

Program Change Request

APPROVED BY SENATE
03/07/2022

EP.22.090_FINAL
Approved by EP 02/14/2022

Date Submitted: 12/21/21 12:57 pm

Viewing: **10KP0118BS : Engineering Mechanics, BS**

Last approved: 10/08/21 12:48 pm

Last edit: 02/15/22 10:35 am

Changes proposed by: Stephanie Ott-Monsivais

Catalog Pages
Using this
Program

[Engineering Mechanics, BS](#)

Proposal Type:

In Workflow

1. U Program Review
2. 1917 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

1. 01/05/22 2:37 pm
Deb Forgacs (dforgacs):
Approved for U Program Review
2. 01/05/22 5:21 pm
Sanjiv Sinha (sanjiv): Approved for 1917 Head
3. 02/03/22 11:39 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 11:54 am
John Wilkin

(jpwilkin):
Approved for
University
Librarian

6. 02/03/22 4:15 pm
Kathy Martensen
(kmartens):
Approved for
Provost

History

1. Jan 15, 2019 by
Stephanie Ott-
Monsivais
(ottmonsi)
2. Apr 25, 2019 by
Deb Forgacs
(dforgacs)
3. Aug 12, 2019 by
Deb Forgacs
(dforgacs)
4. Feb 26, 2020 by
Brooke Newell
(bsnewell)
5. Mar 31, 2020 by
Deb Forgacs
(dforgacs)
6. Apr 14, 2020 by
Deb Forgacs
(dforgacs)
7. May 10, 2021 by
Stephanie Ott-
Monsivais
(ottmonsi)
8. Oct 8, 2021 by
Brooke Newell
(bsnewell)

Major (ex. Special Education)

This proposal is
for a:
Revision

Administration Details

Official Program Engineering Mechanics, BS
Name

Sponsor College Grainger College of Engineering
Sponsor Mechanical Sci & Engineering
Department

Sponsor Name Stephanie Ott-Monsivais

Sponsor Email ottmonsi@illinois.edu

College Contact Jonathan Makela ~~Brooke Newell~~

College Contact
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jmakela@illinois.edu ~~bsnewell@illinois.edu~~

College Budget Tessa Hile
Officer

College Budget tmhile@illinois.edu
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;

Stephanie Ott-Monsivais, ottmonsi@illinois.edu, MechSE

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).

Removal of deactivated courses and replacement of renumbered courses is necessary to keep our program current/accurate.

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 through out a student's program of study.

Removed deactivated course, CEE 445, from Fluid Mechanics secondary field elective option.

Replaced renumbered course, NPRE 431 replaced with NPRE 330, in the Mechanics of Materials secondary field elective option.

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?

Yes

Required courses

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 pursuing 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.

Attach letters of support or acknowledgement from other departments.

[Letters of Acknowledgement - Liberal Education Electives.pdf](#)

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).

Data is collected and evaluated every 3 years for key curricular courses, in coordination with the faculty teaching the course in the chosen semester. Courses to be evaluated are determined by the MechSE Undergraduate Programs Committee (UPC) to be necessary to evaluate program outcomes (listed below #1. through 7.). This process allows the program to make and assess changes, advising processes, and the assessment process itself during the 6-year ABET evaluation cycle.

Each instructor (to allow for separation of lecture section results) is asked to classify the outcome attainment of all of the students in one of the five categories: Unsatisfactory (0), Marginal (1), Satisfactory (2), Mastery (3), or did not complete the assignment according to the provided rubrics. To form a metric for each program outcome, we define a performance indicator assessment ratio as the sum of the students who attained "Satisfactory (2)" and "Mastery (3)" achievement of a given performance indicator divided by the number of students who were assessed.

