APPROVED BY SENATE
02/10/2020

EP.20.99_FINAL
Approved by EP 02/03/2020

Date Submitted: 01/07/20 11:44 am

Viewing: 10KP0118BS : Engineering Mechanics, BS

Last approved: 08/12/19 8:33 am

Last edit: 01/22/20 3:02 pm

Changes proposed by: Brooke Newell

Catalog Pages Using this Program	Engineering Mechanics, BS

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. DMI

Approval Path

1. 01/07/20 11:51 am
   Deb Forgacs (dforgacs): Approved for U Program Review
2. 01/09/20 3:45 pm
   Sanjiv Sinha (sanjiv): Approved for 1917 Head
3. 01/10/20 8:45 am
   Michael Hirschi (mch): Approved for KP Committee Chair
4. 01/10/20 8:48 am
   Candy Deaville (candyd): Approved for KP Dean
5. 01/10/20 9:48 am
   John Wilkin (jpwilkin): Approved for

University Librarian
6. 01/13/20 11:31 am
Kathy Martensen (kmartens): Rollback to KP Committee Chair for Provost
7. 01/13/20 11:55 am
Michael Hirschi (mch): Approved for KP Committee Chair
8. 01/13/20 12:36 pm
Candy Deaville (candyd): Approved for KP Dean
9. 01/13/20 12:39 pm
John Wilkin (jpwilkin): Rollback to KP Dean for University Librarian
10. 01/13/20 1:25 pm
Candy Deaville (candyd): Approved for KP Dean
11. 01/13/20 3:06 pm
John Wilkin (jpwilkin): Approved for University Librarian
12. 01/22/20 11:13 am
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)

Proposal Type

Proposal Type:

This proposal is for a:
Revision

Proposal Title:

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

revised gen ed and elective tables, ~~degree audit update.UG Course Lists.~~

EP Control Number	**EP.20.99_original**
Official Program Name	Engineering Mechanics, BS
Effective Catalog Term	Fall 2020
Sponsor College	Grainger College of Engineering
Sponsor Department	Mechanical Sci & Engineering
Sponsor Name	
Sponsor Email	
College Contact	College Contact Email

Program Description and Justification

Justification for proposal change:

Updates for Academic Catalog 2020-21

Is this program interdisciplinary?

No

Academic Level Undergraduate

CIP Code 141101 - Engineering Mechanics.

Is This a Teacher Certification Program?
No

Will specialized accreditation be sought for this program?

No

Admission Requirements

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

None.

Estimated Annual Number of Degrees Awarded

Year One Estimate	5th Year Estimate (or when fully implemented)

Delivery Method

Is this program available on campus and online? **No**

This program is available:
On Campus

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)

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

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.

None.

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.

None.

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 this new program/proposed change result in the replacement of another program?

No

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

No

Financial Resources

How does the unit intend to financially support this proposal?

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

No

Attach letters of support

Will an existing tuition rate be used or continue to be used for this program?

Yes

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).

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

Catalog Page Text

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

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Technical GPA: ~~Overview of Curricular Requirements The curriculum requires 128 hours for graduation and is organized as shownbelow.Orientation and Professional Development These courses introduce the opportunities and resources your college, department, and curriculum can offer you as you work to achieve your careergoals.They also provide the skills to work effectively and successfully in the engineeringprofession.Foundational Mathematics and Science These courses stress the basic mathematical and scientific principles upon which the engineering discipline isbased.Engineering Mechanics Technical Core These courses stress fundamental concepts and basic laboratory techniques that comprise the common intellectual understanding of engineeringmechanics.Secondary Field Option Electives This component of the curriculum enables the student to specialize further by electing a secondary field, a coherent group of technical courses in mechanics and closely relatedsubjects.The current secondary fieldsare:BiomechanicsComputational MechanicsEngineering Science and Applied MathematicsExperimental MechanicsFluid MechanicsMechanics of Materials~~**2.0**

TGPA is ~~Solid MechanicsEach secondary field generally specifies two~~ required **for required Engineering** courses and **any technical** ~~two additional courses from a list of approved~~ 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.

