usually done is to include the 40 hour requirement in the notes area below the table. For example, "ETMAS *majors will need XXX hours of upper-level courses (300- to 400-level) in General Education and elective courses to satisfy the campus minimum requirement of 40 hours of upper-level courses for this degree."*

If somebody can get me responses about how to deal with these, I can try to bring the proposal up for discussion today, but as it stands the committee chair and provost's office would like to at least have clarification on what you intend to propose on these points before we do. The most likely path forward at this point is that the proposal gets rolled back to you to clarify these points. If that can be done quickly, there is still time to pass it at next week's EPC meeting in order to get it on the April Senate agenda.

Thanks,

Nolan

ILLINOIS

NOLAN H MILLER

Daniel and Cynthia Mah Helle Professor in Finance | Department of Finance
Director, Center for Business and Public Policy
Gies College of Business | University of Illinois at Urbana-Champaign
217.244.2847 | nmiller@illinois.edu | http://www.business.illinois.edu/nmiller

---

From: Gregg, Brianna J <bjgray2@illinois.edu>
Sent: Tuesday, March 16, 2021 4:06 PM
To: Miller, Nolan H <nmiller@illinois.edu>
Cc: Rausch, Kent D <krausch@illinois.edu>; Ball, Anna Leigh <aball@illinois.edu>
Subject: Re: ETMAS proposal to Senate Ed Policy - request for a letter

That sounds lovely… thank you!

-Brianna

From: "Miller, Nolan H" <nmiller@illinois.edu>
Date: Tuesday, March 16, 2021 at 3:02 PM
To: Brianna Gregg <bjgray2@illinois.edu>
Cc: "Rausch, Kent D" <krausch@illinois.edu>, "Ball, Anna Leigh" <aball@illinois.edu>
Subject: RE: ETMAS proposal to Senate Ed Policy - request for a letter

Thanks Briana,

I've asked the Senate office to attach the letter to the proposal in CIM-P. Hopefully they can do that without needing a rollback.

So far there haven't been any other substantive questions about the proposals, so there's a good chance they will be discussed (and hopefully passed) at Monday's beeting.

Thanks,

Nolan

ILLINOIS

NOLAN H MILLER
Daniel and Cynthia Mah Helle Professor in Finance | Department of Finance
Director, Center for Business and Public Policy
Gies College of Business | University of Illinois at Urbana-Champaign
217.244.2847 | nmiller@illinois.edu | http://www.business.illinois.edu/nmiller

---

From: Gregg, Brianna J <bjgray2@illinois.edu>
Sent: Tuesday, March 16, 2021 1:22 PM
To: Miller, Nolan H <nmiller@illinois.edu>
Cc: Rausch, Kent D <krausch@illinois.edu>; Ball, Anna Leigh <aball@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter

Hello Dr. Miller-

Please find the email chain below that includes the information from ENG approval of the name

change.

Please let me know if you need anything else.

Thanks-

Brianna

From: "Maghirang, Ronaldo G" <ronaldom@illinois.edu>
Date: Tuesday, March 16, 2021 at 1:18 PM
To: Brianna Gregg <bjgray2@illinois.edu>
Cc: "Rausch, Kent D" <krausch@illinois.edu>, "Davidson, Paul Curtis" <pdavidso@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter

Dear Brianna,

Here's the email from Dean Bashir. If you need anything else, please let me know.

Sincerely,
Ronaldo

From: Bashir, Rashid <rbashir@illinois.edu>
Sent: Tuesday, March 16, 2021 1:15 PM
To: Maghirang, Ronaldo G <ronaldom@illinois.edu>; Eckstein, James N <eckstein@illinois.edu>
Subject: RE: ETMAS proposal to Senate Ed Policy - request for a letter

Dear Ronaldo,

Yes the name change was approved by the Executive Committee. I am also supportive of this change and wish ABE all the best to expand and rebrand this program.

Best wishes

Rashid

++
Rashid Bashir, Ph.D.
Dean, The Grainger College of Engineering
Grainger Distinguished Chair in Engineering,
Professor of Bioengineering, Electrical and Computer Engineering, Mechanical Science and Engineering, Materials Science and Engineering
University of Illinois at Urbana-Champaign
306 Engineering Hall, MC-266
1308 W. Green Street, Urbana, IL 61801
(217) 333-2150

https://grainger.illinois.edu/
Research Page: http://libna.mntl.illinois.edu/
++

From: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Sent: Monday, March 15, 2021 2:46 PM
To: Bashir, Rashid <rbashir@illinois.edu>; Eckstein, James N <eckstein@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter
Importance: High

Dear Dean Bashir, Jim,

Thanks again for your support for the proposed name change for our Technical Systems Management (TSM) program. In order for our proposal to move forward, would you be able to provide an email/letter indicating that the college is supportive of the proposed change?

If you have any questions or need additional information, please let me know.

Sincerely,
Ronaldo

From: Gregg, Brianna J <bjgray2@illinois.edu>
Sent: Wednesday, March 10, 2021 10:52 AM
To: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Cc: Rausch, Kent D <krausch@illinois.edu>; Ball, Anna Leigh <aball@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy

Hi Dr. Maghirang-

Do you have an email/letter from Engineering so we can add it officially to the CIM proposal?

Thank you!

-Brianna

From: Miller, Nolan H <nmiller@illinois.edu>
Sent: Wednesday, March 10, 2021 10:48 AM
To: Ball, Anna Leigh <aball@illinois.edu>; Rausch, Kent D <krausch@illinois.edu>; Gregg, Brianna J <bjgray2@illinois.edu>
Subject: ETMAS proposal to Senate Ed Policy

Hello,

I am the subcommittee chair handling the proposal(s) to change the name and curriculum for TSM. I am just starting to get feedback from members of Ed Pol, but so far there haven't been any

significant concerns. One member did raise the question of whether Grainger is in support of the name change. Usually what we do in this case is request a letter of support from the unit, in this case Grainger. I see in CIM-P a note from Brianna on 2/10 saying that Grainger is in support of the name change to include Engineering in the title. Do you have this in an email or something from them already? If so, we can just attach it to the proposal in CIM-P and quickly take care of this concern. If not, presumably Brianna has already had this conversation with Grainger and can get something generated pretty quickly. It doesn't need to be long.

If you send me the email/letter when you get it, I will ask the Senate office to upload it to CIM-P. This way we can avoid the need to roll the proposal back to you and save some time.

I'll be in touch if I hear of any substantive concerns from the committee. Based on my read of the proposals, it seems pretty clear what you're doing. It isn't my place to pass judgments on what units want to do with their programs, but to me the changes seem well thought out and beneficial. Unless anything new arises, I think we should be able to get these changes passed in time for the April Senate meeting.

Best,

Nolan

ILLINOIS

NOLAN H MILLER
Daniel and Cynthia Mah Helle Professor in Finance | Department of Finance
Director, Center for Business and Public Policy
Gies College of Business | University of Illinois at Urbana-Champaign
217.244.2847 | nmiller@illinois.edu | http://www.business.illinois.edu/nmiller

From: Gregg, Brianna J
To: Miller, Nolan H
Cc: Rausch, Kent D; Ball, Anna Leigh
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter
Date: Tuesday, March 16, 2021 1:21:44 PM
Attachments: image001.png

Hello Dr. Miller-

Please find the email chain below that includes the information from ENG approval of the name change.

Please let me know if you need anything else.

Thanks-

Brianna

From: "Maghirang, Ronaldo G" <ronaldom@illinois.edu>
Date: Tuesday, March 16, 2021 at 1:18 PM
To: Brianna Gregg <bjgray2@illinois.edu>
Cc: "Rausch, Kent D" <krausch@illinois.edu>, "Davidson, Paul Curtis" <pdavidso@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter

Dear Brianna,

Here's the email from Dean Bashir. If you need anything else, please let me know.

Sincerely,
Ronaldo

From: Bashir, Rashid <rbashir@illinois.edu>
Sent: Tuesday, March 16, 2021 1:15 PM
To: Maghirang, Ronaldo G <ronaldom@illinois.edu>; Eckstein, James N <eckstein@illinois.edu>
Subject: RE: ETMAS proposal to Senate Ed Policy - request for a letter

Dear Ronaldo,

Yes the name change was approved by the Executive Committee. I am also supportive of this change and wish ABE all the best to expand and rebrand this program.

Best wishes

Rashid

++

Rashid Bashir, Ph.D.
Dean, The Grainger College of Engineering
Grainger Distinguished Chair in Engineering,
Professor of Bioengineering, Electrical and Computer Engineering, Mechanical Science and Engineering, Materials Science and Engineering
University of Illinois at Urbana-Champaign
306 Engineering Hall, MC-266
1308 W. Green Street, Urbana, IL 61801
(217) 333-2150
https://grainger.illinois.edu/
Research Page: http://libna.mntl.illinois.edu/
++

From: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Sent: Monday, March 15, 2021 2:46 PM
To: Bashir, Rashid <rbashir@illinois.edu>; Eckstein, James N <eckstein@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy - request for a letter
Importance: High

Dear Dean Bashir, Jim,

Thanks again for your support for the proposed name change for our Technical Systems Management (TSM) program. In order for our proposal to move forward, would you be able to provide an email/letter indicating that the college is supportive of the proposed change?

If you have any questions or need additional information, please let me know.

Sincerely,
Ronaldo

From: Gregg, Brianna J <bjgray2@illinois.edu>
Sent: Wednesday, March 10, 2021 10:52 AM
To: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Cc: Rausch, Kent D <krausch@illinois.edu>; Ball, Anna Leigh <aball@illinois.edu>
Subject: FW: ETMAS proposal to Senate Ed Policy

Hi Dr. Maghirang-

Do you have an email/letter from Engineering so we can add it officially to the CIM proposal?

Thank you!

-Brianna

From: Miller, Nolan H <nmiller@illinois.edu>
Sent: Wednesday, March 10, 2021 10:48 AM

To: Ball, Anna Leigh <aball@illinois.edu>; Rausch, Kent D <krausch@illinois.edu>; Gregg, Brianna J <bjgray2@illinois.edu>
Subject: ETMAS proposal to Senate Ed Policy

Hello,

I am the subcommittee chair handling the proposal(s) to change the name and curriculum for TSM. I am just starting to get feedback from members of Ed Pol, but so far there haven't been any significant concerns. One member did raise the question of whether Grainger is in support of the name change. Usually what we do in this case is request a letter of support from the unit, in this case Grainger. I see in CIM-P a note from Brianna on 2/10 saying that Grainger is in support of the name change to include Engineering in the title. Do you have this in an email or something from them already? If so, we can just attach it to the proposal in CIM-P and quickly take care of this concern. If not, presumably Brianna has already had this conversation with Grainger and can get something generated pretty quickly. It doesn't need to be long.

If you send me the email/letter when you get it, I will ask the Senate office to upload it to CIM-P. This way we can avoid the need to roll the proposal back to you and save some time.

I'll be in touch if I hear of any substantive concerns from the committee. Based on my read of the proposals, it seems pretty clear what you're doing. It isn't my place to pass judgments on what units want to do with their programs, but to me the changes seem well thought out and beneficial. Unless anything new arises, I think we should be able to get these changes passed in time for the April Senate meeting.

Best,

Nolan

ILLINOIS

NOLAN H MILLER
Daniel and Cynthia Mah Helle Professor in Finance | Department of Finance
Director, Center for Business and Public Policy
Gies College of Business | University of Illinois at Urbana-Champaign
217.244.2847 | nmiller@illinois.edu | http://www.business.illinois.edu/nmiller

ILLINOIS

COLLEGE OF AGRICULTURAL, CONSUMER & ENVIRONMENTAL SCIENCES

Academic Programs
128 Mumford Hall, MC-710
1301 W. Gregory Drive
Urbana, IL 61801

September 30, 2020

Paul Davidson
TSM Task Force Chair
360E Agricultural Engineering Sciences Bld.
1304 W. Pennsylvania
Urbana Illinois 61801

Dear Paul,

This letter is in support of changing the name of Technical Systems Management (TSM) to Engineering Technology and Management.

In over 20 years in Human Resources and eight in career services, I have never encountered a job description searching for majors in technical systems management. Although there are three words in the major's title, together they are so generic that they say nothing.

In my role as the Director of Career Services for the College of ACES, I work with over 700 employers who hire our students at both the undergraduate and graduate level. When I talk with employers who are seeking talent, and they describe the job duties in which they are seeking candidates to fulfill, time and again, I have to explain to them that they need to consider TSM majors. The employers look at me quizzically because TSM is not in their vernacular. Invariably, I simplify it to "engineering lite" I explain that TSM majors are not the students that design the blueprint but they are the ones that execute it. TSM majors roll up their sleeves and make the vision come to life whether it be installing the solar panels, handling the bioprocessing, managing project timelines, running a grain elevator, or contributing to a technical team. Then the employers will respond, "Oh, you mean Engineering Technologists."

I skimmed the ACES First Destination three year report and found ACES TSM graduates were hired into these types of positions: Project Engineer-15; Construction Engineer-3; Engineering Technician-3; Field Engineer-2; Engineer-2; Cost Engineer-1; Assistant Engineer-1; Production Engineer-1; Controls Engineer-1; Ventilation Engineer-1; and Sales Engineer-1. Clearly, employers see that TSM students deserve the title Engineering Technology and Management in their degree based on their competencies.

Sincerely,

Jean Drasgow

Jean Drasgow
Director, ACES Career Services

ILLINOIS
Division of General Studies

Division of General Studies
520 Illini Union Bookstore Building
807 S. Wright St., MC-317
Champaign, Illinois 61820

MEMORANDUM

To: Dr. Paul Davidson, Associate Professor
Brianna Gregg, Data Analyst and Marketing Coordinator
College of Agricultural, Consumer and Environmental Sciences

From: Dr. Daniel Turner, Director
Division of General Studies

Date: September 29, 2020

Re: Support of TSM name change to "Engineering Technology and Management"

I write in support of the proposed name change of "Technical Systems Management" to "Engineering Technology and Management." The Division of General Studies serves as the academic home for close to 3,000 students including approximately 1,500 incoming students each year who are undeclared or in the Pre-Engineering Program at the University of Illinois. Our mission is to assist students with the process exploring over 150 potential majors and academic programs based on their own interests and goals.

We regularly discuss Technical Systems Management as an option for students with interests in STEM and business. Many of these students come to Illinois thinking they must pursue a major in the Gies College of Business or Granger College of Engineering, but do not necessarily understand these academic areas or realize there are other fantastic majors at Illinois that may actually meet their interests better than those in Gies or Granger.

For many students, especially those that begin their college career at Illinois as undeclared or Pre-Engineering, TSM has become a discovery major. This being a major that students did not initially choose or understand, but after learning more about the academic and career opportunities available, decide to pursue. "Technical Systems Management" as a name has been difficult for the students we work with to comprehend. We explain TSM as an academic program and have been successful with encouraging DGS students to pursue. Just in the last year alone, 33 students successfully declared TSM from DGS.

I believe the "Engineering Technology and Management" would be more recognizable and understandable for students and could have the potential of encouraging more students to consider this as a possibility. Additionally, I suspect students would have less of a propensity to view this major as a second choice to engineering majors but would be more likely to view it as an alternate instead. This proposed name would also seem more in line with other engineering technology types of programs at peer institutions or other institutions in Illinois. Overall, I believe this potential name change would be helpful for students in the process of choosing majors and understanding this program.