The UPC will evaluate all direct outcomes assessment data and discuss opportunities for improvement according to the 3-year assessment cycle. If the performance indicator assessment ratio is less than 75% for a given outcome, for a given section of a course, for a given semester then the UPC must investigate. In such cases, the UPC would first determine if further action is deemed appropriate. An example of why further action is not deemed necessary includes, but is not limited to, that the assessment ratio for one particular section of the assessed course is slightly below 75% due to small sample sizes or other explainable statistical variation in the numbers. If further action is deemed appropriate, then the UPC or a UPC appointed ad-hoc subcommittee would evaluate the assessment material, identify opportunities to improve the program if the assessment appears accurate, or improve the assessment process if the method of assessment appears lacking or inappropriate in some regard. If an improvement to either the program, assessment process or both is implemented, the performance indicator for the given outcome is reassessed and then reevaluated. If the performance indicator assessment ratios are all equal or greater than 75%, then the level of attainment is considered satisfactory and investigation is not required for the given performance indicator of the given outcome.

Program outcomes and learning objectives:

The Engineering Mechanics Program prepares graduates to achieve the following student outcomes by the time of graduation:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. 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.
5. 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.
 6. 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.

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

No

Program of Study

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

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

Revised programs [Engineering Mechanics, 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.

The Engineering Mechanics program at Illinois (accredited by the Engineering Accreditation Commission of ABET, www.abet.org) is a major that focuses on the principles of mechanics that underpin design and engineering in diverse industries including materials, energy, biotechnology, civil, and aerospace to name a few. Students learn rigorous mathematical, scientific, and engineering principles in subject areas such as statics, dynamics, strength of materials, and fluid dynamics. Further, Engineering Mechanics students learn how to apply these basic principles in modern engineering design through laboratory and project work. The program also benefits from a cohesive secondary field which students can tailor to fit their academic and career objectives. Engineering Mechanics is well suited for students with an interest in analysis and design, and physical principles.

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Technical GPA: 2.0

TGPA is required for required Engineering courses and any technical elective courses. 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. ME 470 and TAM 324 will each satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

~~Specific Advanced Composition courses required for this degree are listed below.~~ Orientation and Professional Development

Course List

Code	Title	Hours
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300 .)	1
TAM 195	Mechanics in the Modern World	1
ME 290	Seminar	0
Total Hours		2

Foundational Mathematics and Science

Course List

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications	3
MATH 441	Differential Equations	3
MATH 442	Intro Partial Diff Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 213	Univ Physics: Thermal Physics	2
PHYS 214	Univ Physics: Quantum Physics	2
Total Hours		40

Engineering Mechanics Technical Core

Course List

Code	Title	Hours
CS 101	Intro Computing: Engrg & Sci (CS 124 or ECE 220 may be substituted.)	3

Code	Title	Hours
ECE 205	Electrical and Electronic Circuits (ECE 110 and either ECE 210 or ECE 211 may be substituted.)	3
ME 170	Computer-Aided Design	3
ME 200	Thermodynamics	3
ME 470	Senior Design Project	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
TAM 251	Introductory Solid Mechanics	3
TAM 252	Solid Mechanics Design	1
TAM 270	Design for Manufacturability	3
TAM 324	Behavior of Materials	4
TAM 335	Introductory Fluid Mechanics	4
TAM 412	Intermediate Dynamics	4
TAM 445	Continuum Mechanics	4
TAM 470	Computational Mechanics	3
Total Hours		47

Secondary Field Option Electives

Course List

Code	Title	Hours
Secondary field electives selected from departmentally approved courses for Secondary Field Options.12		
Each secondary field generally specifies two required courses and two additional courses from a list of approved elective courses. For each of the secondary fields, the required and approved elective courses specified for each are listed below. To add flexibility to the program and to accommodate particular interests, the student may fashion an individualized secondary field option. The only requirements are that the courses be related to mechanics, form a coherent and cohesive group, include at least two engineering courses, and total at least 12 hours of advanced-level coursework that are distinct from required courses in the Engineering Mechanics curriculum. This can include 500-level courses, if the student has the adequate preparation, for any of the secondary field elective courses. Each student must formally declare their choice of secondary field with a Mechanical Science and Engineering Undergraduate Programs Office advisor using a Secondary Field Options form.		
Biomechanics		
Required Courses		
MCB 150	Molec & Cellular Basis of Life	4
MCB 151	Molec & Cellular Laboratory	1
TAM 461	Cellular Biomechanics	4
Approved Courses		
ECE 473	Fund of Engrg Acoustics	3 or 4
ECE 380	Biomedical Imaging	3
ME 481	Whole-Body Musculoskel Biomech	3 or 4
ME 482	Musculoskel Tissue Mechanics	3 or 4
ME 483	Mechanobiology	4
BIOP 401	Introduction to Biophysics	3
TAM 497	Independent Study	1 to 3

