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Engineering & Design, BS

Last approved: 10/08/21 12:49 pm

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Changes proposed by: Heidi Craddock

Systems Engineering & Design, BS

Catalog Pages Using this Program

Proposal Type:

In Workflow

- 1. U Program Review
- 2. 1422 Head
- 3. KP Committee Chair
- 4. KP Dean
- 5. University Librarian
- 6. Provost
- 7. Senate EPC
- 8. Senate
- 9. U Senate Conf
- 10. Board of Trustees
- 11. IBHE
- 12. HLC
- 13. DMI

Approval Path

- 01/05/22 4:25 pm
 Deb Forgacs
 (dforgacs):
 Approved for U
 Program Review
- 2. 01/06/22 7:54 am Jeff Shamma (jshamma): Approved for 1422
 - Approved for 1422 Head
- 3. 02/03/22 11:40 am

Brooke Newell

(bsnewell):

Approved for KP

Committee Chair

4. 02/03/22 11:47 am

Candy Deaville (candyd):

Approved for KP Dean

5. 02/03/22 11:56 am

John Wilkin (jpwilkin): Approved for University Librarian

6. 02/03/22 4:16 pm Kathy Martensen (kmartens): Approved for Provost

History

- 1. Dec 13, 2018 by Deb Forgacs (dforgacs)
- 2. Dec 13, 2018 by Deb Forgacs (dforgacs)
- 3. Apr 23, 2019 by Deb Forgacs (dforgacs)
- 4. Aug 12, 2019 by Deb Forgacs (dforgacs)
- 5. Feb 26, 2020 by Brooke Newell (bsnewell)
- 6. Mar 31, 2020 by Deb Forgacs (dforgacs)
- 7. Apr 14, 2020 by Deb Forgacs (dforgacs)
- 8. Oct 8, 2021 by Brooke Newell (bsnewell)

Major (ex. Special Education)

This proposal is for a:

Revision

Administration Details

Official Program Name Systems Engineering & Design, BS

Sponsor College Grainger College of Engineering

Sponsor Industrial and Enterprise Systems

Department Engineering

Sponsor Name Carolyn Beck

Sponsor Email beck3@illinois.edu

College Contact <u>Jonathan Makela</u> <u>Brooke Newell</u> College Contact

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College Budget

Tessa Hile

Officer

College Budget

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Officer Email

List the role for rollbacks (which role will edit the proposal on questions from EPC, e.g., Dept Head or Initiator) and/or any additional stakeholders. *Purpose: List here who will do the editing work if proposal needs rolled back. And any other stakeholders.*

Brooke Newell, bsnewell@illinois.edu, GCOE; Heidi Craddock, hcraddoc@illinois.edu;

ISE Department

Does this program have inter-departmental administration?

No

Proposal Title

Effective Catalog

Fall 2022

Term

Provide a brief, concise description (not justification) of your proposal.

Removed Liberal Education Electives, updated number of free elective hours, and moved footnotes (when possible) into the Program of Study Table (to improve accessibility).

SE 261 changing from 1 credit hour to 2 credit hours.

Replaced MATH 415 with MATH 257.

Arranged for students to take CS 124 in place of CS 101.

Revised the Secondary Field Options (SFO):

- a. Revised the SFO hours to reflect only undergraduate course hours.
- b. Clarified the requirements for the Automotive Engineering SFO.
- c. Revised the Autonomous Systems and Robotics SFO and the Nondestructive Testing and Evaluation to include ME 270.
- d. Revised Business Systems Integration & Consulting, Engineering Administration, and Engineering Marketing to only allow 1 course below the 300-level.
- e. Revised the Digital Prototyping SFO to include TAM 470.
- f. Removed Internet of Things as an SFO option.
- g. Revised the following SFOs: Autonomous Systems and Robotics, Business Systems Integration & Consulting, Computer Science, Control Systems, and Nondestructive Testing and Evaluation to incorporate more or different CS courses within the requirements and electives.

List here any related proposals/revisions and their keys. *Example: This BS proposal (key 567) is related to the Concentration A proposal (key 145) and the Concentration B proposal (key 203).*

Program Justification

Why are these changes necessary?

After careful analysis of programs of studies, various requirements, and course selection for students in The Grainger College of Engineering, we have decided to provide additional flexibility to all engineering undergraduate students by increasing the number of free elective hours in all engineering programs. While the actual number of credit hours for free electives varies by program, within the college - 8 programs currently provide only 6 credit hours for free electives while an additional 2 have less than 10 - only 4 programs have more than 10 free elective credits. This lack of free elective credit hours limits students' abilities to efficiently pursue minors, certificates, and other educational opportunities and potentially limits those opportunities only to students coming in with significant AP credit or similar.

The additional free elective credit hours added to the program of study are obtained through the removal of The Grainger College of Engineering's Liberal Education requirement, which required engineering students to take an additional 6 credit hours above-and-beyond the campus' General Education requirement from the Humanities & the Arts, Social & Behavioral Sciences, or a college-curated list of courses. Over time, the Liberal Education requirement has been revised within the college, successively relaxing restrictions and providing additional choice to students (i.e., removal of a sequencing requirement in 1999; addition of the college-curated course list in 2010). Simultaneously, the college-curated list of courses continued to expand to include courses from approximately 120 rubrics across campus (including within The Grainger College of Engineering), gradually removing constraints to allow greater flexibility of choice for students to take advantage of the many opportunities the campus has to offer. Still, in its current form, this additional college-level requirement constrains student choice and interferes with their ability to efficiently pursue minors, certificates, and other educational opportunities across campus unless those opportunities intersect with coursework in the Liberal Education requirement.

Simultaneously, the required engineering orientation course, ENG 100, will be granted 1-credit hour. Previously, this course was a 0-credit course. The allocation of 1-credit appropriately recognizes the time and commitment expected of all students who take this course. In the 1-credit version of ENG 100, content will be added to improve teamwork and interpersonal skills, including topics related to diversity, equity, and inclusion (DEI). The engineering accrediting agency, ABET, will soon be adding DEI requirements for accredited programs. This component of ENG 100 is therefore beneficial to all Grainger Engineering programs and students by providing a common framework on which additional DEI topics can build throughout a student's program of study.

The SE 261 course was originally approved for 1 or 2 credit hours. This course was originally taught as a 1 credit hour course for the Systems Engineering and Design (SED) students (due to credit hour constraints in the curriculum) and a 2 credit hour course for the Industrial Engineering (IE) students. The IE students received more engineering economy content as is expected by industry partners. Many SED students chose to take the 2 hour version of the course to receive all the material. With the removal of the liberal education requirement for the Grainger College of Engineering, we used 1 credit hour freed up to require SED students to also take the 2 credit hour version of SE 261. As such, we are now removing the 1 credit hour option for SE 261.

The added credit hour of SE 261 for Systems Engineering and Design students would allow for a more in-depth study of engineering economics topics, including the addition of case studies, giving the students in the systems engineering and design curriculum practical experience in implementing the theory behind engineering economics. With the added hour, emphasis will be given to a more in-depth use of spreadsheet packages such as MS Excel, and other tools of professional engineering practice.

Replaced MATH 415 with MATH 257 due to the Math Department no longer offering MATH 415 as of Fall 2022.

Allowed for students to take CS 124 in place of CS 101 for students that will be pursuing the CS Minor. As the CS Department changed their curricular requirements and prerequisites, it was necessary for ISE to reflect those changes the SED curriculum.

Revised the Secondary Field Options:

- a. Revised the SFO hours to reflect only undergraduate course hours rather than listing both undergraduate and graduate hours.
- b. Clarified the requirements for the Automotive Engineering SFO. The list of courses were previously listed twice.
- c. Revised the Autonomous Systems and Robotics SFO and the Nondestructive Testing and Evaluation to include ME 270. The addition of this course gives students the option and a more in-depth study of design process as it applies in these concentrations.
- d. Revised Business Systems Integration & Consulting, Engineering Administration, and Engineering Marketing because these courses are meant to be taken at the junior or senior level.
- e. Revised the Digital Prototyping SFO to include TAM 470. The addition of this course allows the students incorporate a deeper knowledge of mechanics into their design-focused concentration.
- f. Removed Internet of Things as an SFO option. This SFO overlapped with other SFO options and few students were selecting this SFO.
- g. Revised the following SFOs: Autonomous Systems and Robotics, Business Systems Integration & Consulting, Computer Science, Control Systems, and Nondestructive Testing and Evaluation to incorporate more or different CS courses within the requirements and electives. Making these changes was to increase the opportunities for students to pursue appropriate courses in computer science subjects to complement their curricular requirements.

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?

Required courses

CS 173 - Discrete Structures

CS 225 - Data Structures

MATH 257 - Linear Algebra w Computat Appl

ME 270 - Design for Manufacturability

TAM 470 - Computational Mechanics

Explain how the inclusion or removal of the courses/subjects listed above impacts the offering departments.

The current Liberal Education requirement is satisfied by a student completing 6 credit hours beyond those required by campus' General Education requirement from Humanities & the Arts, Social & Behavioral Sciences, or a college-curated list of courses (containing courses from over 120 rubrics across campus). An analysis of student course selection in the Liberal Education category indicates 25% of courses are taken in the College of Liberal Arts & Sciences, 20% from the College of Applied Health Sciences, 18% from Gies College of Business, 11% from the College of Agricultural, Consumer and Environmental Sciences, 11% from the College of Fine and Applied Arts, and 9% from The Grainger College of Engineering. Less than 2% of credits are taken in each of the remaining colleges and units across campus.

Although it might stand to reason that removal of the Liberal Education requirement would reduce the amount of credits Grainger Engineering students take outside of their home college, the data do not support that assertion. Specifically, despite the current Liberal Education requirement being set at 6 credit hours, the average number of credit hours completed from the Liberal Education course list upon graduation is 11.9. Through discussions with departmental and college advisors as well as students, students are making course selections not because the course satisfies the Liberal Education requirement, but because they are interested in the coursework offered outside of their home college, are pursing minors and other educational opportunities, and are looking to balance course loads between technical and non-technical courses. Taken together, the data and evidence from advisors and students suggest that students will continue to take the types of courses represented on the Liberal Education course list, even if not specifically required to do so.

A subset of SED students will pursue the CS coursework and a CS minor in addition to their degree program. This will not be all students. The ISE Department has the approval from the CS Department for this.

All SED students will be required to complete MATH 257.

The addition of ME and TAM courses to several Secondary Field Options allows more in-

depth student in those areas. These courses are approved by the Mechanical Science and Engineering Department.

Attach letters of <u>ISE letter Math 257.pdf</u> support or <u>Support Letter ISE.pdf</u>

from other <u>Letters of Acknowledgement - Liberal Education Electives.pdf</u>

departments.