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
ACES 102	Intro Sustainable Food Systems	3
ANSC 100	Intro to Animal Sciences	3
CPSC 112	Introduction to Crop Sciences	4
HORT 100	Introduction to Horticulture	3
FSHN 101	Science of Food & How it Relates to You	3
LEAD 260	Foundations of Leadership	3
MFST 101	Experiencing Food Systems	3
NRES 201	Introductory Soils	4
TSM electives		
Required		
Rubric	Course Title	Hours
TSM 103	Ag Machinery & Technology	2
Select an additional 18 hours from the below list for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 232	Materials & Construction Sys	3
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 262	Off-Road Equipment Mgmt	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
TSM 381	Grain Drying & Storage Sys	3
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 464	Engine & Tractor Power	3
TSM 467	Precision Agriculture Tech	3
TSM 486	Grain Bioprocessing Coproducts	3
TSM 496	Independent Study	1 to 4

Concentration Electives		
Select 18 hours from the lists below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
Food & Agricultural Marketing, Management, and Law		
Two of:		
ACE 222	Agricultural Marketing	3
ACE 231	Food & Agribusiness Mgmt	3
ACE 232	Mgmt of Farm Enterprises	3
ACE 306	Food Law	3
ACE 403	Agricultural Law	3
ACE 427	Commodity Price Analysis	3
ACE 428	Commodity Futures & Options	3
ACE 430	Food Marketing	3
ACE 431	Agri-food Strategic Mgmt	3
ACE 432	Farm Management	3
ACE 435	Global Agribusiness Mgmt	3
Pick four classes from no more than two of these categories:		
Animal Production & Processing		
ANSC 219	Meat Technology	3
ANSC 223	Animal Nutrition	3
ANSC 301	Food Animal Prod, Mgmt, & Eval	3
ANSC 310	Meat Selection & Grading	3
ANSC 322	Livestock Feeds and Feeding	3
ANSC 400	Dairy Herd Management	3
ANSC 401	Beef Production	3
ANSC 402	Sheep Production	3
ANSC 403	Pork Production	3
ANSC 404	Poultry Science	3
ANSC 424	Pet Food & Feed Manufacturing	3
Food Production & Processing		
FSHN 232	Science of Food Preparation	3
FSHN 260	Raw Materials for Processing	3
FSHN 345	Strategic Operations Management	3
FSHN 460	Food Processing Engineering	3
FSHN 465	Principles of Food Technology	3
FSHN 469	Package Engineering	3
FSHN 471	Food & industrial Microbiology	3
FSHN 472	Applied Microbiology	3
Horticultural Production & Processing		
HORT 205	Local Food Networks	3
HORT 341	Greenhouse Mgmt & Prod	4
HORT 360	Vegetable Crop Production	3
HORT 361	Small Fruit Production	3
HORT 363	Postharvest Handling Hort Crop	2
HORT 434	Designing Urban Agriculture	2

HORT 435	Urban Food Production	3
PLPA 204	Introductory Plant Pathology	3
PLPA 405	Plant Disease Diagnosis & Mgmt	3

Crop Production & Processing

CPSC 226	Introduction to Weed Science	3
CPSC 270	Applied Entomology	3
CPSC 408	Integrated Pest Management	3
CPSC 412	Principles of Crop Advising	3
CPSC 414	Forage Crops & Pasture Eco	3
CPSC 415	Bioenergy Crops	3
CPSC 418	Crop Growth & Management	3
CPSC 426	Weed Mgt in Agronomic Crops	3
CPSC 473	Mgmt of Field Crop Insects	3
NRES 474	Soil and Water Conservation	3
NRES 488	Soil Fertility & Fertilizers	3
PLPA 204	Introductory Plant Pathology	3
PLPA 405	Plant Disease Diagnosis & Mgmt	3

Current Technical Systems Management Curriculum		Hours
Composition I and Speech		
RHET 105 &	Writing and Research and	
CMN 101	Public Speaking	7
or		
CMN 111 &	Oral & Written Comm I and	
CMN 112	Oral & Written Comm II	6
Advanced Composition		3 or 4
Select from campus approved list.		
Cultural Studies		
Select one course from Western, non-Western, and U.S. minority cultures from campus approved lists.		9
Foreign Language		
Coursework at or above the third level is required for graduation.		
Quantitative Reasoning I		
MATH 234 or equivalent	Calculus for Business I	4
Quantitative Reasoning II		
STAT 100, CPSC 241, ECON 202, ACE 261, PSYC 235, or SOC 280	Statistics	3
Natural Sciences and Technology		
CHEM 102 & 103	General Chemistry I and Lab	4
PHYS 101	College Physics: Mech & Heat	5
CHEM 104 & 105 or	General Chemistry II and Lab or	
PHYS 102	College Physics: E&M & Modern	4 or 5
Life Sciences	See campus approved list.	3 or 4
Humanities & the Arts		6
Select from campus approved list.		
Social and Behavioral Sciences		
	Introduction to Applied Microeconomics or	
ACE 100 or ECON 102	Microeconomic Principles	3 or 4
ECON 103	Macroeconomic Principles	3
Social & Behavioral Sciences. Select from campus approved list.		3 or 4
ACES Prescribed		
ACES 101	Contemporary Issues in ACES	2
TSM Required		
ACE 161 or CS 105	Microcomputer Applications or Intro Computing: Non-Tech	3

Proposed Curriculum		Hours
Composition I and Speech		
RHET 105 &	Writing and Research and	
CMN 101	Public Speaking	7
or		
CMN 111 &	Oral & Written Comm I and	
CMN 112	Oral & Written Comm II	6
Advanced Composition		***3 or 4***
Select from the below list of campus approved courses.		
AGCM 220	***Communicating Agriculture***	
BADM 340	***Ethical Dilemnas of Business Principles of Business***	
BTW 250	***Communication Principles of Technical***	
BTW 261	***Communication***	
ECE 316	***Ethics and Engineering***	
ESE 360	***Environmental Writing***	
LEAD 230	***Leadership Communications***	
NRES 419	***Environment and Plant Ecosystems***	
PLPA 200	***Plants, Pathogens, and People***	
TSM 311	***Humanity in the Food Web***	
Cultural Studies		
Select one course from Western, non-Western, and U.S. minority cultures from campus approved lists.		9
Foreign Language		
Coursework at or above the third level is required for graduation.		
Quantitative Reasoning I		
MATH 234 or equivalent	Calculus for Business I	4
Quantitative Reasoning II		
STAT 107, CPSC 241, ECON 202, or ACE 262	Statistics	***3 or 4***
Natural Sciences and Technology		
CHEM 102 & 103	General Chemistry I and Lab	4
PHYS 101	College Physics: Mech & Heat	5
CHEM 104 & 105 or	General Chemistry II and Lab or	
PHYS 102	College Physics: E&M & Modern	4 or 5
~~***Life Sciences***~~		~~***3 or 4***~~
Humanities & the Arts		6
Select from campus approved list.		
Social and Behavioral Sciences		
	Introduction to Applied Microeconomics or	
ACE 100 or ECON 102	Microeconomic Principles	3 or 4
~~***ECON 103***~~	~~***Macroeconomic Principles***~~	~~***3***~~
Social & Behavioral Sciences. Select from campus approved list.		3 or 4
ACES Prescribed		
ACES 101	Contemporary Issues in ACES	2
TSM Required		
CS 105	***Intro Computing: Non-Tech***	***3***

	Fundamentals of Accounting or		~~***Fundamentals of Accounting or***~~		
ACCY 200 or ACCY 201	Accounting and Accountancy I	3	~~***ACCY 200 or ACCY 201***~~	~~***Accounting and Accountancy I***~~	~~***3***~~
TSM 100	Technical Systems in Agriculture	3	TSM 100	Technical Systems in Agriculture	3
			TSM 339	***Optimization in Engineering Technology and Management***	***3***
			TSM 421 or 422	***Ag Safety: Injury Prevention or Ag Health: Illness Prevention***	***3***
TSM 430	Project Management	2	TSM 430	Project Management	2
			TSM 439	***Capstone Experience***	***4***
			Introductory Related Courses		***6 to 8***
			Select 2 courses from the list for your concentration, which do not satisfy any other requirements.		
CPSC 112	Introduction to Crop Sciences	4	~~***CPSC 112***~~		***4***
NRES 201	Introductory Soils	4	~~***NRES 201***~~		***4***
			Business electives		***6***
			A total of 6 hours from the list of Business electives (Table A.2), which do not satisfy any other requirements. This is applies to all concentrations.		
TSM elective courses A total of 18 hours from the list with a minimum of 6 hours from TSM 295, TSM 396, or at the 400-level.		18	***TSM electives*** ***A total of 20 hours from the list for your concentration with a minimum of 11 hours at the advanced level.***		***20***
Specialization electives Select 15 hours from the list.		15	***Concentration electives*** ***Select 18 hours from the list for your concentration, which do not satisfy any other requirements, with a minimum of 12 hours at the advanced***		***18***
Advanced Hours		21			
Total Hours		126	***Total Hours***		***126***

NOTES:

ETMAS majors will need 40 hours of upper-level courses (300- to 400-level) in General Education and elective courses to satisfy the campus minimum requirement of 40 hours of upper-level courses for this degree.

Proposed TSM 4-Year Plan Phase 1

First Semester			Second Semester		
TSM 100	Technical Systems in Agric	3	TSM electives	See list for your concentration.	3
ACES 101	Contemporary Issues in ACES	2	CHEM 102/103	General Chemistry I with Lab	4
RHET 105 or CMN 101 or CMN 111	Writing and Research or Public Speaking or Oral & Written Comm I	4 or 3	CMN 101 or RHET 105 or CMN 112	Public Speaking or Writing and Research or Oral & Written Comm II	3 or 4
ACE 100	Introduction to Applied Microeconomics	4	MATH 234	Business Calculus	4
General Education		3			14-15
		15-16			

First Semester			Second Semester		
TSM electives	See list for your concentration.	3	TSM electives	See list for your concentration.	3
CHEM 104/105 or PHYS 101	General Chemistry II with Lab or College Physics: Mech & Heat	4 or 5	TSM electives	See list for your concentration.	2
Business electives	See list.	3	PHYS 101 or PHYS 102	College Physics: Mech & Heat or College Physics: E&M & Modern	5
CS 105	Intro Computing: Non-Tech	3	Introductory Related Courses	See list for your concentration.	3 or 4
Elective		3	Statistics	ACE 261, CPSC 241, SOC 280	3
		16-17			16-17

First Semester			Second Semester		
TSM 422 or TSM 339	Ag Health -- Illness Prevention or Optimization for Engineering Tech and Mgmt	3	TSM 421 or TSM 339	Ag Safety -- Injury Prevention or Optimization for Engineering Tech and Mgmt	3
TSM elective	See list for your concentration.	3	Concentration electives	See list for your concentration.	3
Concentration electives	See list for your concentration.	3	Concentration electives	See list for your concentration.	3
Introductory Related Courses	See list for your concentration.	3 or 4	Business electives	See list.	3
Elective		4	Adv Comp	See List	3
		16-17	Elective		2
					17

First Semester			Second Semester		
TSM 430	Project Management	2	TSM 439	Capstone	4

TSM electives	See list for your concentration.	3	TSM electives	See list for your concentration.	3
Concentration electives	See list for your concentration.	3	Concentration electives	See list for your concentration.	3
Concentration electives	See list for your concentration.	3	General Education	See List	3
General Education	See List	3	Elective		3
Elective		2			
		16			16

General Information

Total Hours	128
Elective Hours	14
TSM IUs	35
TSM electives	20
Concentration electives	18
Business electives	6
Advanced Hours	35 built in (degree requirement of 40)

Business Electives					
ACCY 200	Fundamentals of Accounting	3	BADM 320	Principles of Marketing	3
ACCY 201	Accounting and Accountancy I	3	BADM 322	Marketing Research	3
ACCY 202	Accountancy II	3	BADM 323	Marketing Communications	3
ACCY 211	Understanding Financial Statements	3	BADM 326	Pricing Strategy	3
ACCY 212	Understanding Accounting for Business Decisions	3	FIN 221	Corporate Finance	3
ACE 210	Environmental Economics	3	FIN 230	Introduction to Insurance	3
ACE 240	Personal Financial Planning	3	LER 290	Introduction to Employment Law	3
ACE 310	Natural Resource Economics	3	LEAD 140	Harnessing Your Interpersonal Intelligence	2
ACE 345	Finan Decision Indiv Sm Bus	3	LEAD 260	Foundations of Leadership	3
ACE 346	Tax Policy and Finan Planning	3	LEAD 340	Leadership Ethics & Society: Addressing Contemporary Challenges	3
ACE 432	Farm Management	3	LEAD 380	Leadership in Groups and Teams	3
ACE 435	Global Agribusiness Management	3	LEAD 440	Interpersonal Intelligence for Professional Success	2
AGCM 270	Ag Sales and Persuasive Communication	3	SE 361	Emotional Intelligence Skills	3
BADM 300	The Legal Environment of Bus	3	SE 400	Engineering Law	3
BADM 310	Mgmt and Organizational Beh	3	TE 230	Design Thinking/Need-Finding	3
BADM 311	Leading Individuals and Teams	3	TE 250	From Idea to Enterprise	2
BADM 312	Designing and Managing Orgs	3	TE 333	Creativity, Innovation, Vision	4
BADM 313	Strategic Human Resource Mgmt	3	TE 360	Lectures in Engineering Entrepreneurship	1
BADM 314	Leading Negotiations	3	TE 450	Startups: Inc, Fund, Contracts, IP	3

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
LEAD 260	Foundations of Leadership	3
UP 101	Introduction to City Planning	3
UP 136	Urban Sustainability	3
NRES 201	Introductory Soils	4
TSM electives		
Required		
TSM 232	Materials & Construction Sys	3
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
Select an additional 11 hours from the list below for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control	3
TSM 262	Off-Road Equipment Mgmt	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 496	Independent Study	1 to 4

Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
At least two of:		
CEE 320	Construction Engineering	3
CEE 420	Construction Productivity	3
CEE 421	Construction Planning	3
CEE 422	Construction Cost Analysis	3
At least one of:		
BADM 300	Legal Environment of Business	3
BADM 310	Mgmt and Org Behavior	3
BADM 320	Principles of Marketing	3
FIN 221	Corporate Finance	3
FIN 241	Fundamentals of Real Estate	3
At least one of:		
UP 406	Urban Ecology	4
UP 446	Sustainable Planning Seminar	4
UP 466	Energy & the Built Environ	4
UP 475	Real Estate Develop Fund	4
UP 480	Sustainable Design Principles	2
May select from the below list to achieve 18 hours:		
ACE 345	Financial Dec Indiv Sm Bus	3
CEE 424	Sustainable Const Methods	3
ESE 482	Challenges of Sustainability	3

Introductory Related Courses		
Rubric	Course Title	Hours
CPSC 112	Introduction to Crop Sciences	4
NRES 201	Introductory Soils	4
TSM electives		
Required		
Rubric	Course Title	Hours
TSM 103	Ag Machinery & Technology	2
TSM 262	Off-Road Equipment Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 435	Elec Computer Control Sys	3
TSM 464	Engine & Tractor Power	3
TSM 467	Precision Agriculture Tech	3
Select an additional 4 hours from the below list for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Management Sys	3
TSM 381	Grain Drying & Storage Sys	3
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 486	Grain Bioprocessing Coproducts	3
TSM 496	Independent Study	1 to 4

Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
One of:		
ACE 210	Environmental Economics	3
ACE 222	Agricultural Marketing	3
ACE 231	Food & Agribusiness Mgmt	3
ACE 232	Mgmt of Farm Enterprises	3
ACE 427	Commodity Price Analysis	3
ACE 428	Commodity Futures and Options	3
ACE 432	Farm Management	3
ACE 435	Global Agribusiness Management	3
One set of:		
GEOG 379	Intro to GIS Systems	4
GEOG 380	GIS II: Spat Prob Solving	4
OR		
GEOG 477	Introduction to Remote Sensing	3
GEOG 478	Techniques of Remote Sensing	3
OR		
NRES 454	GIS in Natural Resource Mgmt	4
NRES 455	Adv GIS for Natural Res Plng	2
One of:		
NRES 438	Soil Nutrient Cycling	3
NRES 471	Pedology	3
NRES 474	Soil & Water Conservation	3
NRES 475	Environmental Microbiology	3
NRES 488	Soil Fertility & Fertilizers	3
One of:		
CPSC 212	Intro to Plant Protection	4
CPSC 226	Introduction to Weed Science	3
CPSC 270	Applied Entomology	3
PLPA 204	Introductory Plant Pathology	3
One of:		
CPSC 408	Integrated Pest Management	3
CPSC 412	Principles of Crop Production	3
CPSC 418	Crop Growth & Mgmt	3
CPSC 426	Weed Mgt in Agronomic Crops	3
CPSC 473	Mgmt of Field Crop Insects	3
PLPA 407	Diseases of Field Crops	3

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
ACES 102	Intro Sustainable Food Systems	3
CPSC 112	Introduction to Crop Sciences	4
ENVS 101	Introduction to Energy Sources	3
LEAD 260	Foundations of Leadership	3
NRES 102	Introduction to NRES	3
NRES 201	Introductory Soils	4
UP 136	Urban Sustainability	3
TSM Electives		
Required		
TSM 352	Land & Water Mgmt	3
TSM 438	Renewable Energy Applications	3
Select an additional 14 hours from the list below for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 232	Materials & Construction Sys	3
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 496	Independent Study	1 to 4
Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
At least one of:		
ACE 210	Environmental Economics	3
ACE 310	Natural Resource Economics	3
ACE 406	Environmental Law	3
ACE 410	Energy Economics	3
ACE 411	Environment & Development	3

Concentration Electives continued		
At least one of:		
NRES 219	Applied Ecosystem Mgmt	3
NRES 370	Environmental Sustainability	3
NRES 419	Env & Plant Ecosystems	3
NRES 420	Restoration Ecology	4
NRES 425	Natural Resources Law & Policy	3
NRES 426	Renewable Energy Policy	3
NRES 429	Aquatic Ecosystem Conserv	3
NRES 438	Soil Nutrient Cycling	3
NRES 439	Env & Sustainable Development	3
NRES 471	Pedology	3
NRES 474	Soil & Water Conservation	3
NRES 477	Intro to Remote Sensing	3
NRES 488	Soil Fertility & Fertilizers	3
At least one of:		
UP 405	Watershed Ecology & Planning	4
UP 406	Urban Ecology	4
UP 446	Sustainable Planning Seminar	4
UP 466	Energy & the Built Environ	4
UP 480	Sustainable Design Principles	2
May select from the below list to achieve 18 hours.		
AGCM 330	Environmental Communications	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CPSC 215	The Prairie & Bioenergy	3
CPSC 336	Tomorrow's Environment	3
CPSC 415	Bioenergy Crops	3
CPSC 416	Native Plants & Agroecosystems	3
CPSC 431	Plants and Global Change	3
CPSC 437	Principles of Agroecology	3
ESE 465	Transportation & Sustainability	3
ESE 482	Challenges of Sustainability	3
GLBL 201	Energy Systems	2 or 3

TSM Task Force for Curriculum Revision - *Final Report*

Paul Davidson (*Chair*), *Associate Professor*
Anne Marie Boone, *Student Academic Program Coordinator*
Steve Ford, *Senior Research Engineer, BESS Lab Manager*
Salah Issa, *Assistant Professor*
Brian Jacobson, *Assistant Director of Food and Bioprocessing Pilot Plant Operations*
Brendan Kuhns, *Instructor*
Gopu Nair, *Teaching Assistant Professor*
Kent Rausch (*ex-officio*), *Associate Professor*

Executive Summary

The Department of Agricultural and Biological Engineering (ABE) created a task force to collect feedback from current and former students, as well as faculty and staff regarding the Technical Systems Management (TSM) program and propose changes to the TSM curriculum. The Task Force was open to all faculty and staff in ABE and on a voluntary basis. The Task Force consisted of eight members.

The Task Force solicited verbal feedback from faculty, staff, and students. In general, it was noted that students have difficulty marketing the TSM degree to potential employers, the ABE department struggles to recruit incoming freshmen because of a lack of branding, students feel some required courses are not relevant to their career path, the ABE department is capturing a very low number of TSM instructional units (IUs), and a more formal Construction Management degree path is needed[1].

The Task Force completed brief online reviews of approximately 20 "peer programs." Efforts were focused on top-ranked ABE departments, as well as similar programs in Illinois (i.e., SIU, ISU, WIU), with a goal of assessing programs that may be attracting the same pool of students as the TSM program. The Task Force looked at program names, enrollments (if available), student placement, credit hours required for program completion, and accreditation. Results indicated that we require far fewer credit hours within the program (23 credit hours for TSM versus 34-60 credit hours for peer programs). Most other program names are more descriptive of the program focus, such as names like Engineering Management, Agricultural Systems Management, and Construction (Systems) Management. We have one of the highest program enrollments (some programs do not disclose enrollment). In general and based on available information, the TSM program has a higher student placement than peer programs, with higher average starting salaries. In addition, nearly all peer programs require a capstone course, safety course, and core of courses that every student must complete. Our current TSM core of courses only includes TSM 100 and TSM 430.

---

[1] *According to the U.S. Bureau of Labor Statistics, IL is one of the top U.S. states for construction job opportunities and employment is expected to grow 10% from 2018-2028.*

In an effort to acquire additional feedback from the people most knowledgeable about the TSM program (current and former students), participants were asked to take a short survey related to the TSM program. The student and alumni survey questions are included in Appendix B and Appendix C, respectively. A total of 70 students out of 198 registered TSM students (194 undergraduate, 4 graduate) and 133 out of 866 TSM/Agricultural Mechanization alumni (1980-2019) responded to the survey. Results show approximately 40% of current students are pursuing the Mechanization, Marketing, and Technology Management Systems (MMTMS) focus and 26% pursuing Construction Management. This aligned with the 54% of alumni who are in MMTMS careers and 18% who are in Construction Management careers.

Among other things, the survey asked each participant for feedback on new potential names for the program. The survey asked for a rating (1-5) of each of six program names; the current Technical Systems Management name and five new potential names. There was also an option for respondents to submit additional preferred names. The top two names for both groups of respondents (current TSM students and TSM alumni) were (1) Engineering Systems Management and (2) Engineering Technology and Management. For reference, the current program name, Technical Systems Management, was the fourth most-liked name (out of six) provided in the survey.

To gauge overall satisfaction with the TSM program, current students were asked about their perception of how the TSM program met their expectations of what the program would offer them and prepare them for. Overall, nearly 60% of current students were mostly or very satisfied with the TSM program. Therefore, the Task Force wants to make sure we maintain the satisfaction of the majority, while looking for ways to improve the experience for those who said the program only somewhat or did not meet expectations.

Students indicated that the most valuable skills learned from the classroom included (1) technical content and hands-on lab activities, (2) soft skills like problem solving and effective communication, (3) construction skills, (4) time management and project management and computer skills. Alumni identified (1) hands-on problem solving, (2) soft skills, (3) technical knowledge, (4) agricultural mechanization and construction skills, and (5) time management and project management as their top five. Outside of the classroom, students listed the most valuable experiential learning activities as (1) student clubs, (2) internships, (3) fraternities and sororities, (4) undergraduate research and study abroad. Alumni listed (1) student clubs, (2) internships, (3) fraternities and sororities, (4) social interaction and other "college life" aspects, and (5) farming and family businesses.

When asked what attracted them to the TSM program, 35% of current students said it was the application of engineering principles, followed by the business aspect (26%), technical aspect (25%), curriculum flexibility (20%), and hands-on experiences (18%). It should be noted that respondents were allowed to list multiple attractive aspects of the program. The most popular combination of reasons was applied engineering and business (14%).

One survey question asked for respondents to rate their level of agreement with the statement, "Some students and potential employers comment on the program name, Technical Systems Management, being difficult to communicate the meaning." The responses show that approximately 90% of students and 81% of alumni have some level of difficulty (rating of 5, 6, or 7).

The respondents were also asked if they thought additional project management coursework would be beneficial, possibly leading to a certificate. The results were somewhat varied. Overall, approximately 80% of alumni and 63% of students prefer some level of additional project management coursework (rating of 5, 6, or 7). It is not clear from this survey why some did not feel additional project management coursework is necessary. Perhaps they do not feel their future careers warrant it, or maybe the current amount of project management coursework is sufficient.

An open text question was asked about alumni current job duties and responsibilities. The Task Force carefully reviewed these descriptions and noted keywords. The most common job responsibility was management or supervision, followed closely by development/support and marketing/relations/sales. Automation/technology and Operations/Maintenance also received a high number of responses. Some respondents may have listed multiple keywords and will therefore show up more than once (i.e., if somebody talked about management and agriculture in their description, they would show up in both categories). However, this question, alone, does not indicate the job sector of each respondent. For instance, somebody working in management is likely working in either agriculture or construction, but if they did not explicitly indicate agriculture or construction, they would only show up under management.

Other questions in the alumni survey asked about the company name and job description, which were used to further break the information into job disciplines. The information indicates that while the greatest number of TSM alums are going into agriculture (and that number has increased each decade), it is no longer a majority (as of 2010-2019). Construction has significantly increased in the past 10 years and education/academia is the third most popular. While these data do not provide enough information to substantiate this claim, we may not be effectively reaching the students who are interested in agriculture. Since many of our TSM students are transfers from other parts of campus, it is plausible that they were already interested in something to do with construction, making the transition to TSM relatively simple. If the students who are interested in agriculture end up going to another state school (e.g., SIU-C, ISU, WIU), we would never have the opportunity to recruit them from an undeclared, or other major, on campus. Many survey respondents strongly recommended keeping agriculture as a core of the program and better incorporating technology to align with industry needs.

Table of Contents

Current Enrollment and Job Placement

The undergraduate enrollment in the Agricultural and Biological Engineering department is shown in Figure 1 for the period 1991-2020. Both TSM and ABE undergraduate enrollments are provided, as well as the total undergraduate enrollment.

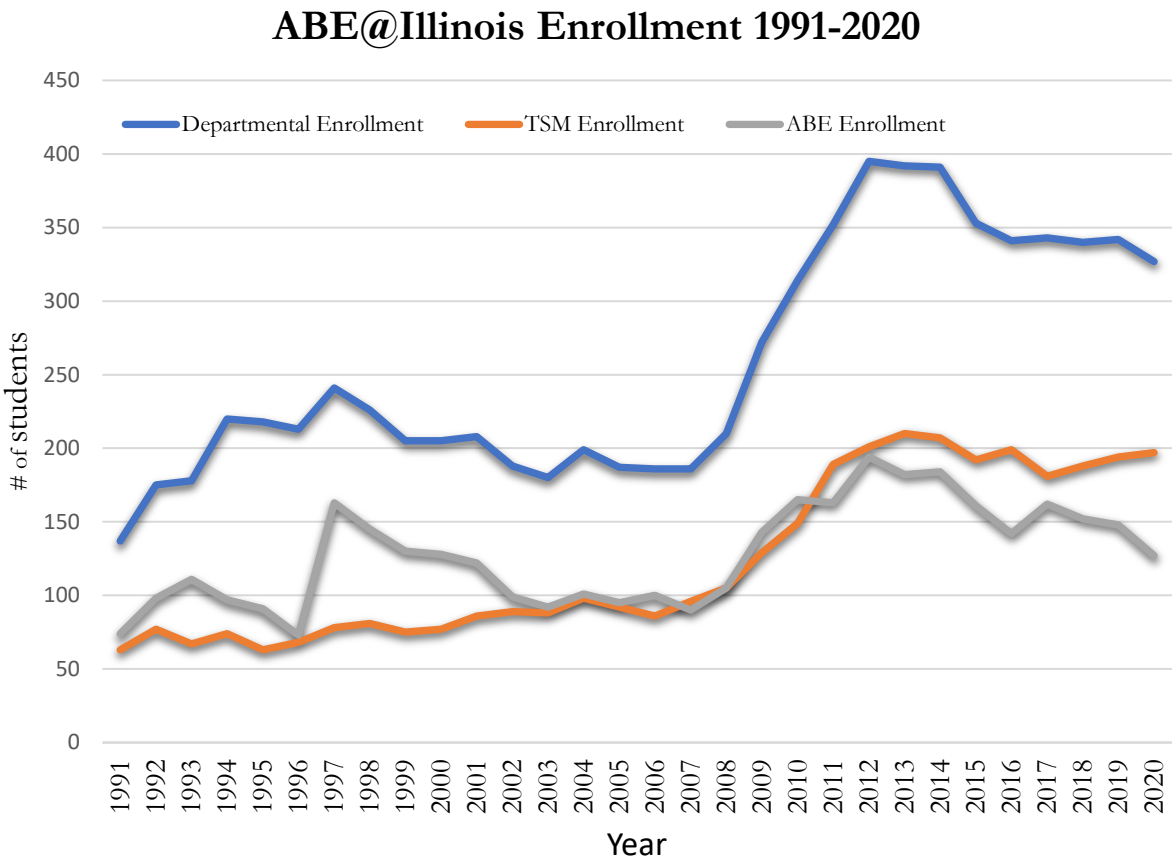

Figure 1. Undergraduate enrollment for the Department of Agricultural and Biological Engineering (1991-2020).

As of Fall 2019, the TSM undergraduate enrollment is shown in Figure 2. The total enrollment is just under 200 students, however, it should be noted that there is a substantial increase between the sophomore and junior years. This sharp increase is largely due to transfer students, both from other programs on campus, as well as community college transfers. The transfers from other campus programs indicate a need to reach these students earlier and get them in the program as close to the start of their college career as possible.

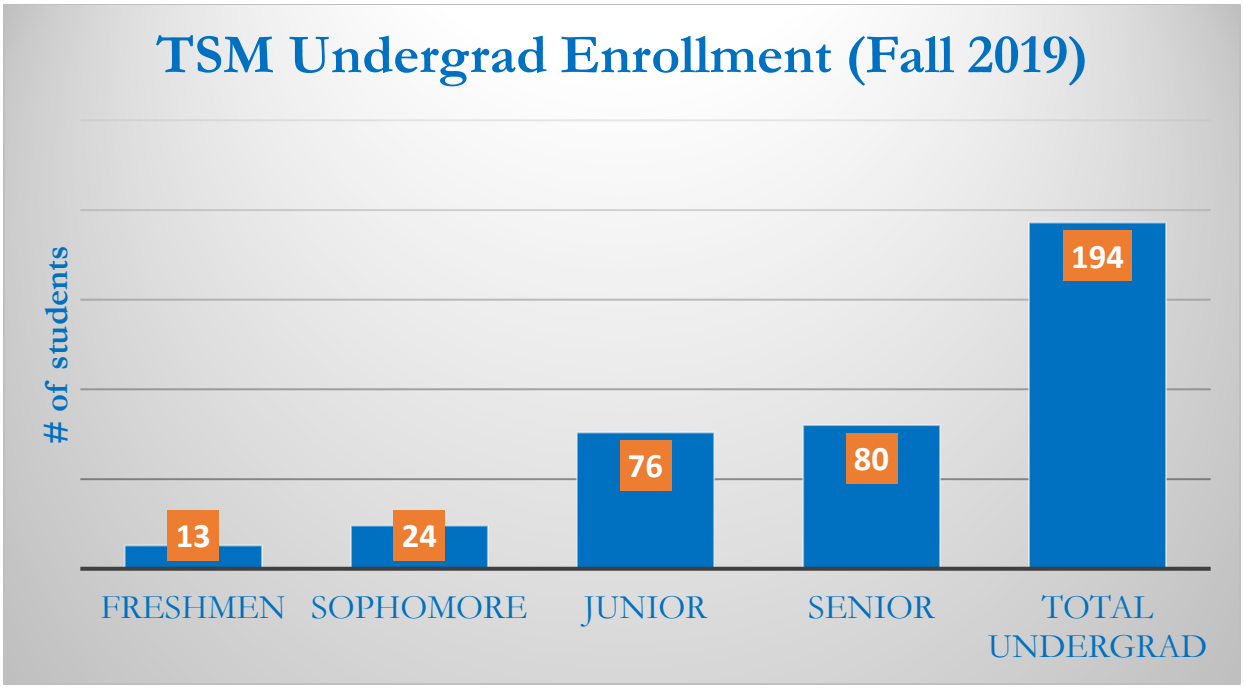

Figure 2. Undergraduate TSM enrollment for Fall 2019.