Code	Title	Hours
Computational Mechanics		
Required Courses		
CS 357	Numerical Methods I	3
ME 471	Finite Element Analysis	3 or 4
Approved Courses		
CS 450	Numerical Analysis	3 or 4
CS 457	Numerical Methods II	3
ME 412	Numerical Thermo-Fluid Mechs	2 to 4
TAM 497	Independent Study	1 to 3
Engineering Science and Applied Mathematics		
Required Courses		
MATH 446	Applied Complex Variables	3-4
or MATH 448	Complex Variables	
Any 400 level MATH course, excluding MATH 415 , MATH 441 , and MATH 442		3 or 4
Approved Courses		
AE 353	Aerospace Control Systems	3
AE 402	Orbital Mechanics	3 or 4
CEE 491	Decision and Risk Analysis	3 or 4
ECE 329	Fields and Waves I	3
ECE 330	Power Ckts & Electromechanics	3
ECE 473	Fund of Engrg Acoustics	3 or 4
PHYS 402	Light	3 or 4
TAM 497	Independent Study	1 to 3
Experimental Mechanics		
Required Courses		
TAM 456	Experimental Stress Analysis	3
ECE 206	Electrical and Electronic Circuits Lab	1
Approved Courses		
CS 357	Numerical Methods I	3
ECE 473	Fund of Engrg Acoustics	3 or 4
ME 360	Signal Processing	3.5
PHYS 402	Light	3 or 4
TAM 497	Independent Study	1 to 3
Fluid Mechanics		

Code	Title	Hours
Required Courses		
TAM 435	Intermediate Fluid Mechanics	4
ME 410	Intermediate Gas Dynamics	3 or 4
Approved Courses		
AE 412	Viscous Flow & Heat Transfer	4
CEE 445	Course CEE 445 Not Found	
CEE 451	Environmental Fluid Mechanics	3
CEE 453	Urban Hydrology and Hydraulics	4
ECE 473	Fund of Engrg Acoustics	3 or 4
ME 412	Numerical Thermo-Fluid Mechs	2 to 4
TAM 497	Independent Study	1 to 3
Mechanics of Materials		
Required Courses		
TAM 424	Mechanics of Structural Metals	3 or 4
TAM 428	Mechanics of Composites	3
Approved Courses		
CEE 310	Transportation Engineering	3
MSE 401	Thermodynamics of Materials	3
MSE 455	Macromolecular Solids	3
MSE 489	Matl Select for Sustainability	3 or 4
NPRE 431	Course NPRE 431 Not Found	
NPRE 330	Materials in Nuclear Engineering	3
TAM 497	Independent Study	1 to 3
Solid Mechanics		
Required Courses		
TAM 424	Mechanics of Structural Metals	3 or 4
TAM 451	Intermediate Solid Mechanics	4
Approved Courses		
CEE 360	Structural Engineering	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CS 357	Numerical Methods I	3
ECE 473	Fund of Engrg Acoustics	3 or 4
TAM 497	Independent Study	1 to 3
<u>Free Electives</u>		
12		

~~CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102, similarly CHEM 105 requirement waived for students who received test-based credit for CHEM 104. Students are still required to have 128 hours minimum to graduate.~~

~~3~~

~~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.~~

~~4~~MATH 415 may be substituted for students entering prior to Fall 2021.~~5~~

~~Transfer or incoming students with credit upon admission to the Engineering Mechanics program may substitute MATH 284 or MATH 285 with a grade of B+ or higher.~~

~~6~~CS 124 or CS 125 or ECE 220 may be substituted.~~7~~

~~ECE 110 and ECE 210 (or ECE 211) combined may be substituted.8~~

~~Advanced Composition satisfied by completing TAM 324%7C and ME 470%7C.9~~

~~Transfers and Physics minor/dual-degree students may substitute PHYS 325.10~~

~~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.~~

~~11~~The Grainger College of Engineering restrictions to free electives can be found here.