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).

Graduates should have:

- 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- <u>2.</u> an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- 3. an ability to communicate effectively with a range of audiences.
- 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- <u>5.</u> an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- <u>6.</u> an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. NA

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

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 Systems Engineering and Design BS Side by Side.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 - Overview Tab

Text for Overview tab on the Catalog Page. This is not official content, it is used to help build the new catalog page for the program. Can be edited in the catalog by the college or department.

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Technical GPA: 2.0

TGPA is required for Engineering and Technical Elective courses and MATH 257. MATH 415. See **Technical GPA** to clarify requirements.

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 (ECON 102 or ECON 103). ECON 103). SE 494 and SE 495 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Specific Advanced Composition courses required for this degree are listedbelow. Orientation and Professional Development

Course List

CodeTitleHoursENG 100 Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)1SE 100 Introduction to ISE1SE 290 ISE Undergraduate Seminar0Total Hours2

Foundational Mathematics and Science		
Course List		
Code Title		Hours
CHEM 102 General Chemistry I		3
CHEM 103 General Chemistry Lab I		1
MATH 221Calculus I (MATH 220 is appropriate for students with no	b background in calculus. 4 of 5	4
credit hours count towards degree.)	3	
MATH 231 Calculus II		3
MATH 241 Calculus III		4
MATH 257 Linear Algebra with Computational Applications		
MATH 285 Intro Differential Equations		<u>3</u> 3
MATH 415 Applied Linear Algebra		3
PHYS 211 University Physics: Mechanics		4
PHYS 212 University Physics: Elec & Mag		4
PHYS 213 Univ Physics: Thermal Physics		2
Total Hours		31
1000		31
Systems Engineering and Design Technica	il Core	
Course List		
Code Title	Hours	
CS 101 Intro Computing: Engrg & Sci (CS 124 may be substituted	I.)3	
ECE 110 Introduction to Electronics	3	
ECE 211 Analog Circuits & Systems	2	
IE 300 Analysis of Data	3	
IE 310 Deterministic Models in Optimization	3	
SE 101 Engineering Graphics & Design	3	
SE 261 Business Side of Engineering	2	
SE 310 Design of Structures and Mechanisms	3	
SE 311 Engineering Design Analysis	3	
SE 312 Instrumentation and Test Lab	1	
SE 320 Control Systems	4	
SE 424 State Space Design for Control	3	
SE 494 Senior Engineering Project I	3	
SE 495 Senior Engineering Project II	2	
TAM 211Statics	3	
TAM 212 Introductory Dynamics	3	
TAM 251 Introductory Solid Mechanics	3	
TAM 335 Introductory Fluid Mechanics	4	
Total Hours	51	
	31	
Secondary Field Option Electives		
Course List		
Code Title		Hours
Secondary field option electives selected from departmentally appr	oved list below or by petition to	12
the department. 4		
Students must select one Secondary Field Option from the list below	ow or they may petition to create	<u>12</u>
their own Secondary Field Option (SFO). Courses from these lists r	may only be used to fulfill one	
<u>curricular requirement.</u>		
Automotive Engineering		

Code	Title	Hours		
Dynamics/Controls Focus - complete at least 1 course from this list:				
ECE 470/AE 482/ME 445	Introduction to Robotics	4		
ECE 486	Control Systems	4		
ME 460	Industrial Control Systems	4		
<u>TAM 412</u>	Intermediate Dynamics	4		
<u>TAM 416</u>	Introduction to Nonlinear Dynamics and Vibrations	4		
Automotive Power Sys	stems Focus - complete at least 1 course from this list:			
ECE 431	Electric Machinery	4		
ECE 464	Power Electronics	3		
<u>ME 400</u>	Energy Conversion Systems	3		
ME 403	Internal Combustion Engines	3		
Other Elective Options	s - complete remaining courses from this list:			
<u>CS 173</u>	Discrete Structures	3		
<u>CS 440</u>	Artificial Intelligence	3		
<u>CS 446</u>	Machine Learning	3		
ME 320	Heat Transfer	4		
ME 360	Signal Processing	3.5		
<u>ME 461</u>	Computer Cntrl of Mech Systems	3		
<u>SE 400</u>	Engineering Law	3		
SE 422	Robot Dynamics and Control	4		
<u>SE 497</u>	Independent Study (May be taken for up to 3 credit hours, based on	1-4		
	automotive Engineering project approved by SFO faculty mentor)			
Autonomous Systems	and Robotics			
<u>CS 173</u>	Discrete Structures	3		
CS 225	Data Structures	4		
CS 233	Computer Architecture	4		
CS 241	Course CS 241 Not Found			
ECE 120	Introduction to Computing	4		
<u>CS 225</u>	Data Structures	4		
<u>CS 440</u>	Artificial Intelligence	3		
<u>CS 446</u>	Machine Learning	3		
ECE 470	Introduction to Robotics	4		
ECE 486	Control Systems	4		
ECE 490	Introduction to Optimization	3		
ME 351	Course ME 351 Not Found			
ME 270	Design for Manufacturability	3		
ME 461	Computer Cntrl of Mech Systems	3		
<u>SE 400</u>	Engineering Law	3		
<u>SE 411</u>	Reliability Engineering	3		
SE 420	Digital Control Systems	4		
<u>SE 422</u>	Robot Dynamics and Control	<u>4</u> 3		
<u>SE 423</u>	Mechatronics	3		
Bioengineering				
BIOE 120	Introduction to Bioengineering	1		
BIOE/ECE 414	Biomedical Instrumentation	3		
BIOE/ECE 415	Biomedical Instrumentation Lab	2		
BIOE 498	Special Topics	3		

Code	Title	Hours
BIOP 401	Introduction to Biophysics	3
<u>CHEM 232</u>	Elementary Organic Chemistry I	3 or
	, •	4
CHEM 233	Elementary Organic Chem Lab I	2
<u>IE 340/PSYC 358</u>	Human Factors	4
KIN 355	Biomechanics of Human Movement	3
MCB 150	Molec & Cellular Basis of Life (recommended only if a prerequisite to	4
	another listed course)	
MCB 250	Molecular Genetics (recommended only if a prerequisite to another listed	3
	course)	
MCB 251	Exp Techniqs in Molecular Biol (recommended only if a prerequisite to	2
	another listed course)	
MCB 401	Cellular Physiology	3
MCB 402	Sys & Integrative Physiology	3
MCB 403	Cell & Membrane Physiology Lab	2
MCB 404	Sys & Integrative Physiol Lab	2
MCB 450	Introductory Biochemistry	3
SE 400	Engineering Law	3
Business Systems Int	egration & Consulting	
Core Requirement:		
SE 400	Engineering Law	3
Group I (At least one co	urse):	
Group I Requirement	- complete at least 1 course from this list:	
BADM 352	Database Design and Management	3
BADM 353	Info Sys Analysis and Design	3
<u>IE 405</u>	Computing for ISE	<u>3</u>
Group II - select rema	aining courses from this list. Of these courses, only 1 selected may be at the	<u>.</u>
100 or 200 level.		
ACCY 200	Fundamentals of Accounting (A basic accounting course is highly	3
	recommended)	
ACCY 201	Accounting and Accountancy I (A basic accounting course is highly	3
	recommended)	
ACCY 202	Accounting and Accountancy II (A basic accounting course is highly	3
	recommended)	
ADV 150	Introduction to Advertising	3
BADM 310	Mgmt and Organizational Beh	3
BADM 311	Leading Individuals and Teams	3
BADM 312	Designing and Managing Orgs	3
BADM 320	Principles of Marketing	3
BADM 445	Small Business Consulting	4
BADM 446	Entrepreneurship: New Venture Creation	4
BTW 250	Principles Bus Comm	3
BTW 261	Principles Tech Comm	3
FIN 221	Corporate Finance	3
<u>FIN 300</u>	Financial Markets	3
<u>IE 420</u>	Financial Engineering	3
Group II (At least one co	ourse)	

Code	Title	Hours
Civil Engineering Stru	ctures	
CEE 380	Geotechnical Engineering	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 462	Steel Structures II	3
CEE 463	Reinforced Concrete II	3
CEE 465	Design of Structural Systems	3
SE 400	Engineering Law	3
Computer Science	gg	
Core Courses:		
<u>CS 173</u>	Discrete Structures	<u>3</u>
CS 225	Data Structures	<u>≅</u> 4
All other 200-, 300-, 400		7
	pplete 2 of the following courses:	
<u>CS 410</u>	Text Information Systems	3
CS 410 CS 411	Database Systems	3 or
<u>C5 411</u>	Database Systems	3 0i 4
CC 425	Distributed Customs	
<u>CS 425</u>	Distributed Systems	3 or
66 430	Carrana de la carra Malacada	4
<u>CS 438</u>	Communication Networks	3 or
All alls a 200 200 400	level CC assumes	4
All other 200-,300-,400-		
	-level CS courses excluding <u>CS 210</u> , <u>CS 211</u> , <u>CS 397</u> , <u>CS 398</u> , and CS	
seminar and senior proj		_
<u>SE 400</u>	Engineering Law	3
Construction		
<u>CEE 300</u>	Behavior of Materials (Credit will not be given for CEE 300, ME 330 and	4
	MSE 280; select only 1 of these courses.)	_
<u>CEE 310</u>	Transportation Engineering	3
<u>CEE 320</u>	Construction Engineering	3
<u>CEE 380</u>	Geotechnical Engineering	3
CEE 420	Construction Productivity	3
<u>CEE 421</u>	Construction Planning	3
<u>CEE 422</u>	Construction Cost Analysis	3
<u>CEE 460</u>	Steel Structures I	3
<u>CEE 461</u>	Reinforced Concrete I	3
<u>CEE 465</u>	Design of Structural Systems	3
ME 330	Engineering Materials (Credit will not be given for CEE 300, ME 330 and	4
	MSE 280; select only 1 of these courses.)	
<u>SE 400</u>	Engineering Law	3
Control Systems		
CS 225	Data Structures	4
ECE 470/AE 482/ME 445	Introduction to Robotics	4
ECE 486	Control Systems	4
<u>CS 173</u>	Discrete Structures	<u>3</u>
	Introduction to Robotics	4
ECE 486	Control Systems	4
	control of of occinio	