For students graduating in the 2018-2019 timeframe, the average starting salary was just short of $60,000 per year (Figure 3). This is a slight increase over the 2017-2018 timeframe, and a somewhat large increase over the 2016-2017 timeframe. The job placement, as indicated by the number of students who secured a first destination (full-time employment or graduate school), remains strong with 85% of graduates securing a first destination within 6 months of graduating.

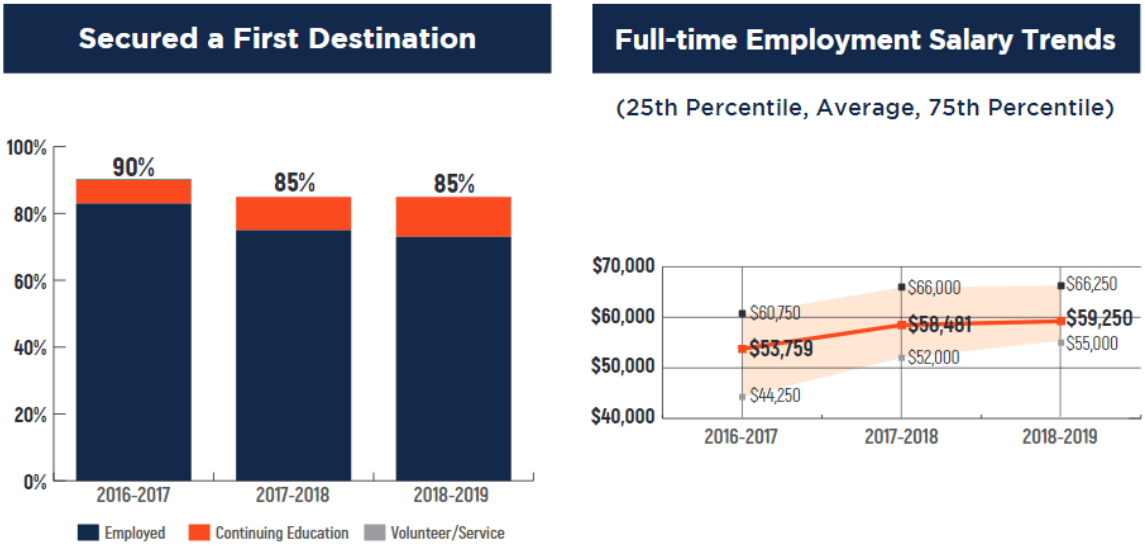

Figure 3. Results from a voluntary survey to recent graduates and included in the Illini Success Annual Report: https://illinisuccess.illinois.edu/annual-reports/.

Proposed Curriculum Changes

After carefully considering all collected information from faculty, staff, students, and alumni, the Task Force has proposed the following changes to the TSM curriculum (see Appendix A for a detailed breakdown of the curriculum):

1. New program name –"Engineering Technology and Management"
2. Formal concentrations will be implemented (will show on transcript) - *Concentrations were chosen over separate degrees for the flexibility in adding additional concentrations in the future, if needed*

   Proposed concentration names:

   a) Agricultural Production and Processing
   b) Construction Management
   c) Digital and Precision Agriculture
   d) Energy and the Environment
3. All students will be required to complete 40 credit hours of upper-level (300- and 400-level) coursework as required by Illinois Board of Higher Education
4. Requirement for each student to complete CPSC 112 and NRES 201 will be expanded to meet individual concentration needs
5. A TSM Capstone requirement will be added (first offering in Spring 2021)
6. Students will be required to take either TSM 421 (Ag Safety-Injury Prevention) or TSM 422 (Ag Health-Illness Prevention)
7. Specify a set of options to satisfy the advanced composition requirement
8. STAT 100 (Statistics), ECON 202 (Economic Statistics I)), and PSYC 235 (Intro to Statistics) will be removed from options to satisfy the statistics requirement
9. Students will be required to take CS 105 (Intro Computing: Non-Tech) instead of choosing between CS 105 and ACE 161 (Microcomputer Applications)
10. The Life Sciences elective will be removed
11. Requirement to take ECON 103 (Macroeconomics Principles) will be removed
12. Students will be required to take TSM 339 (Optimization in Engineering Technology and Management) to learn applied numerical analysis using modern computer-based methods
13. Students will take 6 credit hours of business electives from an approved list in place of being required to take either ACCY 200 (Fundamentals of Accounting) or ACCY 201 (Accounting and Accountancy 1)

Long-term goals (Phase II)

The Task Force identified long-term goals of:

1. Getting the TSM program accredited
2. Increasing enrollment, especially in freshman and sophomore years
3. Enhancing recruitment at the high school level
4. Hire additional faculty/instructors to teach needed courses
5. Requiring each student to complete 11 hours of project management leading to a departmental certificate

6. Developing several new courses that are needed: 200-level health and safety; 200-level processing systems; 200-level renewable energy systems; 300-level renewable energy systems; 300-level urban agriculture; 300-level project management (optimization); 400-level urban agriculture; 400-level environmental systems; 400-level construction management.
7. Formalizing several existing temporary courses: TSM 199 (Soil Construction and Field Methods); TSM 199 (Tools for Project Management); TSM 199 (Geomatics); TSM 22x (Safety Internship); TSM 39x (Project Management Experiential Learning); TSM 42x (Safety Research); TSM 42x (OSHA Certification).

Survey Results and Interpretation

Survey Respondent Demographics

A total of 70 students out of 198 registered TSM students (194 undergraduate, 4 graduate) responded (35% response rate) to our survey. In terms of specialization, the majority of respondents (40%) specialized in our Mechanization, Marketing, and Technology Management Systems track (Figure 4). Construction Management represented 26% of respondents and Renewable Energy and Environmental Systems together represented 16%, with the rest of the specializations represented by two or fewer individuals.

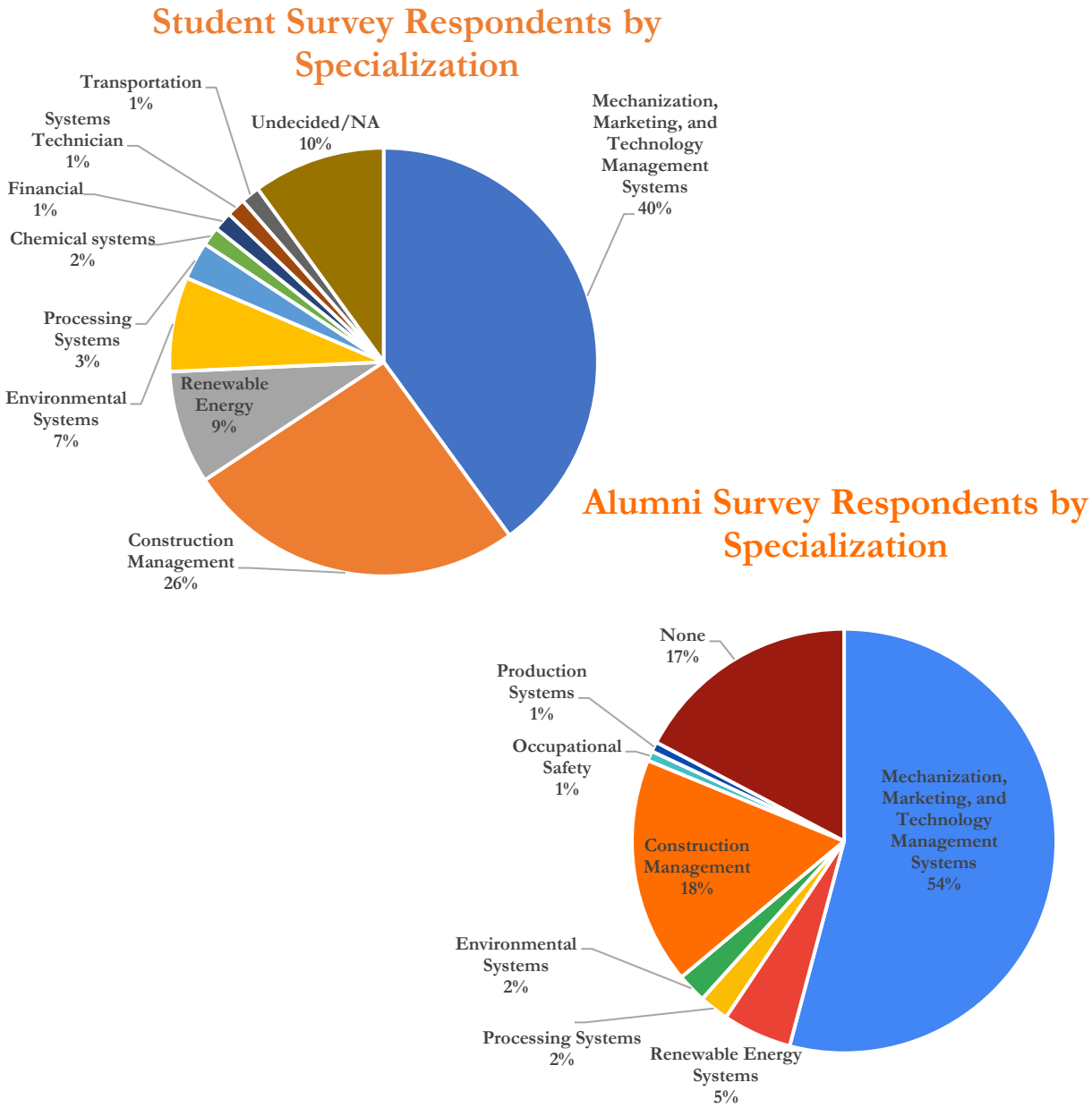

Figure 4. Specialization of survey respondents.

The majority of the respondents came from the senior class (43%; Figure 5), with juniors representing 17%, sophomores 19% and freshmen 6% of all respondents. This closely aligns with our current class distribution, with a majority of enrolled students in the junior and senior classes.

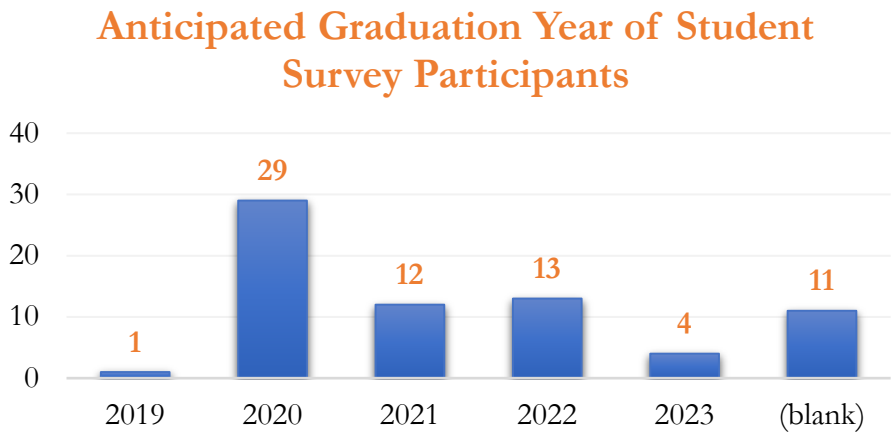

Figure 5. Anticipated graduation year of current student respondents.

A total of 133 out of 866 TSM/Agricultural Mechanization alumni responded (15% response rate) to our survey. The email list included all alumni with graduation years 1980-2019 (Figure 6). It should be noted that it is unknown how many of the 866 alumni were successfully reached, as the survey was sent from the University of Illinois Foundation with a link to a Google Forms survey (different from the Google Forms survey sent to current TSM students) and, therefore, the number of emails that "bounced back" because the email address on file is no longer current is unknown. Figure 7 shows the highest degrees awarded by our alumni respondents.

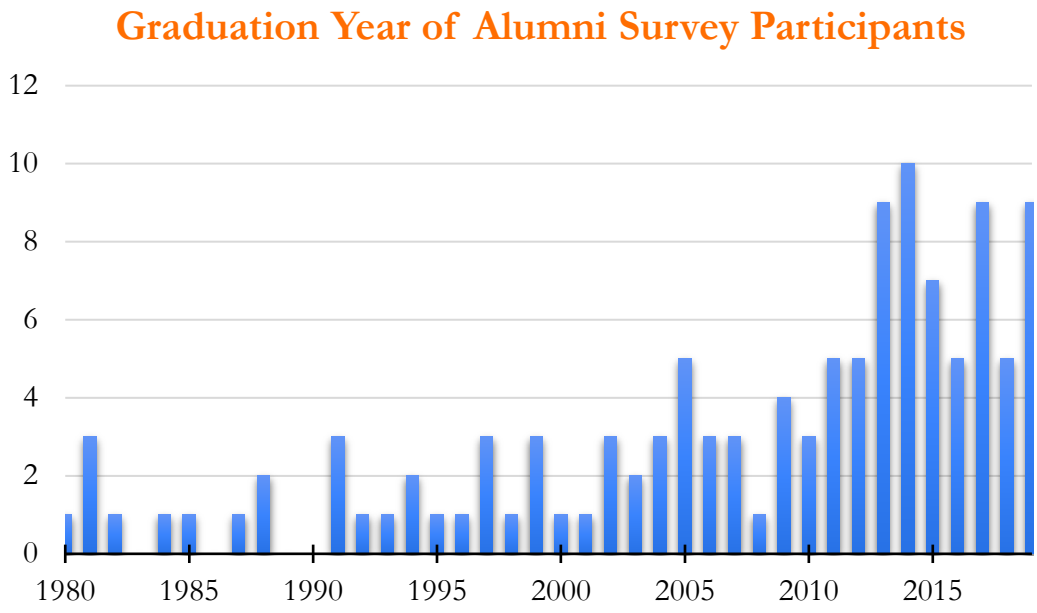

Figure 6. Graduation year of alumni respondents.

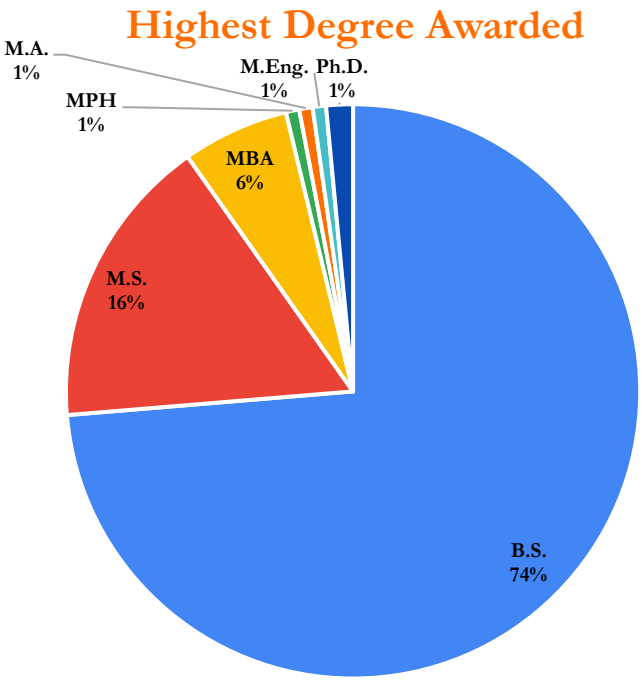

Figure 7. Alumni respondents provided their highest degree awarded.