Course List		
Code	Title	Hours
The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts 10		6
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. 11		6
<u>Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.</u>		<u>11</u>
Total Hours of Curriculum to Graduate		128

Corresponding Degree BS Bachelor of Science

Program Features

Academic Level Undergraduate

Does this major have transcripted concentrations? No

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 141101 - Engineering Mechanics.

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 Fall 2021
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.

Requirements will not change from previous admission requirements.

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

No changes. Admissions to EM is still handled by Illinois Admissions and student advising is handled at the college and departmental levels.

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 No
budgetary
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?

No

Resource Implications

Facilities

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

No

Technology

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

No

Non-Technical Resources

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

No

Resources

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

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 Number

EP.22.090

Attach Rollback/Approval Notices

[ep22090_response_from_sponsor_20220214.pdf](#)

This proposal requires HLC inquiry

No

DMI Documentation

Attach Final Approval Notices

Banner/Codebook Name

BS:Engineering Mechanics -UIUC

Program Code:

10KP0118BS

Minor Code	Conc Code	Degree Code	BS	Major Code
0118				

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
Comments

Addition
Removal
Revision

Current Program of Study

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. Specific Advanced Composition courses required for this degree are listed below.

Current Requirements	Current Hours
Orientation and Professional Development	1
ENG 100: Engineering Orientation ¹	0
TAM 195: Mechanics in the Modern World	1
ME 290: Seminar	0
Foundational Mathematics and Science	40
CHEM 102: General Chemistry I	3
CHEM 103: General Chemistry Lab I ²	1
CHEM 104: General Chemistry II	3
CHEM 105: General Chemistry Lab II ²	1
MATH 221: Calculus I ³	4
MATH 231: Calculus II	3
MATH 241: Calculus III	4
MATH 257: Linear Algebra with Computational Applications ⁴	3
MATH 441: Differential Equations ⁵	3
PHYS 211: University Physics: Mechanics	4
PHYS 212: University Physics: Elec & Mag	4
PHYS 213: University Physics: Mechanics	2
PHYS 214: University Physics: Elec & Mag	2
Engineering Mechanics Technical Core	47
CS 101: Intro Computing: Engrg & Sci ⁶	3
ECE 205: Electrical and Electronic Circuits ⁷	3
ME 170: Computer-Aided Design	3
ME 200: Thermodynamics	3
ME 470: Senior Design Project ⁸	3
TAM 211: Statics	3
TAM 212: Introductory Dynamics ⁹	3