Code	Title	Hours
ECE 490	Introduction to Optimization	3
<u>IE 410</u>	Advanced Topics in Stochastic Processes & Applications	3
<u>MATH 444</u>	Elementary Real Analysis	3
MATH 461	Probability Theory	3
<u>MATH 464</u>	Statistics and Probability II	3
ME 351	Course ME 351 Not Found	
ME 360	Signal Processing	3.5
ME 460	Industrial Control Systems	4
ME 460	Industrial Control Systems	4
ME 461	Computer Cntrl of Mech Systems	3
<u>SE 400</u>	Engineering Law	3
<u>SE 420</u>	<u>Digital Control Systems</u>	<u>4</u>
<u>SE 422</u>	Robot Dynamics and Control	<u>4</u>
SE 423	Mechatronics	3
Digital Prototyping		
ME 270	<u>Design for Manufacturability</u>	<u>3</u>
ME 451	Computer-Aided Mfg Systems	3
ME 452	Num Control of Mfg Processes	3
ME 471/AE 420/CSE 451	Finite Element Analysis	3
<u>SE 400</u>	Engineering Law	3
<u>SE 402</u>	Comp-Aided Product Realization	3
<u>SE 410</u>	Component Design (This course cannot count as an SFO elective and an	3
	SED Design Elective.)	
<u>SE 413</u>	Engineering Design Optimization (This course cannot count as an SFO	3
	elective and an SED Design Elective.)	
<u>SE 423</u>	Mechatronics (This course cannot count as an SFO elective and an SED	3
	Design Elective.)	
TAM 302	Engineering Design Principles	3
TAM 470	Computational Mechanics	<u>3</u>
Engineering Administra	ation	_
Core Requirement:		
<u>SE 400</u>	Engineering Law	3
Elective Options:		
Elective Options - sele	ct remaining courses from this list. Of these courses, only 1 selected may b	<u>e</u>
at the 100 or 200 leve	<u>l.</u>	
ACCY 200	Fundamentals of Accounting	3
ACCY 201	Accounting and Accountancy I	3
ACCY 202	Accounting and Accountancy II	3
ADV 150	Introduction to Advertising	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 375	Operations Strategy	3
BADM 380	International Business	3
BADM 381	Multinational Management	3
BTW 250	Principles Bus Comm	3

Code	Title	Hours
BTW 261	Principles Tech Comm	3
ECON 302	Inter Microeconomic Theory	3
FIN 221	Corporate Finance	3
GEOG 205	Course GEOG 205 Not Found	_
IE 330	Industrial Quality Control	3
IE 340/PSYC 358	Human Factors	4
IE 361	Production Planning & Control	3
IE 420	Financial Engineering	3
<u>IE 445</u>	Human Performance and Cognition in Context	3
PS 321	Principles of Public Policy	3
SE 411	Reliability Engineering	3
Engineering Marketing		
Core Requirement:		
SE 400	Engineering Law	3
Elective Options:		
Elective Options - sele	ect remaining courses from this list. Of these courses, only 1 selected may be	<u>se</u>
at the 100 or 200 leve	el.	
ACCY 200	Fundamentals of Accounting	3
ACCY 201	Accounting and Accountancy I	3
ACCY 202	Accounting and Accountancy II	3
ADV 150	Introduction to Advertising	3
BADM 310	Mgmt and Organizational Beh	3
BADM 320	Principles of Marketing	3
BADM 322	Marketing Research	3
BADM 323	Marketing Communications	3
BADM 325	Consumer Behavior	3
BADM 327	Marketing to Business and Govt	3
BADM 380	International Business	3
BADM 382	International Marketing	3
BADM 420	Advanced Marketing Management	3
BTW 250	Principles Bus Comm	3
BTW 261	Principles Tech Comm	3
PSYC 245	Industrial Org Psych	3
Environmental Quality	<i>'</i>	
ACE 310	Natural Resource Economics	3
<u>CEE 330</u>	Environmental Engineering	3
<u>CEE 437</u>	Water Quality Engineering	3
<u>CEE 440</u>	Fate Cleanup Environ Pollutant	4
<u>CEE 442</u>	Environmental Engineering Principles, Physical	4
<u>CEE 443</u>	Env Eng Principles, Chemical	4
<u>CEE 444</u>	Env Eng Principles, Biological	4
CEE 445	Course CEE 445 Not Found	
<u>CEE 446</u>	Air Quality Engineering	4
ENVS 336	Tomorrow's Environment	3
ENVS 431	Environ Toxicology & Health	3
<u>IB 105</u>	Environmental Biology	3
NPRE 241	Intro to Radiation Protection	2

Code	Title	Hours
NRES 419	Env and Plant Ecosystems	3
NRES 472	Environmental Psychology	4
<u>SE 400</u>	Engineering Law	3
Internet of Things		
Core Requirements:		
ECE 385	Digital Systems Laboratory	3
Manufacturing Engine	ering	
<u>IE 370</u>	Stochastic Processes and Applications	<u>3</u>
ME 330	Engineering Materials (Credit will not be given for CEE 300, ME 330 and	4
	MSE 280; select only 1 of these courses.)	
SE 400	Engineering Law	3
SE 423	Mechatronics	3
Other courses from Digita	al Protoyping and Control Systems SFO	
SE 402	Comp-Aided Product Realization	<u>3</u>
SE 420	Digital Control Systems	
SE 422	Robot Dynamics and Control	<u>4</u> <u>4</u> 3
SE 423	Mechatronics	3
Elective Options:		
CS 125	Introduction to Computer Science	4
Any courses from Digital	Prototyping and Control Systems Secondary Field Option.	
Nondestructive Testing	g and Evaluation	
Core Requirement:		
<u>SE 412</u>	Nondestructive Evaluation	3
Elective Options:		
Elective Options - com	plete remaining courses from this list:	
<u>CEE 300</u>	Behavior of Materials (Credit will not be given for <u>CEE 300</u> , <u>ME 330</u> and	4
	MSE 280; select only 1 of these courses.)	
CS 225	Data Structures	4
<u>CS 173</u>	<u>Discrete Structures</u>	<u>3</u>
<u>CS 225</u>	Data Structures	4
<u>CS 440</u>	Artificial Intelligence	3
<u>CS 446</u>	Machine Learning	3
ECE 470	Introduction to Robotics	4
ECE 473	Fund of Engrg Acoustics	3
ME 351	Course ME 351 Not Found	
<u>ME 270</u>	<u>Design for Manufacturability</u>	<u>3</u>
<u>ME 471</u>	Finite Element Analysis	3
<u>SE 400</u>	Engineering Law	3
TAM 412	Intermediate Dynamics	4
TAM 416	Introduction to Nonlinear Dynamics and Vibrations	4
	ms (select at least one course):	
ME 400	Energy Conversion Systems	3 or
		4
ME 403	Internal Combustion Engines	3 or
EOE 424		4
ECE 431	Electric Machinery	4
ECE 464	Power Electronics	3