Alumni were asked to provide their current job location. Those locations were mapped to illustrate where our alumni go after graduating (Figure 8). While this is only a subset of our entire alumni base, it shows that a large number of alumni remain in Illinois to pursue their careers.

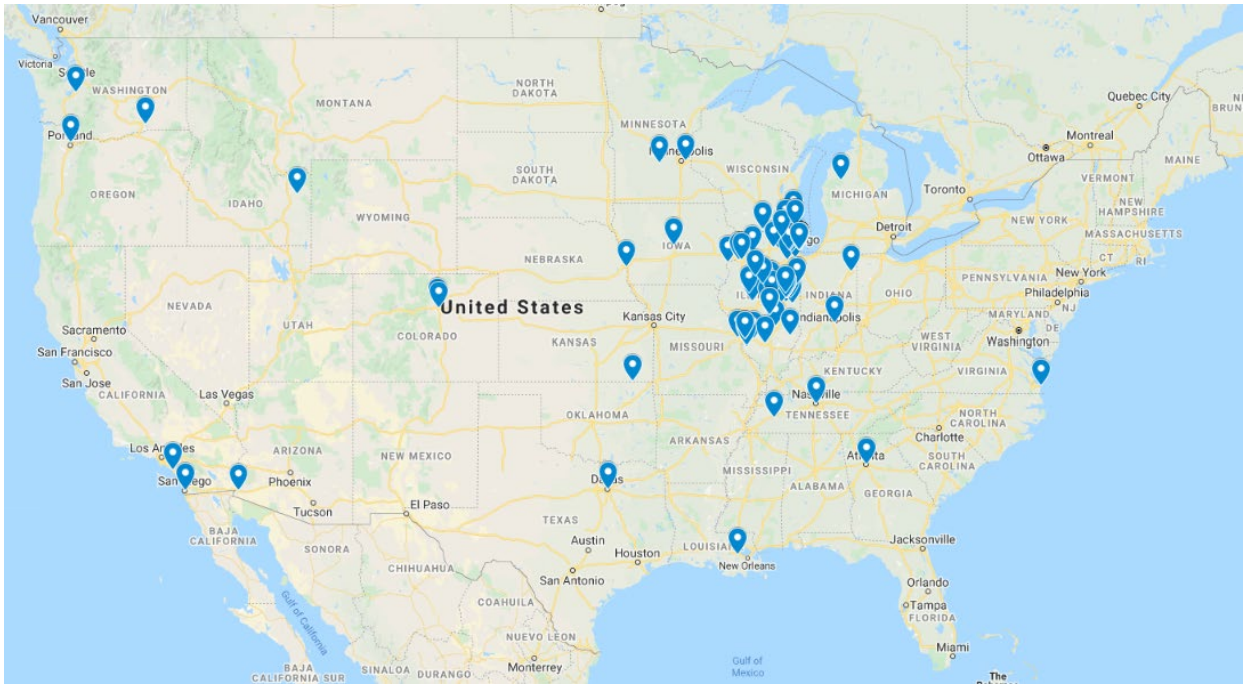

Figure 8. Current work locations for alumni respondents. Note that 2 alumni who responded currently work outside of the U.S.; Kenya and South Korea.

Value of the TSM Degree

Overall, students gave 7 main reasons why they were drawn to the TSM program (Table 1); applied engineering (35%), business-oriented (26%), technically focused (25%), flexible curriculum (20%), hands-on experience (18%), construction management (18%), and agriculture perspective (5%). Applied engineering is a broad category that includes students who are interested in learning engineering principles without the rigor of an engineering program, appreciate an alternative to engineering, or are seeking a combination of engineering principles with other aspects of this program, such as hands-on experience and business aspects. Indeed, about 45% of respondents provided that the combination of two aspects of this program is what interested them in this degree.

Table 1. Number of students listing two aspects of TSM as their reason for choosing the major

	Hands-On Experience	Technical Aspect	Applied Engineering	Business Aspect	Construction Management	Agricultural Aspect	Specialty Flexibility	Totals	%
Hands-On Experience	6	1	4	0	1	0	0	12	18%
Technical Aspect	1	3	2	5	4	1	0	16	25%
Applied Engineering	4	2	8	9	0	0	0	23	35%
Business Aspect	0	5	9	1	2	0	0	17	26%
Construction Management	1	4	0	2	5	0	0	12	18%
Agricultural Aspect	0	1	0	0	0	1	1	3	5%
Specialty Flexibility	0	0	0	0	0	1	12	13	20%

In addition, in a free text form, students were asked what were the most valuable skills they have gained inside the classroom. Students provided a wide variety of skill sets from programs they learned (AutoCAD , EAGLE, LaTex, etc), programming skills, technical knowledge (bioprocessing, machinery, grain drying, etc), construction skills (plan/drawings, welding, wiring, etc), environmental systems (water quality, pollution), time and project management skills, and soft skills (leadership, teamwork, problem solving, communication, etc). These responses were split into six major categories (Figure 9); computer skills, time/project management, construction skills, technology/systems management, environmental systems, and soft skills. Each student's response could fit into multiple categories, depending on what the student chose. The three largest valued skillsets were Technical/Systems Management skills (35%), soft skills (29%) and Construction skills (24%). In addition, 12 respondents indicated that they were able to participate in an internship or undergraduate research. Figure 10 shows the responses from alumni to the same question. The responses were again split into six major categories, but the categories varied slightly from the student responses.

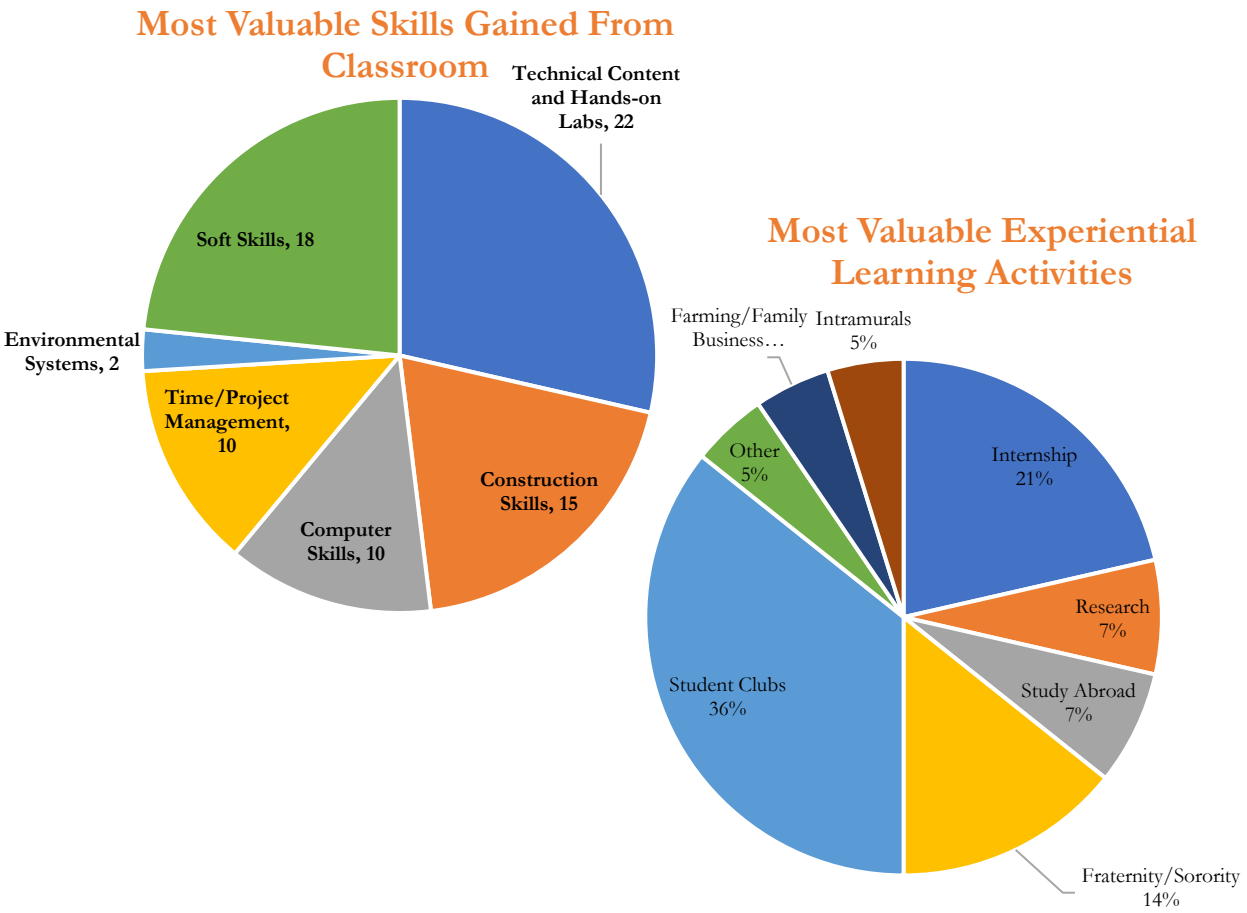

Figure 9. Current student responses regarding the most valuable skills gained from the classroom, as well as the most valuable experiential learning activities.

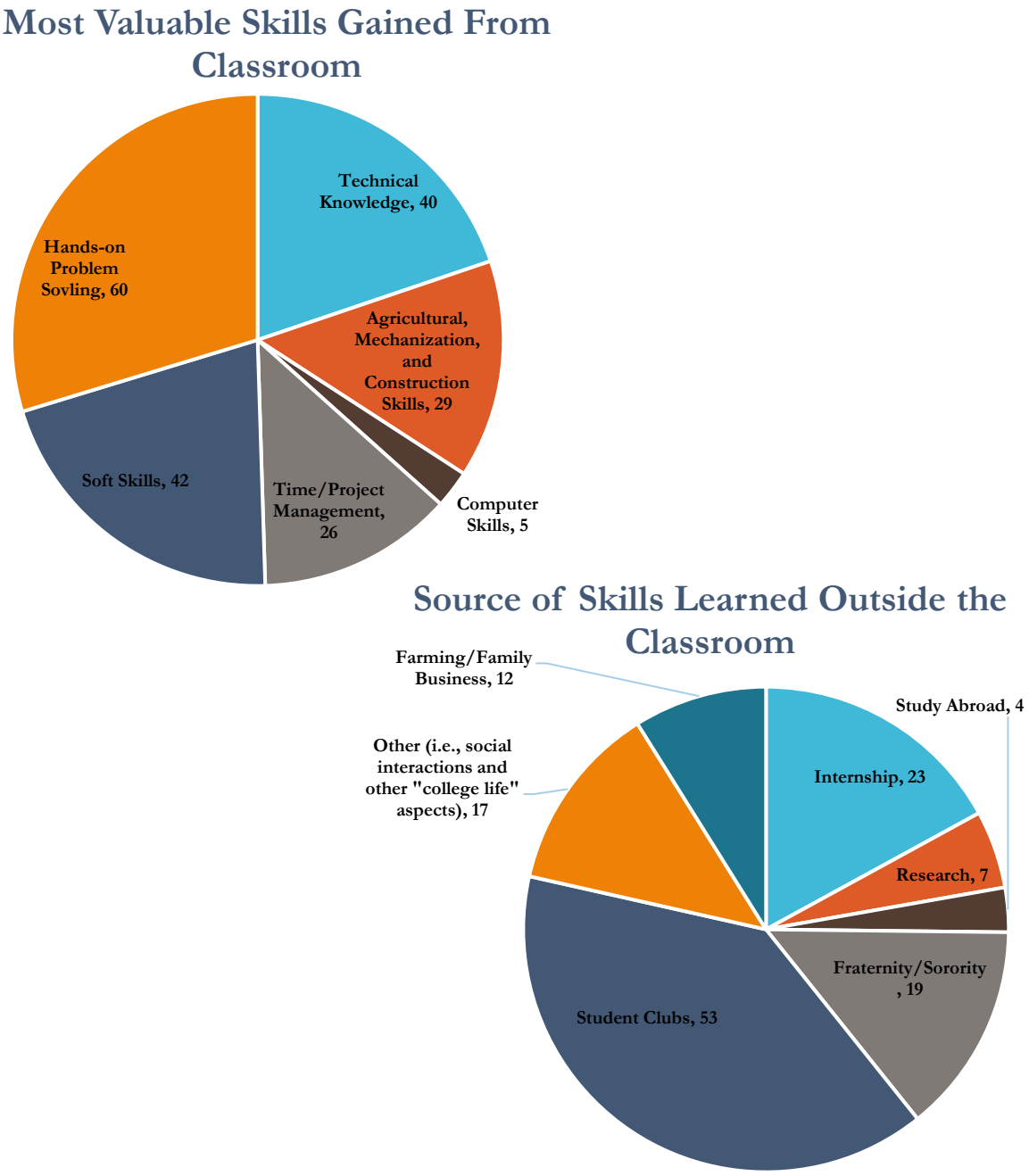

Figure 10. Alumni responses regarding the most valuable skills gained from the classroom, as well as the most valuable experiential learning activities.

To gauge overall satisfaction with the TSM program, participants were asked about their perception of how the TSM program met their expectations of what the program would offer them and prepare them for. Overall, nearly 60% of respondents were mostly or very satisfied with the TSM program (Figure 11).

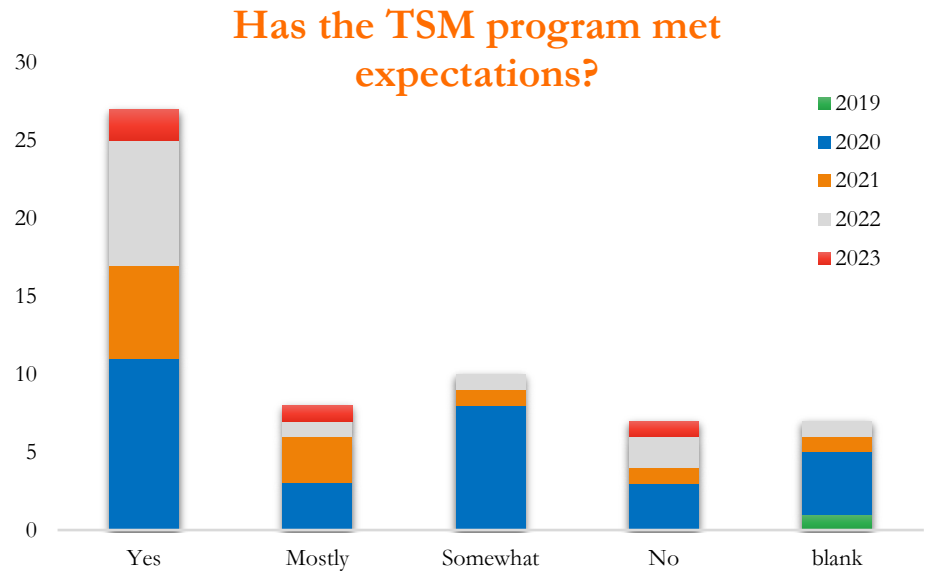

Figure 11. Current student responses regarding whether the TSM program has met their initial expectations of the program, separated by anticipated graduation year.

Areas of Improvement

An important area of improvement for the program is choosing a name that is easily communicable to industry. Overall, about 90% of current students (Figure 12) and 81% (Figure 13) of alumni found that they had some level of difficulty (rating of 5, 6, or 7) in communicating what Technical Systems Management means to potential employers.