TAM 251: Introductory Solid Mechanics	3
TAM 252: Solid Mechanics Design	1
TAM 270: Design for Manufacturability	3
TAM 324: Behavior of Materials ⁸	4
TAM 335: Introductory Fluid Mechanics	4
TAM 412: Intermediate Dynamics	4
TAM 445: Continuum Mechanics	4
TAM 470: Computational Mechanics	3
Secondary Field Option Electives	
Secondary field electives selected from departmentally approved courses for Secondary Field Options. Each secondary field generally specifies two required courses and two additional courses from a list of approved elective courses. For each of the secondary fields, the required and approved elective courses specified for each are listed below. To add flexibility to the program and to accommodate particular interests, the student may fashion an individualized secondary field option. The only requirements are that the courses be related to mechanics, form a coherent and cohesive group, include at least two engineering courses, and total at least 12 hours of advanced-level coursework that are distinct from required courses in the Engineering Mechanics curriculum. This can include 500-level courses, if the student has the adequate preparation, for any of the secondary field elective courses. Each student must formally declare their choice of secondary field with a Mechanical Science and Engineering Undergraduate Programs Office advisor using a Secondary Field Options form.	12
Biomechanics	
Required Courses	
MCB 150: Molec & Cellular Basis of Life	4
MCB 151: Molec & Cellular Laboratory	1
TAM 461: Cellular Biomechanics	4
Approved Courses	
ECE 473: Fund of Engrg Acoustics	3 or 4
ECE 380: Biomedical Imaging	3
ME 481: Whole-Body Musculoskel Biomech	3 or 4
ME 482: Musculoskel Tissue Mechanics	3 or 4
ME 483: Mechanobiology	4
BIOP 401: Introduction to Biophysics	3
TAM 497: Independent Study	1 to 3
Computational Mechanics	
Required Courses	
CS 357: Numerical Methods I	3
ME 471: Finite Element Analysis	3 or 4
Approved Courses	
CS 450: Numerical Analysis	3 or 4
CS 457: Numerical Methods II	3
ME 412: Numerical Thermo-Fluid Mechs	2 to 4
TAM 497: Independent Study	1 to 3
Engineering Science and Applied Mathematics	
Required Courses	
MATH 446: Applied Complex Variables or MATH 448: Complex Variables	3 or 4
Any 400 level MATH course, excluding MATH 415, MATH 441, and MATH 442	3 or 4
Approved Courses	
AE 353: Aerospace Control Systems	3
AE 402: Orbital Mechanics	3 or 4
CEE 491: Decision and Risk Analysis	3 or 4
ECE 329: Fields and Waves I	3
ECE 330: Power Ckts & Electromechanics	3
ECE 473: Fund of Engrg Acoustics	3 or 4
PHYS 402: Light	3 or 4
TAM 497: Independent Study	1 to 3
Experimental Mechanics	
Required Courses	
TAM 456: Experimental Stress Analysis	3
ECE 206: Electrical and Electronic Circuits Lab	1
Approved Courses	
CS 357: Numerical Methods I	3
ECE 473: Fund of Engrg Acoustics	3 or 4
ME 360: Signal Processing	3.5
PHYS 402: Light	3 or 4
TAM 497: Independent Study	1 to 3