Math	Code	Title	Hours
IE 360 Facilities Planning and Design IE 361 Production Planning & Control IE 370 Stochastic Processes and Applications IE 400 Design & Anlys of Experiments IE 410 Advanced Topics in Stochastic Processes & Applications IE 411 Optimization of Large Systems IE 411 Optimization of Large Systems IE 411 Optimization of Large Systems IMATH 461 Probability Theory IMATH 461 Statistics and Probability II IME 451 Computer-Aided Mfg Systems IS 400 Engineering Law ISE 401 Reliability Engineering Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I IME 451 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 451 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 451 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 451 Biomedical Instrumentation IME 452 Biomedical Instrumentation IME 454 Biomedical Instrumentation IME 455 Biomedical Instrumentation IME 454 Biomedical Instrumentation IME 455 Biomedical Instrumentation IME 457 Biomedical Instrumentation IME 458 Benevity Instrumentation IME 459 Biomedical Instrumentation IME 471 Finite Element Analysis IME 471 Finite Element Ana	<u>TAM 456</u>	Experimental Stress Analysis	3
IE 361	Operations Research		
IE 370 Stochastic Processes and Applications IE 400 Design & Anlys of Experiments 3 IE 411 Advanced Topics in Stochastic Processes & Applications 3 IE 411 Optimization of Large Systems 3 IE 411 Optimization of Large Systems 3 IMATH 461 Probability Theory 3 IMATH 464 Statistics and Probability II 3 or 4 IME 451 Computer-Aided Mfg Systems 3 ISE 400 Engineering Law 3 ISE 411 Reliability Engineering 4 ISE 411 Biomedical Instrumentation 4 ISE 411 Biomedical Instrumentation 4 ISE 411 Reliability Engineering 4 ISE 400 Engineering Law 4 INER 471 Finite Element Analysis 3 INE 471 Finite Element Analysis 4 ISE 400 Engineering Law 4 INSE 280; select only 1 of these courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) ISE 400 Engineering Law 4 INSE 280; select only 1 of these Courses.) IS	<u>IE 360</u>	Facilities Planning and Design	3
MATH 464 Statistics and Probability II 4 ME 451 Computer-Aided Mfg Systems 3 SE 400 Engineering Law 3 SE 411 Reliability Engineering 3 Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation 4 ECE 415 Biomedical Instrumentation 2 ECE 415 Biomedical Instrumentation 4 MCB 150 Molec & Cellular Basis of Life 4 MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 REHB 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and 4 MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 445 Continuum Mechanics 4 TAM 445 Intermediate Fluid Mechanics 4 TAM 445 Experimental Stress Analysis 3 TAM 445 Experimental Stress Analysis 3 TECHORAL TITLE Hours Code Title Posigin electives below: 3 SE 420 Digital Control Systems 4 SE 420 Digital Control Systems 4	<u>IE 361</u>	Production Planning & Control	3
MATH 464 Statistics and Probability II ME 451 Computer-Aided Mfg Systems SE 400 Engineering Law SE 411 Reliability Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation SE 415 Biomedical Instrumentation Lab MCB 150 MOlec & Cellular Basis of Life MCB 250 Molecular Genetics MCB 251 Exp Techniqs in Molecular Biol REHB 401 Introduction to Rehabilitation REHB 402 Medical Aspects of Disability SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law TAM 412 Intermediate Dynamics IAM 412 Intermediate Dynamics IAM 424 Mechanics of Structural Metals TAM 424 Mechanics of Composites IAM 435 Intermediate Fluid Mechanics IAM 445 Continuum Mechanics IAM 445 Continuum Mechanics Continuum Mechanics Continuum Mechanics Coruse List Code Title Design elective selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems 4 Coruse List Code Title Design electives selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems	<u>IE 370</u>	Stochastic Processes and Applications	<u>3</u>
MATH 464 Statistics and Probability II ME 451 Computer-Aided Mfg Systems SE 400 Engineering Law SE 411 Reliability Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation SE 415 Biomedical Instrumentation Lab MCB 150 MOlec & Cellular Basis of Life MCB 250 Molecular Genetics MCB 251 Exp Techniqs in Molecular Biol REHB 401 Introduction to Rehabilitation REHB 402 Medical Aspects of Disability SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law TAM 412 Intermediate Dynamics IAM 412 Intermediate Dynamics IAM 424 Mechanics of Structural Metals TAM 424 Mechanics of Composites IAM 435 Intermediate Fluid Mechanics IAM 445 Continuum Mechanics IAM 445 Continuum Mechanics Continuum Mechanics Continuum Mechanics Coruse List Code Title Design elective selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems 4 Coruse List Code Title Design electives selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems	<u>IE 400</u>	Design & Anlys of Experiments	<u>3</u>
MATH 464 Statistics and Probability II 4 ME 451 Computer-Aided Mfg Systems 3 SE 400 Engineering Law 3 SE 411 Reliability Engineering 3 Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation 4 ECE 415 Biomedical Instrumentation 2 ECE 415 Biomedical Instrumentation 4 MCB 150 Molec & Cellular Basis of Life 4 MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 REHB 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and 4 MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 445 Continuum Mechanics 4 TAM 445 Intermediate Fluid Mechanics 4 TAM 445 Experimental Stress Analysis 3 TAM 445 Experimental Stress Analysis 3 TECHORAL TITLE Hours Code Title Posigin electives below: 3 SE 420 Digital Control Systems 4 SE 420 Digital Control Systems 4	<u>IE 410</u>	Advanced Topics in Stochastic Processes & Applications	<u>3</u>
MATH 464 Statistics and Probability II ME 451 Computer-Aided Mfg Systems SE 400 Engineering Law SE 411 Reliability Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation SE 415 Biomedical Instrumentation Lab MCB 150 MOlec & Cellular Basis of Life MCB 250 Molecular Genetics MCB 251 Exp Techniqs in Molecular Biol REHB 401 Introduction to Rehabilitation REHB 402 Medical Aspects of Disability SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law TAM 412 Intermediate Dynamics IAM 412 Intermediate Dynamics IAM 424 Mechanics of Structural Metals TAM 424 Mechanics of Composites IAM 435 Intermediate Fluid Mechanics IAM 445 Continuum Mechanics IAM 445 Continuum Mechanics Continuum Mechanics Continuum Mechanics Coruse List Code Title Design elective selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems 4 Coruse List Code Title Design electives selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems	<u>IE 411</u>	Optimization of Large Systems	<u>3</u>
ME 451 Computer-Aided Mfg Systems 3 SE 400 Engineering Law 3 SE 411 Reliability Engineering 3 Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation 3 ECE 415 Biomedical Instrumentation 2 MCB 150 Molec & Cellular Basis of Life 4 MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 TAM 412 Intermediate Dynamics 4 ITAM 412 Intermediate Dynamics 4 ITAM 424 Mechanics of Composites 3 ITAM 415 Intermediate Dynamics 4 ITAM 425 Continuum Mechanics 4 ITAM 445 Continuum Mechanics 4 ITAM 456 Experimental Stress Analysis 3 Technical Electives COde Title Design elective selected from the departmentally approved list of Design Electives below: 3 SE 420 Digital Control Systems 4	MATH 461	Probability Theory	3
ME 451 Computer-Aided Mfg Systems 3 SE 400 Engineering Law 3 Rehabilitation Engineering Rehability Engineering Rehability Engineering Rehabilitation Rehabilitation Rehabilitation Refer 415 Biomedical Instrumentation Lab 2 MCB 150 Molec & Cellular Basis of Life 44 AMCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 44 AMCB 251 Exp Techniqs in Molecular Biol 2 REHB 402 Medical Aspects of Disability 44 AMCB 254 Molecular Biol 255 AMCB 255 Molecular Biol 255 AMCB 255 Molecular Biol 255 AMCB 255 Molecular Biol 256 AMCB 257 Molecular Biol 257 Molecular Biol 258 AMCB 259 Molecular Biol 259 Molecular B	MATH 464	Statistics and Probability II	3 or
SE 400 Engineering Law SE 411 Reliability Engineering Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I ECE 414 Biomedical Instrumentation SE 415 Biomedical Instrumentation CEC 415 Biomedical Instrumentation			4
Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I SE 414 Biomedical Instrumentation 4 ECE 414 Biomedical Instrumentation Lab 4 ECE 415 Biomedical Instrumentation Lab 4 ECE 415 Biomedical Instrumentation Lab 4 MCB 250 Molec & Cellular Basis of Life 4 MCB 251 Exp Techniqs in Molecular Biol REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 5 E 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or SE 400 Engineering Law 4 Intermediate Dynamics 4 IAM 412 Intermediate Dynamics 1AM 412 Intermediate Dynamics 1AM 424 Mechanics of Structural Metals 1AM 425 Intermediate Dynamics 1AM 435 Intermediate Fluid Mechanics 1AM 435 Intermediate Fluid Mechanics 1AM 435 Intermediate Fluid Mechanics 1AM 445 Continuum Mechanics 1AM 451 Intermediate Solid Mechanics 1AM 451 Intermediate Solid Mechanics 1AM 451 Intermediate Solid Mechanics 1AM 456 Experimental Stress Analysis 3 or Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design SE 420 Digital Control Systems	ME 451	Computer-Aided Mfg Systems	3
Rehabilitation Engineering CHEM 232 Elementary Organic Chemistry I 3 or 4 ECE 414 Biomedical Instrumentation 3 ECE 415 Biomedical Instrumentation Lab 2 MCB 150 Molec & Cellular Basis of Life 4 MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 are 14 intermediate Dynamics 4 intermediate Dynamics 4 intermediate Dynamics 4 intermediate Dynamics 4 intermediate Dynamics 5 intermediate Dynamics 5 intermediate Dynamics 7 intermediate Fluid Mechanics 6 Composites 7 intermediate Fluid Mechanics 7 intermediate Fluid Mechanics 7 intermediate Fluid Mechanics 7 intermediate Fluid Mechanics 4 intermediate Fluid Mechanics 5 intermediate Fluid Mechanics 4 intermediate Solid Mechanics 4 intermediate Solid Mechanics 5 intermediate Solid Mechanics 5 intermediate Solid Mechanics 5 intermediate Solid Mechanics 5 intermediate Solid Mechanics 7 intermediate Solid Mech	<u>SE 400</u>	Engineering Law	3
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ECE 414 Biomedical Instrumentation 3 ECE 415 Biomedical Instrumentation Lab 2 MCB 150 Molec & Cellular Basis of Life 4 MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	Rehabilitation Engine	eering	
ECE 414 Biomedical Instrumentation	<u>CHEM 232</u>	Elementary Organic Chemistry I	3 or
ECE 415 Biomedical Instrumentation Lab MCB 150 Molec & Cellular Basis of Life MCB 250 Molecular Genetics MCB 251 Exp Techniqs in Molecular Biol REHB 401 Introduction to Rehabilitation REHB 402 Medical Aspects of Disability SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis SE 400 Engineering Law Finite Element Analysis SE 400 Engineering Law I AM 412 Intermediate Dynamics TAM 412 Intermediate Dynamics TAM 412 Intermediate Dynamics TAM 424 Mechanics of Structural Metals TAM 428 Mechanics of Composites TAM 435 Intermediate Fluid Mechanics TAM 445 Continuum Mechanics TAM 445 Continuum Mechanics TAM 456 Experimental Stress Analysis TECHNICal Electives Course List Code Title Design elective selected from the departmentally approved list of Design Electives below: SE 410 Component Design SE 420 Digital Control Systems			4
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MCB 250 Molecular Genetics 3 MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and 4 MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 412 Mechanics of Structural Metals 3 TAM 424 Mechanics of Composites 3 TAM 428 Mechanics of Composites 3 TAM 428 Mechanics of Composites 3 TAM 445 Continuum Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Fluid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	ECE 415	Biomedical Instrumentation Lab	2
MCB 251 Exp Techniqs in Molecular Biol 2 REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	MCB 150	Molec & Cellular Basis of Life	4
REHB 401 Introduction to Rehabilitation 4 REHB 402 Medical Aspects of Disability 4 SE 400 Engineering Law 3 Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 4 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	MCB 250	Molecular Genetics	3
REHB 402 Medical Aspects of Disability SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis SE 400 Engineering Law TAM 412 Intermediate Dynamics TAM 412 Intermediate Dynamics TAM 424 Mechanics of Structural Metals TAM 428 Mechanics of Composites TAM 435 Intermediate Fluid Mechanics TAM 445 Continuum Mechanics TAM 456 Experimental Stress Analysis Technical Electives Code Title Code Title Design elective selected from the departmentally approved list of Design Electives below: SE 410 Component Design SE 420 Digital Control Systems	MCB 251	Exp Techniqs in Molecular Biol	2
SE 400 Engineering Law Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	REHB 401	Introduction to Rehabilitation	4
Theoretical and Applied Mechanics CEE 300 Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis SE 400 Engineering Law TAM 412 Intermediate Dynamics TAM 412 Intermediate Dynamics TAM 424 Mechanics of Structural Metals TAM 428 Mechanics of Composites TAM 445 Intermediate Fluid Mechanics TAM 445 Continuum Mechanics TAM 451 Intermediate Solid Mechanics TAM 456 Experimental Stress Analysis Technical Electives Code Title Design elective selected from the departmentally approved list of Design Electives below: SE 410 Component Design SE 420 Digital Control Systems	REHB 402	Medical Aspects of Disability	4
CEE 300Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of these courses.)ME 471Finite Element Analysis3 or 4SE 400Engineering Law3TAM 412Intermediate Dynamics4TAM 412Intermediate Dynamics4TAM 424Mechanics of Structural Metals3TAM 428Mechanics of Composites3TAM 435Intermediate Fluid Mechanics4TAM 445Continuum Mechanics4TAM 451Intermediate Solid Mechanics4TAM 456Experimental Stress Analysis3Technical ElectivesCourse ListHoursCodeTitleHoursDesign elective selected from the departmentally approved list of Design Electives below:3SE 410Component Design3SE 420Digital Control Systems4	SE 400	Engineering Law	3
MSE 280; select only 1 of these courses.) ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 3 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	Theoretical and Appl	ied Mechanics	
ME 471 Finite Element Analysis 3 or 4 SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	CEE 300	Behavior of Materials (Credit will not be given for CEE 300, ME 330 and	4
SE 400 Engineering Law 3 TAM 412 Intermediate Dynamics 4 TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems		MSE 280; select only 1 of these courses.)	
SE 400Engineering Law3TAM 412Intermediate Dynamics4TAM 424Mechanics of Structural Metals3TAM 428Mechanics of Composites3TAM 435Intermediate Fluid Mechanics4TAM 445Continuum Mechanics4TAM 451Intermediate Solid Mechanics4TAM 456Experimental Stress Analysis3Technical ElectivesCourse ListCodeTitleHoursDesign elective selected from the departmentally approved list of Design Electives below:3SE 410Component Design3SE 420Digital Control Systems4	ME 471		3 or
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TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	SE 400	Engineering Law	3
TAM 412 Intermediate Dynamics 4 TAM 424 Mechanics of Structural Metals 3 TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4	TAM 412		4
TAM 424 Mechanics of Structural Metals TAM 428 Mechanics of Composites TAM 435 Intermediate Fluid Mechanics TAM 445 Continuum Mechanics TAM 451 Intermediate Solid Mechanics TAM 456 Experimental Stress Analysis Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: SE 410 Component Design SE 420 Digital Control Systems 3 3 TAM 428 Component Design 3 SE 420 Mechanics of Structural Metals 3 3 Technical Fluid Mechanics 4 Tam 456 Continuum Mechanics 4 Touris 1 Tam 456 Course List Course List Code Title Hours 3 SE 410 Component Design 3 SE 420 Digital Control Systems	TAM 412	•	4
TAM 428 Mechanics of Composites 3 TAM 435 Intermediate Fluid Mechanics 4 TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4		•	3
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TAM 445 Continuum Mechanics 4 TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4		·	4
TAM 451 Intermediate Solid Mechanics 4 TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4		Continuum Mechanics	
TAM 456 Experimental Stress Analysis 3 Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4		Intermediate Solid Mechanics	4
Technical Electives Course List Code Title Hours Design elective selected from the departmentally approved list of Design Electives below: 3 SE 410 Component Design 3 SE 420 Digital Control Systems 4		Experimental Stress Analysis	
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CodeTitleHoursDesign elective selected from the departmentally approved list of Design Electives below:3SE 410Component Design3SE 420Digital Control Systems4		Course List	
SE 410Component Design3SE 420Digital Control Systems4	Code T		Hours
SE 410Component Design3SE 420Digital Control Systems4			
SE 420 Digital Control Systems 4	•		
		•	