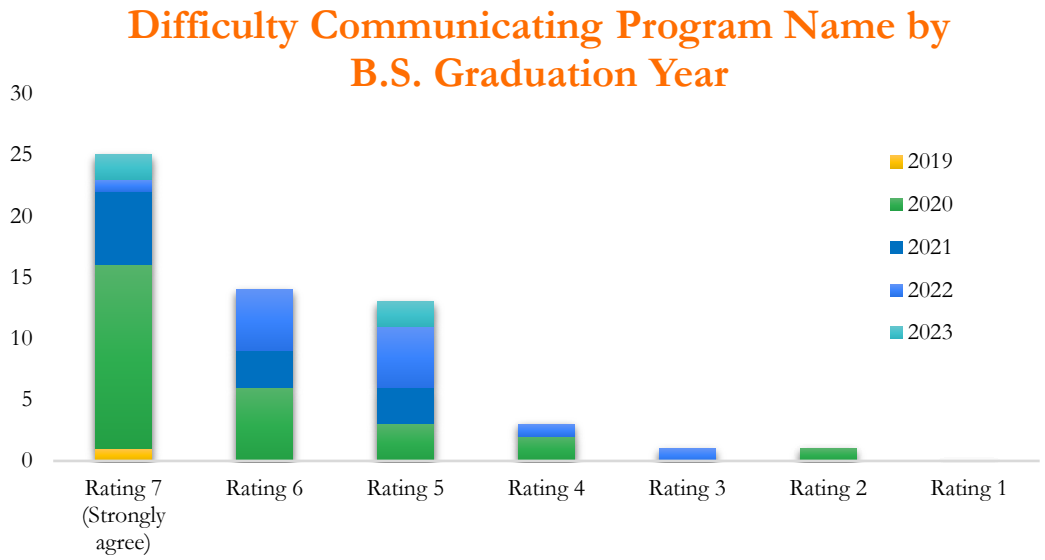

Figure 12. Current student responses regarding the level of difficulty communicating the program name, separated by anticipated graduation year.

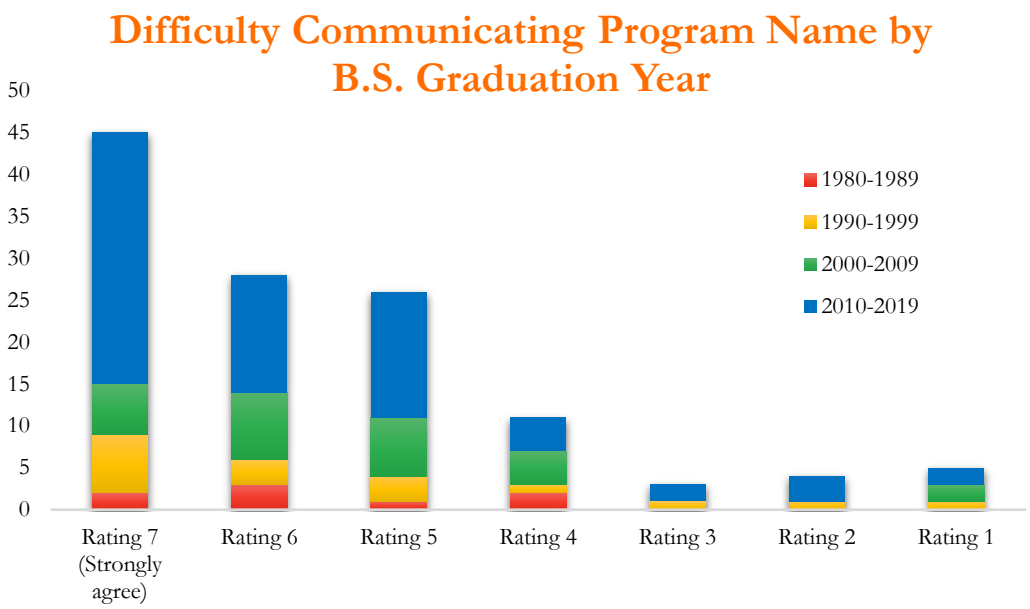

Figure 13. Alumni responses regarding the level of difficulty communicating the program name, separated by graduation year.

Five new program names, in addition to the current Technical Systems Management name, were provided to students, and they were told to evaluate each from like to dislike (5 point scale), in comparison to the current name. The two most popular names for both current TSM students and alumni were (1) Engineering Systems Management and (2) Engineering Technology and Management. In addition, 7 students suggested including agriculture in the program name (Table 2).

Table 2. Current student and alumni ratings for five proposed names and the existing TSM name.

	STUDENTS		ALUMNI	
Proposed Name	**Average Rating**	**% "Like" or "Somewhat Like"**	**Average Rating**	**% "Like" or "Somewhat Like"**
Engineering Systems Management	4.46	91%	3.80	69%
Engineering Technology and Management	4.16	80%	3.71	61%
Applied Engineering Management	3.69	70%	3.45	59%
Applied Technology Management	2.52	30%	2.83	37%
Applied Technical Systems	2.32	23%	2.36	21%
Technical Systems Management	2.74	28%	3.16	37%

Alumni were asked what qualities currently stand out in TSM students, as well as what is lacking. A summary of the qualities are included in Table 3. A majority of alumni indicated that TSM students need more exposure and competence in technical skills that can be quickly transferred to an industry job. Some of the technical skills of note were advanced knowledge of the trades, project management, computer programming and control systems, data analysis, and 3-D drawing. Alumni also indicated a strong desire to have new or additional coursework in the areas of urban agriculture, grain and food processing, production agriculture equipment, precision agriculture, databases, environmental systems, and sustainability.

Table 3. A summary of qualities alumni feel currently stand out with TSM graduates, as well as a summary of qualities that are currently lacking. Qualities with an orange asterisk were highlighted by both alumni and current students.

What currently stands out?		What is currently lacking?	
1. *Problem solvers*	12. *Confidence*	1. *Program Identity**	12. *Grain and food processing courses*
2. *Ag background*	13. *General mechanical understanding*	2. *Advanced knowledge of trades (i.e., welding, wiring, construction)*	13. *Leadership courses*
3. *Effective communicators*	14. *Leadership*	3. *Project management**	14. *Production agriculture equipment courses*
4. *Hands-on abilities*	15. *Extracurricular activities*	4. *Ability to market TSM degree*	15. *Precision agriculture courses**
5. *Common sense and practical knowledge*	16. *Project management*	5. *Specialization, or specific focus area*	16. *Database courses*
6. *Disciplined and strong work ethic*	17. *Independent thinking*	6. *Computer programming and control systems**	17. *Environmental systems (and renewable energy) courses**
7. *Understanding of mechanical systems*	18. *Self motivated*	7. *Data analysis*	18. *Courses focused on sustainability**
8. *Responsible*	19. *Team player*	8. *Tighter connection to industry*	
9. *High-quality education*		9. *CAD/Pro E/Creo/GIS courses**	
10. *Attention to detail*		10. *Business courses**	
11. *Construction skills and experience*		11. *Urban agriculture and greenhouse management courses**	

highlighted by both students and alumni

Since the TSM program is strongly rooted in management, students and alumni were asked if additional project management coursework would be beneficial to students, including adding experiential learning activities that might lead to a project management certificate. Approximately 63% of students (Figure 14) and 81% of alumni (Figure 15) prefer some level of additional project management coursework.

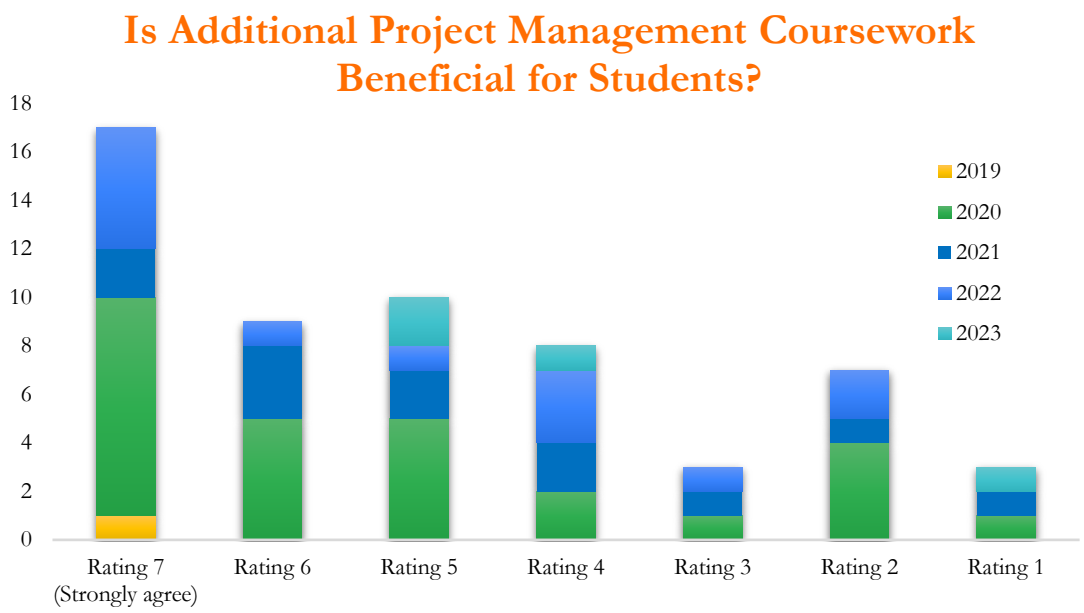

Figure 14. Current student responses regarding whether additional project management coursework would be beneficial for students.

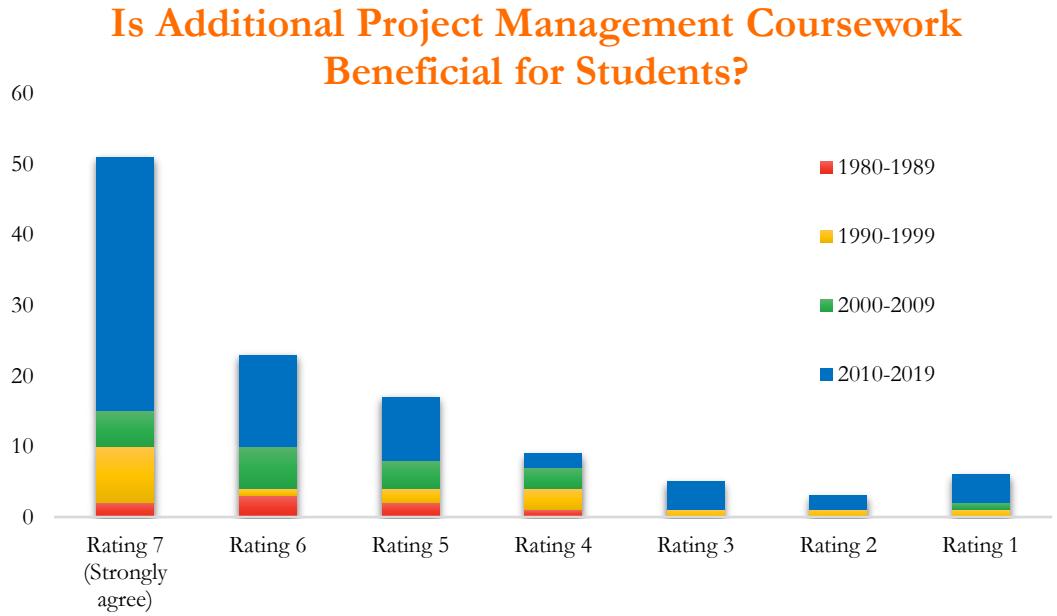

Figure 15. Alumni responses regarding whether additional project management coursework would be beneficial for students.

Participants were also asked what areas TSM program can be improved in, in terms of coursework. Students provided 21 different areas of focus. The top five were expanding class opportunities in environmental studies (5), programming (5), business (4), renewable energy (4), and computer control systems (3). A full list is available in Appendix C.

Where do our alumni work?

An open text question was asked about alumni current job duties and responsibilities. The Task Force carefully reviewed these descriptions and noted keywords. The most common job responsibility was management or supervision, followed closely by development/support and marketing/relations/sales (Figure 16). Automation/technology and Operations/Maintenance also received a high number of responses. Some respondents may have listed multiple keywords and will therefore show up more than once (i.e., if somebody talked about management and agriculture in their description, they would show up in both categories).

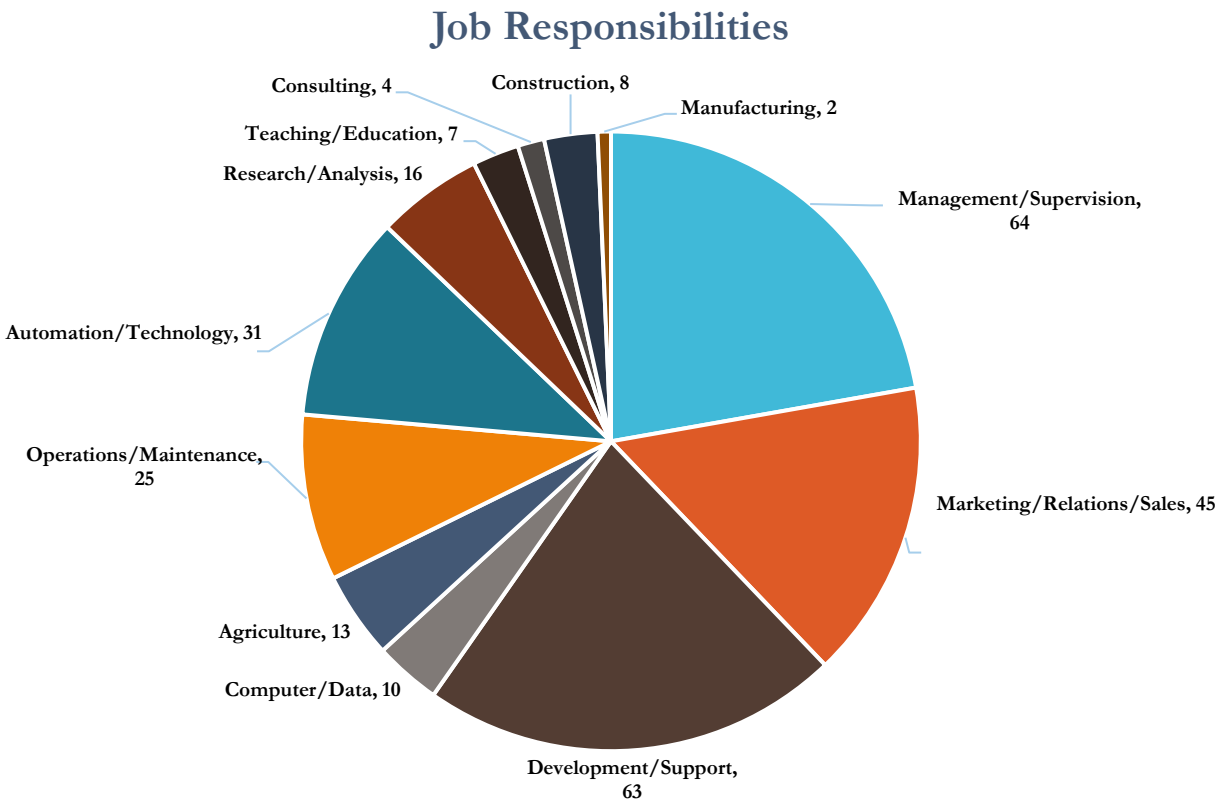

Figure 16. Alumni provided information about their current job responsibilities. The information was then grouped according to the categories provided in the pie chart.

However, this question, alone, does not indicate the job sector of each respondent. For instance, somebody working in management is likely working in either agriculture or construction, but if they did not explicitly indicate agriculture or construction, they would only show up under management.