New Program of Study

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. ME 470 and TAM 324 will each satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Revised Requirements	Revised Hours
Orientation and Professional Development	2
ENG 100: Engineering Orientation (External transfer students take ENG 300.)	1
TAM 195: Mechanics in the Modern World	1
ME 290: Seminar	0
Foundational Mathematics and Science	40
CHEM 102: General Chemistry I	3
CHEM 103: General Chemistry Lab I	1
CHEM 104: General Chemistry II	3
CHEM 105: General Chemistry Lab II	1
MATH 221: Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231: Calculus II	3
MATH 241: Calculus III	4
MATH 257: Linear Algebra with Computational Applications	3
MATH 441: Differential Equations	3
PHYS 211: University Physics: Mechanics	4
PHYS 212: University Physics: Elec & Mag	4
PHYS 213: University Physics: Mechanics	2
PHYS 214: University Physics: Elec & Mag	2
Engineering Mechanics Technical Core	47
CS 101: Intro Computing: Engrg & Sci (CS 124 or ECE 220 may be substituted.)	3
ECE 205: Electrical and Electronic Circuits (ECE 110 and either ECE 210 or ECE 211 may be substituted.)	3
ME 170: Computer-Aided Design	3
ME 200: Thermodynamics	3
ME 470: Senior Design Project	3
TAM 211: Statics	3
TAM 212: Introductory Dynamics	3
TAM 251: Introductory Solid Mechanics	3
TAM 252: Solid Mechanics Design	1
TAM 270: Design for Manufacturability	3
TAM 324: Behavior of Materials	4
TAM 335: Introductory Fluid Mechanics	4
TAM 412: Intermediate Dynamics	4
TAM 445: Continuum Mechanics	4
TAM 470: Computational Mechanics	3
Secondary Field Option Electives	
Secondary field electives selected from departmentally approved courses for Secondary Field Options. Each secondary field generally specifies two required courses and two additional courses from a list of approved elective courses. For each of the secondary fields, the required and approved elective courses specified for each are listed below. To add flexibility to the program and to accommodate particular interests, the student may fashion an individualized secondary field option. The only requirements are that the courses be related to mechanics, form a coherent and cohesive group, include at least two engineering courses, and total at least 12 hours of advanced-level coursework that are distinct from required courses in the Engineering Mechanics curriculum. This can include 500-level courses, if the student has the adequate preparation, for any of the secondary field elective courses. Each student must formally declare their choice of secondary field with a Mechanical Science and Engineering Undergraduate Programs Office advisor using a Secondary Field Options form.	12
Biomechanics	
Required Courses	
MCB 150: Molec & Cellular Basis of Life	4
MCB 151: Molec & Cellular Laboratory	1
TAM 461: Cellular Biomechanics	4
Approved Courses	
ECE 473: Fund of Engrg Acoustics	3 or 4
ECE 380: Biomedical Imaging	3
ME 481: Whole-Body Musculoskel Biomech	3 or 4
ME 482: Musculoskel Tissue Mechanics	3 or 4
ME 483: Mechanobiology	4
BIOP 401: Introduction to Biophysics	3
TAM 497: Independent Study	1 to 3
Computational Mechanics	
Required Courses	
CS 357: Numerical Methods I	3
ME 471: Finite Element Analysis	3 or 4
Approved Courses	
CS 450: Numerical Analysis	3 or 4
CS 457: Numerical Methods II	3
ME 412: Numerical Thermo-Fluid Mechs	2 to 4
TAM 497: Independent Study	1 to 3
Engineering Science and Applied Mathematics	
Required Courses	
MATH 446: Applied Complex Variables or MATH 448: Complex Variables	3 or 4
Any 400 level MATH course, excluding MATH 415, MATH 441, and MATH 442	3 or 4
Approved Courses	
AE 353: Aerospace Control Systems	3
AE 402: Orbital Mechanics	3 or 4
CEE 491: Decision and Risk Analysis	3 or 4
ECE 329: Fields and Waves I	3
ECE 330: Power Ckts & Electromechanics	3
ECE 473: Fund of Engrg Acoustics	3 or 4
PHYS 402: Light	3 or 4
TAM 497: Independent Study	1 to 3
Experimental Mechanics	
Required Courses	
TAM 456: Experimental Stress Analysis	3
ECE 206: Electrical and Electronic Circuits Lab	1
Approved Courses	
CS 357: Numerical Methods I	3
ECE 473: Fund of Engrg Acoustics	3 or 4
ME 360: Signal Processing	3.5
PHYS 402: Light	3 or 4
TAM 497: Independent Study	1 to 3