Title	Hours
Engineering Design Optimization	3 or
	4
elective selected from the departmentally approved list of Engineering Science	3
Thermodynamics	3
Engineering Materials	3
	Engineering Design Optimization elective selected from the departmentally approved list of Engineering Science Thermodynamics

Free Electives

Course List

Code	Title	Hours
The Grainger College of Engineering Liberal Educat	on course list, or additional courses from the	6
campus General Education lists for Social and Beha	vioral Sciences or Humanities and the Arts 5	
Free electives. Additional unrestricted course work,	subject to certain exceptions as noted by the	6
College, so that there are at least 128 credit hours	earned toward the degree. 6	
Additional course work, subject to the Grainger Col	lege of Engineering restrictions to Free Electives,	<u>10</u>
so that there are at least 128 credit hours earned t	oward the degree.	
Total Hours of Curriculum to Graduate		128

12

MATH 220%7C may be substituted, with four of the five credit hours applying toward the degree. MATH 220%7C is appropriate for students with no background in calculus.

3Advanced Composition satisfied by completing the combination of SE 494%7C and SE 495%7C.**4**The following course substitutions may be used interchangeably to comply with prerequisites of specified courses in some of the secondary fields:

CEE 202, IE 300, STAT 400

CEE 201, IE 310

MSE 406, CEE 300

ECE 486, SE 320, ME 340

5

The Grainger College of Engineering approved liberal education course list can be found here. Note that these credit hours could carry the required cultural studies designation required for campus general education requirements.

6The Grainger College of Engineering restrictions to free electives can be found here.

Corresponding

BS Bachelor of Science

Degree

Program Features

Academic Level Undergraduate

Does this major No

have transcripted concentrations?

What is the typical time to completion of this program?

4 years

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

128

CIP Code

142701 - Systems Engineering.

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Delivery Method

This program is available:

On Campus - Students are required to be on campus, they may take some online courses.

Admission Requirements

Desired Effective

Admissions Term

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.

Describe how critical academic functions such as admissions and student advising are managed.

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

These changes will not impact enrollment.

Estimated Annual Number of Degrees Awarded

Year One Estimate

5th Year Estimate (or when

fully implemented)

What is the matriculation term for this program?

Fall

Budget

Are there budgetary

No

implications for this revision?

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

No

Additional Budget Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

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

No

Attach letters of support

What tuition rate do you expect to charge for this program? e.g, Undergraduate Base Tuition, or Engineering Differential, or Social Work Online (no dollar amounts necessary)

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

Nο

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.

Attach File(s)

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.

These changes will not impact our faculty resources.

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.

There is no impact to the use of the Library collections, resources, and services.

EP Documentation

EP Control EP.22.097

Number

Attach <u>ep22097_response from sponsor_20220214.pdf</u>

Rollback/Approval

Notices

This proposal No

requires HLC

inquiry

DMI Documentation

Attach Final

Approval Notices

Banner/Codebook BS:Systems Engr & Design -UIUC

Name

Program Code: 10KP5532BS

MinorConcDegreeBSMajorCodeCodeCodeCode

5532

Senate Approval

Date

Senate

Conference

Approval Date

BOT Approval

Date

IBHE Approval
Date

HLC Approval
Date

Effective Date:

Attached Document Justification for this request

Program Reviewer Deb Forgacs (dforgacs) (01/05/22 10:27 am): Rollback: requested. Comments

Key: 118

Key GREEN HIGHLIGHT = Course addition or requirement replacement RED HIGHLIGHT = Course to be removed from listed requirements. Yellow Highlight - Revision to requirement			
Current Programs of Study		Proposed Programs of Study	
Graduation Requirements		Graduation Requirements	
Minimum Technical GPA: 2.0 TGPA is required for Engineering and Technical Elective courses and MATH 415. See Technical GPA to clarify requirements.		Minimum Technical GPA: 2.0 TGPA is required for Engineering and Technical Elective courses and MATH 257. See Technical GPA to clarify requirements.	
Minimum Overall GPA: 2.0 Minimum hours required for graduation: 128 hours		Minimum Overall GPA: 2.0 Minimum hours required for graduation: 128 hours	
General education: Students must complete the Campus General Education requirements including the		General education: Students must complete the Campus General Education requirements including the	
campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). Specific Advanced Composition courses required for this degree are listed below.		campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). SE 494 and SE 495 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.	
Current Requirement Current	t Hours	Revised Requirement	Revised Hours
Orientation and Professional Development ENG 100: Engineering Orientation (External transfer students take ENG 300 instead) ¹	0	Orientation and Professional Development ENG 100: Engineering Orientation (External transfer students take ENG 300 instead)	2 1
SE 100: Introduction to ISE SE 290: ISE Undergraduate Seminar	1 0	SE 100: Introduction to ISE SE 290: ISE Undergraduate Seminar	1
Foundational Mathematics and Science	31	Foundational Mathematics and Science	21
CHEM 102: General Chemistry I	3	CHEM 102: General Chemistry I	31
CHEM 103: General Chemistry Lab I MATH 221: Calculus I ²	1 4	CHEM 103: General Chemistry Lab I MATH 221: Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no backgrou	4
MATH 231: Calculus II MATH 241: Calculus III	3 4	MATH 231: Calculus II MATH 241: Calculus III	3 4
MATH 285: Intro Differential Equations	3	MATH 257: Linear Algebra with Computational Applications MATH 285: Intro Differential Equations	3
MATH 415: Applied Linear Algebra PHYS 211: University Physics: Mechanics	3	PHYS 211: University Physics: Mechanics	
PHYS 212: University Physics: Elec & Mag	4	PHYS 212: University Physics: Elec & Mag	4
PHYS 213: Univ Physics: Thermal Physics	2	PHYS 213: Univ Physics: Thermal Physics	2
Systems Engineering and Design Technical Core CS 101: Intro Computing: Engrg & Sci	50	Systems Engineering and Design Technical Core CS 101: Intro Computing: Engrg & Sci (CS 124 may be substituted.)	51 3
ECE 110: Introduction to Electronics ECE 211: Analog Circuits & Systems	3	ECE 110: Introduction to Electronics ECE 211: Analog Circuits & Systems	3
IE 300: Analysis of Data	3	IE 300: Analysis of Data	3
IE 310: Deterministic Models in Optimization SE 101: Engineering Graphics & Design	3	IE 310: Deterministic Models in Optimization SE 101: Engineering Graphics & Design	3
SE 261: Business Side of Engineering SE 310: Design of Structures and Mechanics	3	SE 261: Business Side of Engineering SE 310: Design of Structures and Mechanics	2
SE 311: Engineering Design Analysis SE 312: Instrumentation and Test Lab	3	SE 311: Engineering Design Analysis SE 312: Instrumentation and Test Lab	3 1
SE 320: Control Systems SE 424: State Space Design for Control	4 3	SE 320: Control Systems SE 424: State Space Design for Control	4
SE 494: Senior Engineering Project I3 SE 495: Senior Engineering Project II3	3	SE 494: Senior Engineering Project I SE 495: Senior Engineering Project II	3
TAM 211: Statics	3	TAM 211: Statics	3
TAM 212: Introductory Dynamics TAM 251: Introductory Solid Mchanics	3	TAM 212: Introductory Dynamics TAM 251: Introductory Solid Mchanics	3
TAM 335: Introductory Fluid Mechanics	4	TAM 335: Introductory Fluid Mechanics	4
Secondary Field Option Electives		Secondary Field Option Electives	
Secondary field option electives from departmentally approved list below or by petition to the department4	12	Students must select one Secondary Field Option from the list below or they may petition to create their own Secondary Field Option (SFO). Courses from these lists may only be used to fulfill one curricular requirement.	12
Automotive Engineering CS 440: Artificial Intelligence	12 3 or 4	secondary ricia option (or o), courses from these lists may only se used to ruling one curricular requirements	
CS 446: Machine Learning	3 or 4		
ECE 431: Electric Machinery ECE 464: Power Electronics	3		
ECE 470/AE 482/ME 445: Introduction to Robotics ECE 486: Control Systems	4		
ME 320: Heat Transfer ME 360: Signal Processing	4 3.5		
ME 400: Energy Conversion Systems ME 403: Internal Combustion Engines	3 or 4 3 or 4		
ME 460: Industrial Control Systems ME 461: Computer Control of Mech Systems	4 3 or 4		
SE 400: Engineering Law	3 or 4		
SE 497: Independent Study (May be taken for up to 3 credit hours, based on automotive Engineering project approve by SFO faculty mentor)	1 to 4		
TAM 412: Intermediate Dynamics TAM 416: Intro to Nonlinear Dyn & Vib	4		
In addition to completing 12 credit hours from the list of approved courses above, students must complete: Dynamics/Controls (select at least one course):			
ECE 470/AE 482/ME 445: Introduction to Robotics ECE 486: Control Systems	4		
ME 460: Industrial Control Systems TAM 412: Intermediate Dynamics	4		
TAM 416: Intro to Nonlinear Dyn & Vib	4		
Automotive Power Systems (select at least one course): ECE 431: Electric Machinery	4		
ECE 464: Power Electronics ME 400: Energy Conversion Systems	3 3 or 4		
ME 403: Internal Combustion Engines	3 or 4	Automotive Engineering	
		Dynamics/Controls Focus - complete at least 1 course from this list: ECE 470/AE 482/ME 445: Introduction to Robotics	4
		ECE 486: Control Systems ME 460: Industrial Control Systems	4
		TAM 412: Intermediate Dynamics	4
		TAM 416: Intro to Nonlinear Dyn & Vib Automotive Power Systems Focus - complete at least 1 course from this list:	4
		ECE 431: Electric Machinery ECE 464: Power Electronics	4
		ME 400: Energy Conversion Systems ME 403: Internal Combustion Engines	3
		Other Elective Options - complete remaining courses from this list: CS 173: Discrete Structures	2
		CS 440: Artificial Intelligence CS 446: Machine Learning	3
		ME 320: Heat Transfer	4
		ME 360: Signal Processing ME 461: Computer Control of Mech Systems	3.5
		SE 400: Engineering Law SE 422: Robot Dynamics and Control	3
		SE 497: Independent Study (May be taken for up to 3 credit hours, based on automotive Engineering project approve by SFO faculty mentor)	1 to 4
Autonomous Systems and Robotics		Autonomous Systems and Robotics CS 173 Discrete Structures	3
CS 225: Data Structures CS 440: Artificial Intelligence	4 3 or 4	CS 225 Data Structures CS 440 Artificial Intelligence	4
CS 446: Machine Learning	3 or 4	CS 446 Machine Learning	3
ECE 470: Introduction to Robotics ECE 486: Control Systems	4 4	ECE 470 Introduction to Robotics ECE 486 Control Systems	4
ECE 490: Introduction to Optimization ME 351: Course ME 351 Not Found	3 or 4	ECE 490 Introduction to Optimization	3
		ME 270 Design for Manufacturability	3