Other questions in the alumni survey asked about the company name and job description, which were used to further break the information into job disciplines (Figures 17-18). The information indicates that while the greatest number of TSM alums are going into agriculture (and that number has increased each decade), it is no longer a majority (as of 2010-2019). Construction has significantly increased in the past 10 years and education/academia is the third most popular.

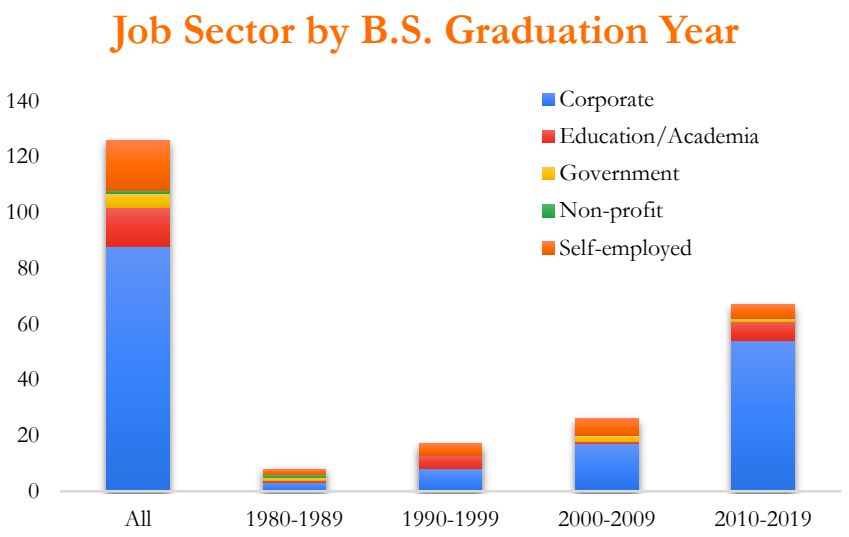

Figure 17. Alumni current job sectors, separated by graduation year (decade).

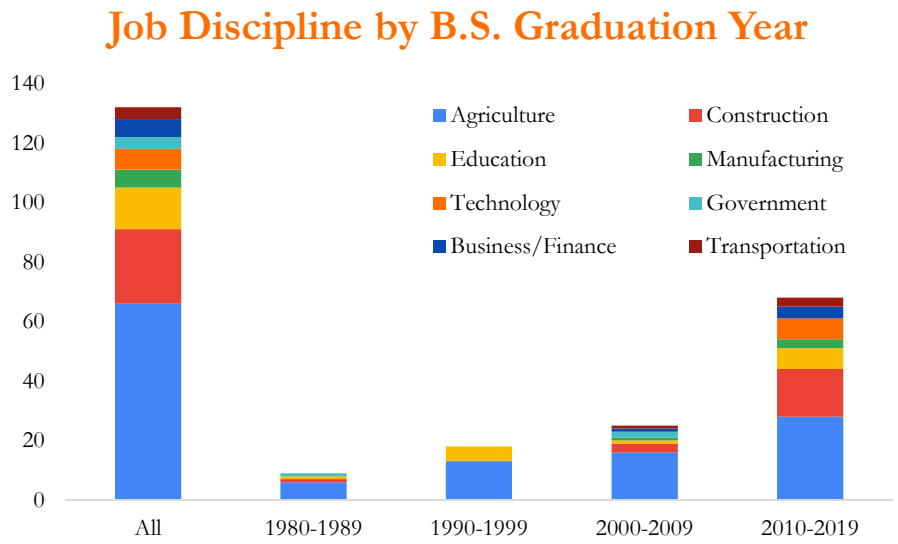

Figure 18. Alumni current job discipline, separated by graduation year (decade). The job discipline was determined by using a combination of the company name, job description and job sector information provided by each respondent.

While these data do not provide enough information to substantiate this claim, we may not be effectively reaching the students who are interested in agriculture. Since many of our TSM students are transfers from other parts of campus, it is plausible that they were already interested in something to do with construction, making the transition to TSM relatively simple. If the students who are interested in agriculture end up going to another state school (e.g., SIUC, ISU, WIE, etc.), we would never have the opportunity to recruit them from an undeclared, or other major, on campus. To highlight the diversity in what the program means to our alumni, respondents were asked to describe the TSM program in one sentence. Selected responses are shown in Table 4.

Table 4. Selected statements from alumni regarding how they would describe the TSM program in one sentence.

TSM in One Sentence

"TSM is one third hands-on learning, one third engineering principles, and one third business."

"Engineers design it and we make it go."

"The degree that can take you into any industry in the world."

"An applied engineering degree focused on understanding and managing complex technical systems."

"A degree attained by those in pursuit of a career that lets them continually challenge themselves."

"It's a program for smart, hands-on technical people who can handle about anything a potential employer can throw at them."

"TSM is a practical, hands-on degree focused on engineering project management."

"TSM connects the engineers to the consumers."

"TSM is a great balance of entry level engineering accompanied by business and marketing."

"Engineering but not engineering."

"Applied engineering (or interdisciplinary) major with a management focus."

"TSM is the management of engineering principles through a hybrid of engineering and business curriculum."

"TSM is a degree that combines technical, organizational and communication skillsets to manage projects and achieve goals."

"Integration of management and problem solving in to everyday applications of agriculture and construction."

"Great opportunity to earn a practical education that is valuable to employers."

"The best decision that anyone interested in engineering can make."

Appendix A: TSM Curriculum (before and after revisions)

Table A.1. The current curriculum is indicated on the left side of the table, while the right side indicates the proposed new curriculum. Items in *italics* are those that are proposed to be added or modified, while those that are proposed being removed have a line through them.

Current Technical Systems Management Curriculum		Hours	Proposed Curriculum		Hours
Composition I and Speech			**Composition I and Speech**		
RHET 105 & CMN 101	Writing and Research and Public Speaking	7	RHET 105 & CMN 101	Writing and Research and Public Speaking	7
or			or		
CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	6	CMN 111 & CMN 112	Oral & Written Comm I and Oral & Written Comm II	6
Advanced Composition		3 or 4	*Advanced Composition*		*3*
			Select from the below list of campus approved courses.		
			AGCM 220	*Communicating Agriculture*	*3*
			BADM 340	*Ethical Dilemmas of Business*	*3*
			BTW 250	*Principles of Business Communication*	*3*
			BTW 261	*Principles of Technical Communication*	*3*
Select from campus approved list.			*ECE 316*	*Ethics and Engineering*	*3*
			ESE 360	*Environmental Writing*	*3*
			LEAD 230	*Leadership Communications*	*3*
			NRES 419	*Environment and Plant Ecosystems*	*3*
			PLPA 200	*Plants, Pathogens, and People*	*3*
			TSM 311	*Humanity in the Food Web*	*3*

Current Technical Systems Management Curriculum		Hours	Proposed Curriculum		Hours
Cultural Studies Select one course from Western, non-Western, and U.S. minority cultures from campus approved lists.			**Cultural Studies** Select one course from Western, non-Western, and U.S. minority cultures from campus approved lists.		
Foreign Language Coursework at or above the third level is required for graduation.			**Foreign Language** Coursework at or above the third level is required for graduation.		
Quantitative Reasoning I			**Quantitative Reasoning I**		
MATH 234 or equivalent	Calculus for Business I	4	MATH 234 or equivalent	Calculus for Business I	4
Quantitative Reasoning II			***Quantitative Reasoning II***		
STAT 100, CPSC 241, ECON 202, ACE 261, PSYC 235, or SOC 280	Statistics	3	***CPSC 241, ECON 202, or ACE 261***	Statistics	***3***
Natural Sciences and Technology			***Natural Sciences and Technology***		
CHEM 102 & 103	General Chemistry I and Lab	4	CHEM 102 & 103	General Chemistry I and Lab	4
PHYS 101	College Physics: Mech & Heat	5	PHYS 101	College Physics: Mech & Heat	5
CHEM 104 & 105 or PHYS 102	General Chemistry II and Lab or College Physics: E&M & Modern	4 or 5	CHEM 104 & 105 or PHYS 102	General Chemistry II and Lab or College Physics: E&M & Modern	4 or 5
Life Sciences	See campus approved list.	3 or 4	~~***Life Sciences***~~		~~***3 or 4***~~
Humanities & the Arts Select from campus approved list.		6	**Humanities & the Arts** Select from campus approved list.		6

Current Technical Systems Management Curriculum		Hours	Proposed Curriculum		Hours
Social and Behavioral Sciences			***Social and Behavioral Sciences***		
ACE 100 or ECON 102	Introduction to Applied Microeconomics or Microeconomic Principles	3 or 4	ACE 100 or ECON 102	Introduction to Applied Microeconomics or Microeconomic Principles	3 or 4
ECON 103	Macroeconomic Principles	3	~~***ECON 103***~~	~~***Macroeconomic Principles***~~	~~***3***~~
Social & Behavioral Sciences. Select from campus approved list.		3 or 4	Social & Behavioral Sciences. Select from campus approved list.		3 or 4
ACES Prescribed			**ACES Prescribed**		
ACES 101	Contemporary Issues in ACES	2	ACES 101	Contemporary Issues in ACES	2
TSM Required			**TSM Required**		
ACE 161 or CS 105	Microcomputer Applications or Intro Computing: Non-Tech	3	***CS 105***	***Intro Computing: Non-Tech***	***3***
ACCY 200 or ACCY 201	Fundamentals of Accounting or Accounting and Accountancy I	3	~~***ACCY 200 or ACCY 201***~~	~~***Fundamentals of Accounting or Accounting and Accountancy I***~~	~~***3***~~
TSM 100	Technical Systems in Agriculture	3	TSM 100	Technical Systems in Agriculture	3
			TSM 339	***Optimization in Engineering Technology and Management***	***3***
			TSM 421 or 422	***Ag Safety: Injury Prevention or Ag Health: Illness Prevention***	***3***
TSM 430	Project Management	2	TSM 430	Project Management	2
			TSM 439	***Capstone Experience***	***4***

Current Technical Systems Management Curriculum		Hours	Proposed Curriculum		Hours
			Introductory Related Courses		*6 to 8*
CPSC 112	Introduction to Crop Sciences	4	*Select 2 courses from the list for your concentration.*		
NRES 201	Introductory Soils	4	~~*CPSC 112*~~	~~*Introduction to Crop Sciences*~~	~~*4*~~
			~~*NRES 201*~~	~~*Introductory Soils*~~	~~*4*~~
			Business elective courses *A total of 6 hours from the list of Business electives (Table A.2) which are the same across concentrations.*		*6*
TSM elective courses A total of 18 hours from the list with a minimum of 6 hours from TSM 295, TSM 396, or at the 400-level.		18	*TSM elective courses* *A total of 20 hours from the list for your concentration with a minimum of 11 hours at the advanced level.*		*20*
Specialization electives Select 15 hours from the list.		15	*Concentration electives* *Select 18 hours from the list for your concentration with a minimum of 12 hours at the advanced level.*		*18*
Advanced Hours		21	*Advanced Hours*		*40*
Total Hours		126	*Total Hours*		*128*

Table A.2 List of courses which fulfill the new Business electives requirement. Students must complete 6 hours from this list.

Business Electives					
Rubric	Course Title	Hours	Rubric	Course Title	Hours
ACCY 200	Fundamentals of Accounting	3	BADM 320	Principles of Marketing	3
ACCY 201	Accounting and Accountancy I	3	BADM 322	Marketing Research	3
ACCY 202	Accountancy II	3	BADM 323	Marketing Communications	3
ACCY 211	Understanding Financial Statements	3	BADM 326	Pricing Strategy	3
ACCY 212	Understanding Accounting for Business Decisions	3	FIN 221	Corporate Finance	3
ACE 210	Environmental Economics	3	FIN 230	Introduction to Insurance	3
ACE 240	Personal Financial Planning	3	LER 290	Introduction to Employment Law	3
ACE 310	Natural Resource Economics	3	LEAD 140	Harnessing Your Interpersonal Intelligence	2
ACE 345	Finan Decision Indiv Sm Bus	3	LEAD 260	Foundations of Leadership	3
ACE 346	Tax Policy and Finan Planning	3	LEAD 340	Leadership Ethics & Society: Addressing Contemporary Challenges	3
ACE 432	Farm Management	3	LEAD 380	Leadership in Groups and Teams	3
ACE 435	Global Agribusiness Management	3	LEAD 440	Interpersonal Intelligence for Professional Success	2
AGCM 270	Ag Sales and Persuasive Communication	3	SE 361	Emotional Intelligence Skills	3
BADM 300	The Legal Environment of Bus	3	SE 400	Engineering Law	3
BADM 310	Mgmt and Organizational Beh	3	TE 230	Design Thinking/Need-Finding	3
BADM 311	Leading Individuals and Teams	3	TE 250	From Idea to Enterprise	2
BADM 312	Designing and Managing Orgs	3	TE 333	Creativity, Innovation, Vision	4
BADM 313	Strategic Human Resource Mgmt	3	TE 360	Lectures in Engineering Entrepreneurship	1
BADM 314	Leading Negotiations	3	TE 450	Startups: Inc, Fund, Contracts, IP	3

Table A.3. Course requirements specific to the proposed Agricultural Production & Processing Concentration.

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
ACES 102	Intro Sustainable Food Systems	3
ANSC 100	Intro to Animal Sciences	3
CPSC 112	Introduction to Crop Sciences	4
HORT 100	Introduction to Horticulture	3
FSHN 101	Science of Food & How it Relates to You	3
LEAD 260	Foundations of Leadership	3
MFST 101	Experiencing Food Systems	3
NRES 201	Introductory Soils	4

TSM electives		
Required		
Rubric	Course Title	Hours
TSM 103	Ag Machinery & Technology	2
Select an additional 18 hours from the below list for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 232	Materials & Construction Sys	3
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 262	Off-Road Equipment Mgmt	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
TSM 381	Grain Drying & Storage Sys	3

Concentration Electives		
Select 18 hours from the lists below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
Two of:		
ACE 222	Agricultural Marketing	3
ACE 231	Food & Agribusiness Mgmt	3
ACE 232	Mgmt of Farm Enterprises	3
ACE 306	Food Law	3
ACE 403	Agricultural Law	3
ACE 427	Commodity Price Analysis	3
ACE 428	Commodity Futures & Options	3
ACE 430	Food Marketing	3
ACE 431	Agri-food Strategic Mgmt	3
ACE 432	Farm Management	3
ACE 435	Global Agribusiness Mgmt	3
Pick four classes from no more than two of these categories:		
ANSC 219	Meat Technology	3
ANSC 223	Animal Nutrition	3
ANSC 301	Food Animal Prod, Mgmt, & Eval	3
ANSC 310	Meat Selection & Grading	3
ANSC 322	Livestock Feeds and Feeding	3
ANSC 400	Dairy Herd Management	3
ANSC 401	Beef Production	3
ANSC 402	Sheep Production	3
ANSC 403	Pork Production	3
ANSC 404	Poultry Science	3
ANSC 424	Pet Food & Feed Manufacturing	3

TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 464	Engine & Tractor Power	3
TSM 467	Precision Agriculture Tech	3
TSM 486	Grain Bioprocessing Coproducts	3
TSM 496	Independent Study	1 to 4

FSHN 232	Science of Food Preparation	3
FSHN 260	Raw Materials for Processing	3
FSHN 345	Strategic Operations Management	3
FSHN 460	Food Processing Engineering	3
FSHN 465	Principles of Food Technology	3
FSHN 469	Package Engineering	3
FSHN 471	Food & industrial Microbiology	3
FSHN 472	Applied Microbiology	3

HORT 205	Local Food Networks	3
HORT 341	Greenhouse Mgmt & Prod	4
HORT 360	Vegetable Crop Production	3
HORT 361	Small Fruit Production	3
HORT 363	Postharvest Handling Hort Crop	2
HORT 434	Designing Urban Agriculture	2
HORT 435	Urban Food Production	3
PLPA 204	Introductory Plant Pathology	3
PLPA 405	Plant Disease Diagnosis & Mgmt	3
PLPA 407	Diseases of Field Crops	3

CPSC 226	Introduction to Weed Science	3
CPSC 270	Applied Entomology	3
CPSC 408	Integrated Pest Management	3
CPSC 412	Principles of Crop Advising	3
CPSC 414	Forage Crops & Pasture Eco	3
CPSC 415	Bioenergy Crops	3
CPSC 418	Crop Growth & Management	3
CPSC 426	Weed Mgt in Agronomic Crops	3
CPSC 473	Mgmt of Field Crop Insects	3
NRES 474	Soil and Water Conservation	3
NRES 488	Soil Fertility & Fertilizers	3
PLPA 204	Introductory Plant Pathology	3
PLPA 405	Plant Disease Diagnosis & Mgmt	3
PLPA 407	Diseases of Field Crops	3

Table A.4. Course requirements specific to the proposed Construction Management Concentration.