Fluid Mechanics	
Required Courses	
TAM 435: Intermediate Fluid Mechanics	4
ME 410: Intermediate Gas Dynamics	3 or 4
Approved Courses	
AE 412: Viscous Flow & Heat Transfer	4
CEE 445: Air Quality Modeling	4
CEE 451: Environmental Fluid Mechanics	3
CEE 453: Urban Hydrology and Hydraulics	4
ECE 473: Fund of Engrg Acoustics	3 or 4
ME 412: Numerical Thermo-Fluid Mechs	2 to 4
TAM 497: Independent Study	1 to 3
Mechanics of Materials	
Required Courses	
TAM 424: Mechanics of Structural Metals	3 or 4
TAM 428: Mechanics of Composites	3
Approved Courses	
CEE 310: Transportation Engineering	3
MSE 401: Thermodynamics of Materials	3
MSE 455: Macromolecular Solids	3
MSE 489: Matl Select for Sustainability	3 or 4
NPRE 431: Materials in Nuclear Engrg	3
TAM 497: Independent Study	1 to 3
Solid Mechanics	
Required Courses	
TAM 424: Mechanics of Structural Metals	3 or 4
TAM 451: Intermediate Solid Mechanics	4
Approved Courses	
CEE 360: Structural Engineering	3
CEE 460: Steel Structures I	3
CEE 461: Reinforced Concrete I	3
CS 357: Numerical Methods I	3
ECE 473: Fund of Engrg Acoustics	3 or 4
TAM 497: Independent Study	1 to 3
Electives	
The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts ¹⁰	6
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. ¹¹	6
Total Hours of Curriculum to Graduate	128
Footnotes	
¹ External transfer students take ENG 300 instead	
² CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102, similarly CHEM 105 requirement waived for students who received test-based credit for CHEM 104. Students are still required to have 128 hours minimum to graduate.	
³ 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.	
⁴ MATH 415 may be substituted for students entering prior to fall 2022.	
⁵ Transfer or incoming students with credit upon admission to the Engineering Mechanics program may substitute MATH 284 or MATH 285 with a grade of B+ or higher.	
⁶ CS 124 or CS 125 or ECE 220 may be substituted.	
⁷ ECE 110 and ECE 210 (or ECE 211) combined may be substituted.	
⁸ Advanced Composition satisfied by completing TAM 324 and ME 470.	
⁹ Transfers and Physics minor/dual degree students may substitute PHYS 325.	
¹⁰ 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.	
¹¹ The Grainger College of Engineering restrictions to free electives can be found here.	

Fluid Mechanics	
Required Courses	
TAM 435: Intermediate Fluid Mechanics	4
ME 410: Intermediate Gas Dynamics	3 or 4
Approved Courses	
AE 412: Viscous Flow & Heat Transfer	4
CEE 451: Environmental Fluid Mechanics	3
CEE 453: Urban Hydrology and Hydraulics	4
ECE 473: Fund of Engrg Acoustics	3 or 4
ME 412: Numerical Thermo-Fluid Mechs	2 to 4
TAM 497: Independent Study	1 to 3
Mechanics of Materials	
Required Courses	
TAM 424: Mechanics of Structural Metals	3 or 4
TAM 428: Mechanics of Composites	3
Approved Courses	
CEE 310: Transportation Engineering	3
MSE 401: Thermodynamics of Materials	3
MSE 455: Macromolecular Solids	3
MSE 489: Matl Select for Sustainability	3 or 4
NPRE 330: Materials in Nuclear Engrg	3
TAM 497: Independent Study	1 to 3
Solid Mechanics	
Required Courses	
TAM 424: Mechanics of Structural Metals	3 or 4
TAM 451: Intermediate Solid Mechanics	4
Approved Courses	
CEE 360: Structural Engineering	3
CEE 460: Steel Structures I	3
CEE 461: Reinforced Concrete I	3
CS 357: Numerical Methods I	3
ECE 473: Fund of Engrg Acoustics	3 or 4
TAM 497: Independent Study	1 to 3
Free Electives	
Additional course work subject to the Grainger College of Engineering restrictions to Free Electives so that there are at least 128 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives)	11
Total Hours of Curriculum to Graduate	128



**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,

A handwritten signature in black ink, which appears to read 'Germán Bollero', written over a horizontal line.

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 to 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,

A handwritten signature in blue ink that reads 'Cheryl Hanley-Maxwell'.

Dean



College of Education

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,

A handwritten signature in black ink that reads 'April Carter'.

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,

A handwritten signature in black ink that reads 'Kevin Hamilton'.

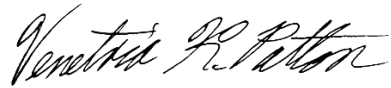
Kevin Hamilton
Dean and Professor

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,

A handwritten signature in black ink, appearing to read 'Tracy Sulkin', with a stylized flourish at the end.

Tracy Sulkin
Dean, College of Media



**Gies College
of Business**

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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,

A handwritten signature in cursive script that reads 'Eunice Santos'.

Eunice Santos
Professor and Dean

From: Hanley-Maxwell, Cheryl D <cherylhm@illinois.edu>
Sent: Monday, February 14, 2022 3:57 PM
To: Miller, Nolan H <nmiller@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
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