ME 461: Computer Control of Mech Systems	3 or 4	ME 461 Computer Control of Mech Systems 3
SE 400: Engineering Law	3 or 4	SE 400 Engineering Law 3
SE 411: Reliability Engineering	3	SE 411 Reliability Engineering SE 420 Digital Control Systems 4
		SE 422 Robot Dynamics and Control 4
SE 423: Mechatronics Bioengineering		SE 423 Mechatronics 3 Bioengineering
BIOE 120: Introduction to Bioengineering	1	BIOE 120: Introduction to Bioengineering
BIOE 414: Biomedical Instrumentation ECE 414: Biomedical Instrumentation	3	BIOE/ECE 414: Biomedical Instrumentation 3
BIOE 415: Biomedical Instrumentation Lab	2	BIOE/ECE 415: Biomedical Instrumentation Lab 2
ECE 415: Biomedical Instrumentation Lab BIOE 498: Special Topics	3	BIOE 498: Special Topics 3
BIOP 401: Introduction to Biophysics	3	BIOP 401: Introduction to Biophysics
CHEM 232: Elementary Organic Chemistry I CHEM 233: Elementary Organic Chem Lab I	3 or 4 2	CHEM 232: Elementary Organic Chemistry I 3 or 4 CHEM 233: Elementary Organic Chem Lab I 2
IE 340/PSYC 358: Human Factors	4	IE 340/PSYC 358: Human Factors 4
KIN 355: Biomechanics of Human Movement	3	KIN 355: Biomechanics of Human Movement 3
MCB 150: Molec & Cellular Basis of Life (recommended only if a prerequisite to another listed course)	4	MCB 150: Molec & Cellular Basis of Life (recommended only if a prerequisite to another listed course) 4
MCB 250: Molecular Genetics (recommended only if a prerequisite to another listed course)	3	MCB 250: Molecular Genetics (recommended only if a prerequisite to another listed course) 3
MCB 251: Exp Techniqs in Cellular Biol (recommended only if a prerequisite to another listed course)		MCB 251: Exp Techniqs in Cellular Biol (recommended only if a prerequisite to another listed course) 2
MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology	3 3	MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology 3
MCB 403: Cell & Membrane Physiology Lab	1 or 2	MCB 403: Cell & Membrane Physiology Lab
MCB 404: Sys & Integrative Physiol Lab MCB 450: Introductory Biochemistry	1 to 2	MCB 404: Sys & Integrative Physiol Lab MCB 450: Introductory Biochemistry 3
SE 400: Engineering Law	3 or 4	SE 400: Engineering Law
Business Systems Integration & Consulting SE 400: Engineering Law	3 OR 4	
Group I	3	
ACCY 200: Fundamentals of Accounting (A basic accounting course is highly recommended) ACCY 201: Accounting and Accountancy I (A basic accounting course is highly recommended)	3	
ACCY 202: Accounting and Accountancy II (A basic accounting course is highly recommended)	3	
ADV 150: Introduction to Advertising BADM 310: Mgmt and Organizational Beh	3	
BADM 311: Leading Individuals and Teams	3	
BADM 312: Designing and Managing Orgs BADM 320: Principles of Marketing	3	
BADM 445: Small Business Consulting	4	
BADM 446: Entrepreneurship: New Venture Creation BTW 250: Principles Bus Comm	3	
BTW 261: Principles Tech Comm	3	
FIN 221: Corporate Finance FIN 300: Financial Markets	3 3 or 4	
IE 420: Financial Engineering	3 01 4	
Group II (At least one course) BADM 352: Database Design and Management	2	
BADM 353: Info Sys Analysis and Design	3	
CS 225: Data Structures	4	Dusiness Systems Integration 9 Consulting
		Business Systems Integration & Consulting Core Requirement:
		SE 400: Engineering Law 3
		Group I - complete at least one course from this list: BADM 352: Database Design and Management 3
		BADM 353: Info Sys Analysis and Design
		IE 405: Computing for ISE Group II - select remaining courses from this list. Of these courses, only 1 selected may be at the 100 or 200
		level.
		ACCY 200: Fundamentals of Accounting (A basic accounting course is highly recommended.) 3 ACCY 201: Accounting and Accountancy I (A basic accounting course is highly recommended.)
		ACCY 202: Accounting and Accountancy II (A basic accounting course is highly recommended.) 3
		ADV 150: Introduction to Advertising BADM 310: Mgmt and Organizational Beh 3
		BADM 311: Individual Behavior in Orgs
		BADM 312: Org Design and Environment BADM 320: Principle of Marketing 3
		BADM 445: Small Business Consulting 4
		BADM 446: Entrepreneurship Sm Bus Form BTW 250: Principles Bus Comm 3
		BTW 261: Principles Tech Comm
		FIN 221: Corporate Finance 3 FIN 300: Financial Markets 3
		IE 361: Production Planning and Control 3
Civil Engineering Structures		IE 420: Financial Engineering Civil Engineering Structures
CEE 380: Geotechnical Engineering	3	CEE 380: Geotechnical Engineering
CEE 460: Steel Structures I CEE 461: Reinforced Concrete I	3	CEE 460: Steel Structures I 3 CEE 461: Reinforced Concrete I 3
CEE 462: Steel Structures II	3 or 4	CEE 462: Steel Structures II
CEE 463: Reinforced Concrete II CEE 465: Design of Structural Systems	3 or 4 3	CEE 463: Reinforced Concrete II CEE 465: Design of Structural Systems 3
SE 400: Engineering Law	3 or 4	SE 400: Engineering Law
Computer Science		Computer Science Core Courses:
CS 173: Discrete Structures	3	CS 173 Discrete Structures 3
CS 225: Data Structures	4	CS 225 Data Structures 4 Elective Options - complete 2 of the following courses:
CS 410: Text Information Systems	3 or 4	CS 410: Text Information Systems
CS 411: Database Systems CS 425: Distributed Systems	3 or 4 3 or 4	CS 411: Database Systems 3 CS 425: Distributed Systems 3 or 4
CS 438: Communication Networks	3 or 4	CS 438: Communication Networks
All other 200-,300-,400-level CS courses		All 200-, 300-, and 400-level CS courses excluding CS 210, CS 211, CS 397, CS 398, and CS seminar and senior project courses.
SE 400: Engineering Law	3 or 4	SE 400 Engineering Law 3
Construction CEE 300: Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280 (only one course		Construction CEE 300: Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of
may be taken out of these three))	4	these course courses.)
CEE 310: Transportation Engineering CEE 320: Construction Engineering	3 3	CEE 310: Transportation Engineering CEE 320: Construction Engineering 3
CEE 380: Geotechnical Engineering	3	CEE 380: Geotechnical Engineering 3
CEE 420: Construction Productivity CEE 421: Construction Planning	3 or 4 3 or 4	CEE 420: Construction Productivity CEE 421: Construction Planning 3
CEE 422: Construction Cost Analysis	3 or 4	CEE 422: Construction Cost Analysis
CEE 460: Steel Structures I CEE 461: Reinforced Concrete I	3	CEE 460: Steel Structures I 3 CEE 461: Reinforced Concrete I 3
CEE 461: Reinforced Concrete I CEE 465: Design of Structural Systems	3	CEE 461: Reinforced Concrete I CEE 465: Design of Structural Systems 3
ME 330: Engineering Materials (Credit will not be given for CEE 300, ME 330 and MSE 280 (only one course	4	ME 330: Engineering Materials (Credit will not be given for CEE 300, ME 330 and MSE 280 (only one course may be taken out of these three)
may be taken out of these three) SE 400: Engineering Law	3 or 4	may be taken out of these three) SE 400: Engineering Law 3
Control Systems		Control Systems
CS 225: Data Structures	4	CS 173: Discrete Structures 3
ECE 470/AE 482/ME 445: Introduction to Robotics	4	ECE 470/AE 482/ME 445: Introduction to Robotics 4
ECE 486: Control Systems ECE 490: Introduction to Optimization	3 or 4	ECE 486: Control Systems 4 ECE 490: Introduction to Optimization 3
·	3 or 4	IE 410: Stochastic Processes & Applic
IE 410: Advanced Topics in Stochastic Processes & Applications		
MATH 444: Elementary Real Analysis	3 or 4	MATH 444: Elementary Real Analysis MATH 461: Probability Theory 3
MATH 444: Elementary Real Analysis MATH 461: Probability Theory MATH 464: Statistics and Probability II	3 or 4 3 or 4 3 or 4	MATH 461: Probability Theory MATH 464: Statistics and Probability II 3
MATH 444: Elementary Real Analysis MATH 461: Probability Theory MATH 464: Statistics and Probability II ME 360: Signal Processing	3 or 4 3 or 4	MATH 461: Probability Theory MATH 464: Statistics and Probability II ME 360: Signal Processing 3 3 3 3 3 3 3 3 3 3 3 3 3
MATH 444: Elementary Real Analysis MATH 461: Probability Theory MATH 464: Statistics and Probability II	3 or 4 3 or 4 3 or 4	MATH 461: Probability Theory MATH 464: Statistics and Probability II 3