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
LEAD 260	Foundations of Leadership	3
UP 101	Introduction to City Planning	3
UP 136	Urban Sustainability	3

TSM electives		
Required		
TSM 232	Materials & Construction Sys	3
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
Select an additional 11 hours from the list below for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 262	Off-Road Equipment Mgmt	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 496	Independent Study	1 to 4

Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
At least two of:		
CEE 320	Construction Engineering	3
CEE 420	Construction Productivity	3
CEE 421	Construction Planning	3
CEE 422	Construction Cost Analysis	3
At least one of:		
BADM 300	Legal Environment of Business	3
BADM 310	Mgmt and Org Behavior	3
BADM 320	Principles of Marketing	3
FIN 221	Corporate Finance	3
FIN 241	Fundamentals of Real Estate	3
At least one of:		
UP 406	Urban Ecology	4
UP 446	Sustainable Planning Seminar	4
UP 466	Energy & the Built Environ	4
UP 475	Real Estate Develop Fund	4
UP 480	Sustainable Design Principles	2
May select from the below list to achieve 18 hours:		
ACE 345	Financial Dec Indiv Sm Bus	3
CEE 424	Sustainable Const Methods	3
ESE 482	Challenges of Sustainability	3

Table A.5. Course requirements specific to the proposed Digital and Precision Agriculture Concentration.

Introductory Related Courses		
Rubric	Course Title	Hours
CPSC 112	Introduction to Crop Sciences	4
NRES 201	Introductory Soils	4

TSM electives		
Required		
Rubric	Course Title	Hours
TSM 103	Ag Machinery & Technology	2
TSM 262	Off-Road Equipment Mgmt	3
TSM 363	Fluid Power Systems	2
TSM 435	Elec Computer Control Sys	3
TSM 464	Engine & Tractor Power	3
TSM 467	Precision Agriculture Tech	3
Select an additional 4 hours from the below list for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 352	Land & Water Management Sys	3
TSM 381	Grain Drying & Storage Sys	3
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 486	Grain Bioprocessing Coproducts	3
TSM 496	Independent Study	1 to 4

Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
One of:		
ACE 210	Environmental Economics	3
ACE 222	Agricultural Marketing	3
ACE 231	Food & Agribusiness Mgmt	3
ACE 232	Mgmt of Farm Enterprises	3
ACE 427	Commodity Price Analysis	3
ACE 428	Commodity Futures and Options	3
ACE 432	Farm Management	3
ACE 435	Global Agribusiness Management	3
One set of:		
GEOG 379	Intro to GIS Systems	4
GEOG 380	GIS II: Spat Prob Solving	4
OR		
GEOG 477	Introduction to Remote Sensing	3
GEOG 478	Techniques of Remote Sensing	3
OR		
NRES 454	GIS in Natural Resource Mgmt	4
NRES 455	Adv GIS for Natural Res Plng	2
One of:		
NRES 438	Soil Nutrient Cycling	3
NRES 471	Pedology	3
NRES 474	Soil & Water Conservation	3
NRES 475	Environmental Microbiology	3
NRES 488	Soil Fertility & Fertilizers	3

One of:		
CPSC 212	Intro to Plant Protection	4
CPSC 226	Introduction to Weed Science	3
CPSC 270	Applied Entomology	3
PLPA 204	Introductory Plant Pathology	3
One of:		
CPSC 408	Integrated Pest Management	3
CPSC 412	Principles of Crop Production	3
CPSC 418	Crop Growth & Mgmt	3
CPSC 426	Weed Mgt in Agronomic Crops	3
CPSC 473	Mgmt of Field Crop Insects	3
PLPA 407	Diseases of Field Crops	3

Table A.6. Course requirements specific to the proposed Energy & the Environment Concentration.

Introductory Related Courses		
Select 2 courses from this list.		
Rubric	Course Title	Hours
ACES 102	Intro Sustainable Food Systems	3
CPSC 112	Introduction to Crop Sciences	4
ENVS 101	Introduction to Energy Sources	3
LEAD 260	Foundations of Leadership	3
NRES 102	Introduction to NRES	3
NRES 201	Introductory Soils	4
UP 136	Urban Sustainability	3
TSM elective courses		
Required		
TSM 352	Land & Water Mgmt	3
TSM 438	Renewable Energy Applications	3
Select an additional 14 hours from the list below for a total of 20 hours with a minimum of 11 hours at the advanced level.		
TSM 130	Basics of CAD	1
TSM 132	Basics of Project Management	1
TSM 232	Materials & Construction Sys	3
TSM 233	Metallurgy & Welding Proc	3
TSM 234	Wiring, Motors, and Control Sys	3
TSM 295	Undergrad Research or Thesis	1 to 4
TSM 371	Residential Housing Design	3
TSM 372	Environ Control & HVAC Sys	3
TSM 396	UG Honors Research or Thesis	1 to 4
TSM 425	Managing Ag Safety Risk	3
TSM 435	Elec Computer Control Sys	3
TSM 496	Independent Study	1 to 4
Concentration Electives		
Select 18 hours from the list below with a minimum of 12 hours at the advanced level.		
Rubric	Course Title	Hours
At least one of:		
ACE 210	Environmental Economics	3
ACE 310	Natural Resource Economics	3
ACE 406	Environmental Law	3
ACE 410	Energy Economics	3
ACE 411	Environment & Development	3

Concentration Electives continued		
At least one of:		
NRES 219	Applied Ecosystem Mgmt	3
NRES 370	Environmental Sustainability	3
NRES 419	Env & Plant Ecosystems	3
NRES 420	Restoration Ecology	4
NRES 425	Natural Resources Law & Policy	3
NRES 426	Renewable Energy Policy	3
NRES 429	Aquatic Ecosystem Conserv	3
NRES 438	Soil Nutrient Cycling	3
NRES 439	Env & Sustainable Development	3
NRES 471	Pedology	3
NRES 474	Soil & Water Conservation	3
NRES 477	Intro to Remote Sensing	3
NRES 488	Soil Fertility & Fertilizers	3
At least one of:		
UP 405	Watershed Ecology & Planning	4
UP 406	Urban Ecology	4
UP 446	Sustainable Planning Seminar	4
UP 466	Energy & the Built Environ	4
UP 480	Sustainable Design Principles	2
May select from the below list to achieve 18 hours.		
AGCM 330	Environmental Communications	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CPSC 215	The Prairie & Bioenergy	3
CPSC 336	Tomorrow's Environment	3
CPSC 415	Bioenergy Crops	3
CPSC 416	Native Plants & Agroecosystems	3
CPSC 431	Plants and Global Change	3
CPSC 437	Principles of Agroecology	3
ESE 465	Transportation & Sustainability	3
ESE 482	Challenges of Sustainability	3
GLBL 201	Energy Systems	2 or 3

Appendix B: TSM Current Student Survey *(double-click to open PDF of survey)*

Technical Systems Management (TSM) Curriculum Revision - Feedback Requested

TSM Students,

The Department of ABE has created a task force to collect feedback from current and former students regarding the Technical Systems Management (TSM) program and propose changes to the TSM curriculum. In an effort to acquire feedback from the people most knowledgeable about the TSM program (current and former students), we're requesting that you take 5-10 minutes to complete the following survey related to the TSM program.

The primary use of this information will be for summary statistics and to provide the TSM Task Force with an idea of how the TSM program is preparing our students for their future careers. We request your response to the survey by February 11, 2020, in order to allow time to process and compile your feedback and continue moving forward with the curriculum revision process.

Thanks in advance!

Paul C. Davidson, Ph.D.
Assistant Professor

By submitting this survey you consent to the department using this information for the improvement of the TSM program.

About You

1. What semester and year do you anticipate graduating from Technical Systems Management? If you're a TSM graduate student, please indicate when you received your B.S. and when you anticipate receiving your M.S.
   Please use last two numbers of the year(s) and separate with a comma, if multiple degrees received.

Appendix C: TSM Alumni Survey *(double-click to open PDF of survey)*

Technical Systems Management (TSM) Curriculum Revision - Feedback Requested

ABE@Illinois alumni and friends,

The Department of ABE has created a task force to collect feedback from current and former students regarding the Technical Systems Management (TSM; previously Agricultural Mechanization) program and propose changes to the TSM curriculum. In an effort to acquire feedback from the people most knowledgeable about the TSM program (current and former students), we're requesting that you take 10-15 minutes to complete the following survey related to the TSM program.

The primary use of this information will be for summary statistics, to provide the TSM Task Force with an idea of where our alumni and friends are working and the types of careers you hold, how the TSM program helped you achieve your career, and things you believe can be changed or improved in the TSM program to better prepare students for their future careers.

We request your response to the survey by March 13, 2020, in order to allow time to process and compile your feedback and continue moving forward with the curriculum revision process.

Thanks in advance!

Dr. Paul C. Davidson, Assistant Professor

By submitting this survey you consent to the department using this information for the improvement of the TSM program.
* Required

About You

1. What is your name (First and Last)?

Appendix D: Courses Recommended by Students

Table D.1. Summary of courses students would like to see offered in the curriculum.

Additional coursework recommendations	# of respondents
Environmental	5
Programming	5
Business	4
Renewable Energy	4
Computer Control Systems	3
Farm Applicators	2
Precision Agriculture	2
Small Engines	2
Sustainability	2
CAD	1
Effective Management Strategies	1
Excel	1
GIS	1
Green Energy Certification	1
Legal Perspective of Engineering	1
Livestock Building Design	1
Railroad Engineering	1
Supply Chain	1
Trades	1
Urban Systems	1
Wastewater	1

From: Miller, Nolan H
To: Lehman, Barbara J; Ritter, Kelly Allison; Moorhouse, Linda; Martensen, Kathy
Subject: Fwd: Technical Systems Management curriculum revision - ECON 103
Date: Thursday, April 1, 2021 7:28:48 PM
Attachments: image002.png
image003.png

Hi all,

Below is the acknowledgment that Econ has been made aware that TSM is eliminating Econ 103 as a required course for the TSM major. I don't know if we want to upload it to CIM-P to be part of the record. I'm sorry I didn't catch this earlier, but as you know it was quite an adventure getting the proposal in shape in time to make the deadline for the Senate.

Best,

Nolan

Sent from my iPad

Begin forwarded message:

> **From:** "Maghirang, Ronaldo G" <ronaldom@illinois.edu>
> **Date:** April 1, 2021 at 6:28:36 PM CDT
> **To:** "Miller, Nolan H" <nmiller@illinois.edu>
> **Cc:** "Boone, Anne M" <aboone@illinois.edu>, "Davidson, Paul Curtis" <pdavidso@illinois.edu>, "Rausch, Kent D" <krausch@illinois.edu>, "Ball, Anna Leigh" <aball@illinois.edu>, "Gregg, Brianna J" <bjgray2@illinois.edu>, "Paulson, Nicholas Robert" <npaulso2@illinois.edu>
> **Subject: FW: Technical Systems Management curriculum revision - ECON 103**
>
> Dear Nolan,
>
> Here is an acknowledgment from Jamie Thomas-Ward from the Department of Economics regarding ECON 103.
>
> If you need additional information, please let me know.
>
> Thanks again for your help!
>
> Ronaldo
>
> ---
>
> **From:** Thomas-Ward, Jamie Michele <thomas99@illinois.edu>
> **Sent:** Thursday, April 1, 2021 6:01 PM
> **To:** Davidson, Paul Curtis <pdavidso@illinois.edu>

Cc: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Subject: RE: Technical Systems Management curriculum revision - ECON 103

Hi Paul,
I'm not sure if Dr. Powers has already responded. We discussed the revision and I can acknowledge that you have made the Economics department aware of the impending change.
Thank you for following up with me.

TAKE CARE,

JAMIE THOMAS-WARD, JD, MS
Associate Director of Undergraduate Studies
University of Illinois at Urbana-Champaign
College of Liberal Arts & Sciences
Department of Economics
214 David Kinley Hall
1407 W Gregory Dr
Urbana, Illinois 61801
217.244.5237 | thomas99@illinois.edu
www.economics.illinois.edu

From: Davidson, Paul Curtis <pdavidso@illinois.edu>
Sent: Thursday, April 1, 2021 3:52 PM
To: Thomas-Ward, Jamie Michele <thomas99@illinois.edu>
Cc: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Subject: FW: Technical Systems Management curriculum revision - ECON 103

Hi Dr. Thomas-Ward,

I recently emailed Dr. Powers about our TSM curriculum revision and removing the requirement for our students to take ECON 103. I have not gotten a response from her and am not sure if she is the appropriate person for this request, but we are looking for an acknowledgement from your department that we have made you aware of this revision (see below). I'm hoping you may be able to provide this acknowledgement, or direct me to the appropriate person. An email acknowledgement is sufficient. If you have any questions or concerns, please let Dr. Maghirang (ABE Department Head) or

me know.

Thanks!

Paul

From: Davidson, Paul Curtis
Sent: Tuesday, March 30, 2021 2:33 PM
To: Powers, Elizabeth T <epowers@illinois.edu>
Cc: Maghirang, Ronaldo G <ronaldom@illinois.edu>
Subject: Technical Systems Management curriculum revision - ECON 103

Hi Dr. Powers,

I hope things are going well on your end. I'm contacting you because you're listed as the Faculty Director of Undergrad Programs for the Department of Economics. The Department of Agricultural and Biological Engineering is currently undergoing and major curriculum revision for our Technical Systems Management (TSM) program. One of our revisions is to remove the requirement for students to take ECON 103. We are removing ECON 103 because our current TSM curriculum requires our students to take three Social and Behavioral Sciences courses, while the campus only requires two courses (six hours). With the curriculum revision, our students will be required to take either ECON 102 or ACE 100, plus an additional Social and Behavioral Sciences course from the campus approved list.

Our curriculum revision was recently approved by the Senate EPC, with the requirement that we notify the Department of Economics of this curriculum change and receive an acknowledgement. Assuming you are the appropriate person to address this, I would appreciate your acknowledgement and any questions or concerns you may have. I'm also copying my department head, Dr. Maghirang, in case you have any questions for him.

Thanks!

Paul

PAUL C. DAVIDSON, PH.D.
Associate Professor

University of Illinois at Urbana-Champaign
College of Agricultural, Consumer and Environmental Sciences
Department of Agricultural and Biological Engineering
360 E AESB
1304 W. Pennsylvania Ave
Urbana, IL 61801

217-300-3755 | pdavidso@illinois.edu
abe.illinois.edu

Celebrating 100 years of excellence, innovation, and engagement