SE 400: Engineering Law	3 or 4	SE 400: Engineering Law 3		
SE 420: Digital Control Systems	4	SE 420: Digital Control Systems		
SE 422: Robot Dynamics and Control	4	SE 422: Robot Dynamics and Control SE 423: Mach stranging		
SE 423: Mechatronics Digital Prototyping	3	SE 423: Mechatronics Digital Prototyping		
ME 270: Design for Manufacturability	3	ME 270: Design for Manufacturability 3		
ME 451: Computer-Aided Mfg Systems ME 452: Num Control of Mfg Processes	3 or 4 3 or 4	ME 451: Computer-Aided Mfg Systems ME 452: Num Control of Mfg Processes 3		
ME 471/AE 420/CSE 451: Finite Element Analysis	3 or 4	ME 471/AE 420/CSE 451: Finite Element Analysis		
SE 400: Engineering Law SE 402: Comp-Aided Product Realization	3 or 4	SE 400: Engineering Law SE 400: Comp. Aided Broduct Boolization		
SE 410: Component Design (SE Design Electives - one course must be taken to fulfill the design elective require	3 or 4 3	SE 402: Comp-Aided Product Realization SE 410: Component Design (This course cannot count as an SFO elective and an SED Design Elective.) 3		
SE 413: Engineering Design Optimization (SE Design Electives - one course must be taken to fulfill the design el	3 or 4	SE 413: Engineering Design Optimization (This course cannot count as an SFO elective and an SED Design Elect 3		
SE 423: Mechatronics (SE Design Electives - one course must be taken to fulfill the design elective requirement TAM 302: Engineering Design Principles	3	SE 423: Mechatronics (This course cannot count as an SFO elective and an SED Design Elective.) TAM 302: Engineering Design Principles 3		
That sold digital in the pres		TAM 470: Computation Mechanics		
Engineering Administration		Engineering Administration		
Core Requirement: SE 400: Engineering Law	3 or 4	Core Requirement: SE 400 Engineering Law 3		
Elective Options:		Elective Options - select remaining courses from this list. Of these courses, only 1 selected may be at the 100		
ACCY 200: Fundamentals of Accounting	3	or 200 level. ACCY 200 Fundamentals of Accounting		
ACCY 201: Accounting and Accountancy I	3	ACCY 201 Accounting and Accountancy I		
ACCY 202: Accounting and Accountancy II	3	ACCY 202 Accounting and Accountancy II ADV 450 Internal action to Advantage and Accountancy II		
ADV 150: Introduction to Advertising 3 BADM 310: Mgmt and Organizational Beh 3		ADV 150 Introduction to Advertising BADM 310 Mgmt and Organizational Beh 3		
BADM 311: Leading Individuals and Teams 3		BADM 311 Individual Behavior Orgs 3		
BADM 312: Designing and Managing Orgs BADM 313: Strategic Human Resource Management	3	BADM 312 Org Design and Environment 3 BADM 313 Human Resource Management 3		
BADM 375: Operations Strategy	3	BADM 375 Business Process management 3		
BADM 380: International Business	3	BADM 380 International Business 3		
BADM 381: Multinational Management BTW 250: Principles Bus Comm	3	BADM 381 Multinational Management 3 BTW 250 Principles Bus Comm 3		
BTW 261: Principles Tech Comm	3	BTW 261 Principles Tech Comm 3		
ECON 302: Inter Microeconomic Theory	3	ECON 302 Inter Microeconomic Theory 3		
FIN 221: Corporate Finance GEOG 205: Course GEOG 205 Not Found	3	FIN 221 Corporate Finance		
IE 330: Industrial Quality Control	3	IE 330 Industrial Quality Control		
IE 340: Human Factors IE 361: Production Planning & Control	3	IE 340 Human Factors 3 IE 361 Production Planning & Control 3		
IE 420: Financial Engineering	3 or 4	IE 420 Financial Engineering 3		
IE 445: Human Performance and Cognition in Context	3 or 4	IE 445 Human Perform & Engrg Psych BS 321 Principles of Public Policy 3		
PS 321: Principles of Public Policy SE 411: Reliability Engineering	3 or 4	PS 321 Principles of Public Policy SE 411 Reliability Engineering 3		
Engineering Marketing		Engineering Marketing		
Core Requirement: SE 400: Engineering Law	3 or 4	Core Requirement: SE 400: Engineering Law 3		
Elective Options:	5 01 4	Elective Options - select remaining courses from this list. Of these courses, only 1 may be select at the 100 or		
		200 level.		
ACCY 200: Fundamentals of Accounting ACCY 201: Accounting and Accountancy I	3	ACCY 200: Fundamentals of Accounting ACCY 201: Accounting and Accountancy I 3		
ACCY 202: Accounting and Accountancy II	3	ACCY 202: Accounting and Accountancy II		
ADV 150: Introduction to Advertising	3	ADV 150: Introduction to Advertising 3		
BADM 310: Mgmt and Organizational Beh BADM 320: Principles of Marketing	3	BADM 310: Mgmt and Organizational Behavior 3 BADM 320: Principles of Marketing 3		
BADM 322: Marketing Research	3	BADM 322: Marketing Research 3		
BADM 323: Marketing Communications BADM 325: Consumer Behavior	3	BAM 323: Marketing Communications 3 BADM 325: Consumer Behavior 3		
BADM 327: Marketing to Business and Govt	3	BADM 327: Marketing to Business and Govt 3		
BADM 380: International Business	3	BADM 380: International Business 3		
BADM 382: International Marketing BADM 420: Advanced Marketing Management	3	BADM 382: International Marketing BADM 420: Advanced Marketing Management 3		
BTW 250: Principles Bus Comm	3	BTW 250: Principles Bus Comm 3		
RTW 261: Principles Tech Comm				
BTW 261: Principles Tech Comm	3	BTW 261: Principles Tech Comm 3		
PSYC 245: Industrial Org Psych	3	PSYC 245: Industrial Org Psych		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics	_	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics 3		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering	3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering 3		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics	3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics 3		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical	3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical	3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical	3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological Course CEE 445 Not Found CEE 446: Air Quality Engineering	3 3 3 4 4 4 4 4	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological CEE 446: Air Quality Engineering		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological Course CEE 445 Not Found	3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering 3 CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological Course CEE 445 Not Found CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment IE 105: Environ Toxicology & Health IB 105: Environmental Biology	3 3 3 3 4 4 4 4 4	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment 3 3 3 3 3 3 3 3 3 4 4 5 6 7 7 8 8 8 8 8 8 8 8 8 8 8		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological Course CEE 445 Not Found CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment IE 105: Environ Toxicology & Health IB 105: Environmental Biology NPRE 241: Intro to Radiation Protection	3 3 3 3 4 4 4 4 4 3 3 3 3	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment IE 105: Environ Toxicology & Health 3 B 105: Environmental Biology		
PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological Course CEE 445 Not Found CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment IE 105: Environ Toxicology & Health IB 105: Environmental Biology NPRE 241: Intro to Radiation Protection NRES 419: Env and Plant Ecosystems NRES 472: Environmental Psychology	3 3 3 4 4 4 4 4 3 3 3 3 3 4	PSYC 245: Industrial Org Psych Environmental Quality ACE 310: Natural Resource Economics CEE 330: Environmental Engineering 3CEE 437: Water Quality Engineering CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological CEE 446: Air Quality Engineering ENVS 336: Tomorrow's Environment IE 105: Environ Toxicology & Health IB 105: Environmental Biology NRES 419: Env and Plant Ecosystems NRES 472: Environmental Psychology		
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		IE 411: Optimization of Large Systems 3		
MATH 461: Probability Theory	3 or 4	MATH 461: Probability Theory		
MATH 464: Statistics and Probability II	3 or 4	MATH 464: Statistics and Probability II		
Course ME 351 Not Found				
ME 451: Computer-Aided Mfg Systems	3 or 4	ME 451: Computer-Aided Mfg Systems		
SE 400: Engineering Law	3 or 4	SE 400: Engineering Law		
SE 411: Reliability Engineering	3 or 4	SE 411: Reliability Engineering		
Rehabilitation Engineering		Rehabilitation Engineering		
CHEM 232: Elementary Organic Chemistry I	3 or 4	CHEM 232: Elementary Oganic Chemistry I		
ECE 414: Biomedical Instrumentation	3	ECE 414: Biomedical Instrumentation		
ECE 415: Biomedical Instrumentation Lab	2	ECE 415: Biomedical Instrumentation Lab		
MCB 150: Molec & Cellular Basis of Life	4	MCB 150: Molec & Cellular Basis of Life		
MCB 250: Molecular Genetics	3	MCB 250: Molecular Genetics		
MCB 251: Exp Techniqs in Molecular Biol	2	MCB 251: Exp Techniqs in Molecular Biol		
REHB 401: Introduction to Rehabilitation	4	REHB 401: Introduction to Rehabilitation	4	
REHB 402: Medical Aspects of Disability	4	REHB 402: Medical Aspects of Disability		
SE 400: Engineering Law	3 or 4	SE 400: Engineering Law	3	
Theoretical and Applied Mechanics	-	Theoretical and Applied Mechanics		
CEE 300: Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280 (only one course materials)	4	CEE 300: Behavior of Materials (Credit will not be given for CEE 300, ME 330 and MSE 280; select only 1 of the	4	
ME 471: Finite Element Analysis	3 or 4	ME 471: Finite Element Analysis		
SE 400: Engineering Law	3 or 4	SE 400: Engineering Law		
TAM 412: Intermediate Dynamics	4	TAM 412: Intermediate Dynamics		
TAM 424: Mechanics of Structural Metals	3 or 4	TAM 424: Mechanics of Structural Metals		
TAM 428: Mechanics of Composites	3	TAM 428: Mechanics of Composites	3	
TAM 435: Intermediate Fluid Mechanics	4	TAM 435: Intermediate Fluid Mechanics		
TAM 445: Continuum Mechanics	4	TAM 445: Continuum Mechanics		
TAM 451: Intermediate Solid Mechanics	4	TAM 451: Intermediate Solid Mechanics		
TAM 456: Experimental Stress Analysis	3	TAM 456: Experimental Stress Analysis		
Technical Electives		Technical Electives		
Design elective selected from the departmentally approved list of Design Electives below:	3	Design elective selected from the departmentally approved list of Design Electives below:		
SE 410: Component Design	3	SE 410: Component Design		
SE 420: Digital Control Systems	4	SE 420: Digital Control Systems		
SE 423: Mechatronics	3	SE 423: Mechatronics		
SE 413: Engineering Design Optimization	3 or 4	SE 413: Engineering Design Optimization		
Engineering science elective selected from the departmentally approved list of Engineering Science Electives b	3	Engineering science elective selected from the departmentally approved list of Engineering Science Electives b		
ME 200: Thermodynamics	3	ME 200: Thermodynamics	3	
MSE 280: Engineering Materials	3	MSE 280: Engineering Materials		
Electives		Free Electives		
	6			
General Education lists for Social and Behavioral Sciences or Humanities and the Arts ¹³				
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so	6	Additional course work subject to the Grainger College of Engineering restrictions to Free Electives		
that there are at least 128 credit hours earned toward the degree. ¹⁴		so that there are at least 128 credit hours earned toward the degree.	10	
		(https://go.grainger.illinois.edu/FreeElectives)		
Total Hours of Curriculum to Graduate	128	Total Hours of Curriculum to Graduate	128	
1 External transfer students take ENG 300 instead.				
2 MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is				
appropriate for students with no background in calculus.				
3 Advanced Composition satisfied by completing the combination of SE 494 and SE 495.				
4 The Grainger College of Engineering approved liberal education course list can be found here. Note that				
these credit hours could carry the required cultural studies designation required for campus general				
education requirements.				

5 The Grainger College of Engineering restrictions to free electives can be found here.



COLLEGE OF AGRICULTURAL, CONSUMER & ENVIRONMENTAL SCIENCES

Office of the Dean 227 Mumford Hall, MC-710 1301 W. Gregory Drive Urbana, IL 61801

January 13, 2022

Dear Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from our college. Grainger Engineering students will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

Sincerely,

Germán Bollero, Interim Dean



COLLEGE OF APPLIED HEALTH SCIENCES

Office of the Dean 110 Huff Hall, MC-586 1206 S. Fourth St. Champaign, IL 61820

January 25, 2022

Dear Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from our college. Grainger Engineering students will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

While I support the move the give your students more freedom in course selection, it is important to express my concern that discontinuing your Liberal Education requirement may negatively impact my college's finances by reducing the IUs generated from lower enrollments in AHS courses. As you know, the current budget model rewards colleges financially based on the number of registrants in courses. I am hopeful that your students and advisors will continue to view AHS courses as relevant and valuable when they are selecting electives.

Sincerely,

Chery Hanly-Maxwell

Dean





Undergraduate Student Academic Affairs Office 110 Education Building, MC-708 1310 S. Sixth St. Champaign, IL 61820

Dear Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from our college. Grainger Engineering students will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

Sincerely,

Assistant Dean for Academic Affairs

College of Education | University of Illinois at Urbana-Champaign



College of Fine & Applied Arts

Office of the Dean 100 Architecture Building, MC-622 608 E. Lorado Taft Dr. Champaign, IL 61820

21 December 2021

Rashid Bashir, Dean 306 Engineering Hall 1308 W. Green St. M/C 266 Urbana, IL 61801

Dear Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from the College of Fine & Applied Arts. Grainger Engineering students will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

Sincerely,

Kevin Hamilton Dean and Professor

College of Liberal Arts & Sciences



2090 Lincoln Hall, MC-448 702 S. Wright St. Urbana, IL 61801

December 20, 2021

Dear Dean Bashir,

Thank you for informing the College of LAS of the proposed removal of the Liberal Education requirement in all undergraduate programs in the Grainger College of Engineering. I understand that this requirement includes an extensive list of courses from which your students could choose some, many of which are from our college. Grainger Engineering students will continue to be welcome to take our courses formerly on your Liberal Education list as free electives after the removal of this requirement from their programs of study.

Sincerely,

Venetria K. Patton

Harry E. Preble Dean



College of Media

Office of the Dean 119 Gregory Hall, MC-462 810 S. Wright St. Urbana, IL 61801

January 13, 2022

Rashid Bashir, Dean The Grainger College of Engineering 306 Engineering Hall 1308 W. Green Street Urbana, IL 61801

Dear Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from our college. Grainger Engineering students will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

Sincerely,

Tracy Sulkin

Dean, College of Media

Office of the Dean 260 Wohlers Hall, 1206 S. 6th Street Champaign, IL 61820 217.333.2747



December 13th, 2021

Dean Bashir,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in The Grainger College of Engineering. I understand that this requirement included an extensive list of courses Grainger Engineering students could choose from, including some from Gies College of Business. Students from Grainger will continue to be welcome to enroll in the courses formerly on your Liberal Education list as Free Electives after the removal of this requirement.

Sincerely,

Jeffrey R. Brown

Dean, Gies College of Business

School of Information Sciences



501 E. Daniel St., MC-493 Champaign, IL 61820-6211

February 3, 2022

Dean Rashid Bashir 306 Engineering Hall 1308 West Green Street Urbana, IL 61801

Dear Rashid,

Thank you for informing us of the proposed removal of the Liberal Education requirements in all undergraduate programs in the Grainger College of Engineering. I understand that this requirement included an extensive list of courses that Grainger Engineering students could choose from, including some from the iSchool. This letter acknowledges that Grainger Engineering students will continue to be able to enroll in courses as articulated and constrained in Course Explorer and formerly on your Liberal Education list as Free Electives, after the removal of this requirement.

Sincerely,

Eunice Santos

Professor and Dean

Eunice Santos



DEPARTMENT OF COMPUTER SCIENCE

NANCY M. AMATO

Thomas M. Siebel Center for Computer Science 201 N. Goodwin Ave. Urbana, IL 61801-2302 USA Abel Bliss Professor and Head 2248 Siebel Center namato@illinois.edu

November 15, 2021

Dear Prof. Carolyn Beck,

Computer Science is fully supportive of the Department of Industrial and Enterprise Systems Engineering using CS 173, CS 225, and other 200, 300, and 400 level CS courses in subject area concentrations in both their 10KP0127BS: Industrial Engineering, BS and 10KP5532BS: Systems Engineering & Design, BS undergraduate degree programs.

Sincerely,

Nancy M. Amato

Many Chit

Abel Bliss Professor and Head Department of Computer Science



THE GRAINGER COLLEGE OF ENGINEERING

Department of Mechanical Science & Engineering 144 Sidney Lu Mechanical Engineering Building, MC-244 1206 W. Green St. Urbana, IL 61801

15 November, 2021

Carolyn Beck Associate Head of Undergraduate Studies Industrial and Systems Engineering

Dear Prof. Beck,

The Department of Mechanical Science and Engineering will support your request to allow B.S. degree students in the ISE program to take ME 270, ME 360, ME 451, ME 452, ME 460, ME 461, ME 471 and TAM 470 courses as part of their subject area concentrations. The proposed curriculum will not place an unacceptable burden on our department. However, MechSE will continue to provide priority registration in these courses to its own degree program students, consistent with current policies.

Best regards,

gaigin Suite

Sanjiv Sinha

Associate Head for Undergraduate Programs

Mechanical Science and Engineering

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Department of Mathematics

273 Altgeld Hall, MC-382 1409 West Green Street Urbana, IL 61801



Re: Use of Math 257 in Industrial and Systems Engineering

The Mathematics Department, working with the Grainger College of Engineering, has recently created the course MATH 257, *Linear Algebra with Computational Applications*. Quoting from the justification of the approved proposal, "In the future, MATH 257 will replace the MATH 415 requirement in many science and engineering curricula." With this in mind, the department would be pleased to have Industrial and Systems Engineering add MATH 257 as an option to MATH 415 in their curricula. As the Mathematics department is reallocating instructional resources from Math 415 to Math 257 as the need shifts, this will not cause any undue difficulties for Mathematics resources.

Sincerely

Randy McCarthy

Professor of Mathematics

Dir of Undergraduate Studies in Math

Randy M'Carthy

rmccrthy@illinois.edu

telephone 217-333-3350 • fax 217-333-9576 email office@math.uiuc.edu • url http://www.math.uiuc.edu/

From: Hanley-Maxwell, Cheryl D < cherylln@illinois.edu>

Sent: Monday, February 14, 2022 3:57 PM **To:** Miller, Nolan H < mmiller@illinois.edu>

Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

That's fine. Thanks for asking

CHERYL D HANLEY-MAXWELL

Dean

University of Illinois at Urbana-Champaign College of Applied Health Sciences 108 Huff Hall 1206 S Fourth | M/C 586 Champaign, IL 61820 217.333.2131 | cherylhm@illinois.edu www.ahs.illinois.edu (217) 333-0404 (FAX)

Human kindness has never weakened the stamina or softened the fiber of a free people. A nation does not have to be cruel to be tough. -- President Franklin D. Roosevelt



Under the Illinois Freedom of Information Act any written communication to or from university employees regarding university business is a public record and may be subject to public disclosure.

From: Miller, Nolan H < nmiller@illinois.edu Sent: Monday, February 14, 2022 1:49 PM

To: Hanley-Maxwell, Cheryl D < cherylhm@illinois.edu>

Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

Dear Cheryl,

Thanks again for talking with me about the changes to the Grainger BS programs. I read the statement you sent to the committee today. The Chair would like to include it in the record that is forwarded to the Senate. Is it ok to include the email you sent below?

Thanks,		
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

Under the Illinois Freedom of Information Act any written communication to or from university employees regarding university business is a public record and may be subject to public disclosure.

From: Hanley-Maxwell, Cheryl D <cherylhm@illinois.edu>

Sent: Thursday, February 10, 2022 1:49 PM **To:** Miller, Nolan H <nmiller@illinois.edu>

Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

Hi Nolan -

I appreciate what Ed Pol does in juggling the interests and concerns of the various programs across the campus, while keeping the students in mind. I served on a committee like this at my previous institution and know that it all boils down to what is best for the students' learning. Thanks for reminding me of that.

Here is a statement: While the Grainger proposal has the potential to financially affect AHS, we want to affirm another college's right to control their program requirements and student experiences, ensuring the best possible outcomes for their students. As a result, AHS supports this proposal and hopes that Grainger advisors will recognize the valuable contribution AHS classes make to the education of their students and continue to encourage them to consider relevant and/or high interest classes in AHS.

Hope this works!

Cheryl

CHERYL D HANLEY-MAXWELL, PHD Dean

University of Illinois at Urbana-Champaign College of Applied Health Sciences 108 Huff Hall 1206 S Fourth | M/C 586 Champaign, IL 61820 217.333.2131 | cherylhm@illinois.edu www.ahs.illinois.edu (217) 333-0404 (FAX)

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