Orientation and Professional Development

Course List

Code	Title	Hours
ENG 100	Engineering Orientation 1	0
TAM 195	Mechanics in the Modern World	1
ME 290	Seminar	0
Total Hours		1

Foundational Mathematics and Science

Course List

Code	Title	Hours
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 415	Applied Linear Algebra	3
MATH 441	Differential Equations 4	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 5	3
ECE 205	Electrical and Electronic Circuits 6	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 7	3
TAM 251	Introductory Solid Mechanics	3
TAM 252	Solid Mechanics Design	1
TAM 270	Design for Manufacturability	3

Code	Title	Hours
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. 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 499	Senior Thesis	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

Code	Title	Hours
CS 457	Numerical Methods II	3
ME 412	Numerical Thermo-Fluid Mechs	2 to 4
TAM 499	Senior Thesis	3
Engineering Science and Applied Mathematics		
Required Courses		
MATH 446	Applied Complex Variables	3-4
or MATH 448	Complex Variables	
~~MATH 448~~	~~Complex Variables (Or Any 400 level MATH course, excluding MATH 415, MATH 441, and MATH 442)~~	~~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
MATH 423	Differential Geometry	3 or 4
MATH 447	Real Variables	3 or 4
MATH 482	Linear Programming	3 or 4
MATH 484	Nonlinear Programming	3 or 4
MATH 489	Dynamics & Differential Eqns	3 or 4
MATH 490	Advanced Topics in Mathematics	1 to 4
PHYS 402	Light	3 or 4
STAT 400	Statistics and Probability I	4
STAT 410	Statistics and Probability II	3 or 4
TAM 499	Senior Thesis	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

Code	Title	Hours
ECE 473	Fund of Engrg Acoustics	3 or 4
ME 360	Signal Processing	3.5
PHYS 402	Light	3 or 4
TAM 499	Senior Thesis	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 499	Senior Thesis	3
Mechanics of Materials		
Required Courses		
TAM 424	Mechanics of Structural Metals	3 or 4
TAM 427	Mechanics of Polymers	3
or TAM 428	Mechanics of Composites	
~~TAM 428~~	~~Mechanics of Composites~~	~~3~~
Approved Courses		
CEE 310	Transportation Engineering	3
MSE 401	Thermodynamics of Materials	3
MSE 489	Matl Select for Sustainability	3 or 4
NPRE 431	Materials in Nuclear Engrg	3
TAM 499	Senior Thesis	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

Code	Title	Hours
ECE 473	Fund of Engrg Acoustics	3 or 4
TAM 499	Senior Thesis	3
Electives		

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 8		**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. 9		**6**
Total Hours of Curriculum to Graduate		**128**

1

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 *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.*

5 *CS 125 or ECE 220 may be substituted.*

6 *ECE 110 and ECE 210 (or ECE 211) combined may be substituted.*

7 *Transfers and Physics minor/dual degree students may substitute PHYS 325.*

8 *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.*

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

~~**Science and Applied Mathematics**~~

~~For each of the secondary fields, the required and approved elective courses specified for each are listedbelow.To add flexibility to the program and to accommodate particular interests, the student may petition to substitute appropriate courses, including 500-level courses if the student has the adequate preparation, for any of the secondary field electivecourses.Without petition, a student may select any one course listed as required in one of the secondary field options to satisfy elective course credits in a chosen secondaryfield.General Education Requirements Non-Primary Language Requirement University Composition These courses teach fundamentals of expositorywriting. Free Electives~~

~~Course List~~

~~Code~~	~~Title~~	~~Hours~~
~~Free Electives~~		
~~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.~~		~~6~~
~~Total Hours of Curriculum to Graduate~~		~~128~~

~~Course List~~

Code	Title	Hours
Choose one:		
RHET 105	Writing and Research	
CMN 111	Oral & Written Comm I	
& CMN 112	and Oral & Written Comm II	
ESL 111	Intro to Academic Writing I	
& ESL 112	and Intro to Academic Writing II	
ESL 115	Principles of Academic Writing	
Advanced Composition (satisfied by completing TAM 324 and ME 470 in the Engineering Mechanics Technical Core)		

Course List

Code	Title	Hours
Completion of the third semester or equivalent of a non-primary language is required. Completion of three years of a single language in high school satisfies this requirement.		0-9

Course List

Code	Title	Hours
A minimum of six courses is required, as follows:		18
Social and Behavioral Sciences		6
Humanities & the Arts		6
The Grainger College of Engineering Liberal Education course list, or from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts		6
Cultural Studies: Non-Western Cultures (1 course)		
Cultural Studies: U.S. Minorities Cultures (1 course)		
Cultural Studies: Western/Comparative Cultures (1 course)		

EP Documentation

Attach Rollback/Approval Notices

DMI Documentation

Attach Final Approval Notices ep1908.pdf

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

Effective Date:

Attached Document

Justification for this request

Program Reviewer Comments

Kathy Martensen (kmartens) (01/13/20 11:31 am): Rollback: Email exchange.
John Wilkin (jpwilkin) (01/13/20 12:39 pm): Rollback: Please provide a statement regarding needs for library resources.

Key: 121

Proposal	Degree	Footnote 1
EP.20.91	BS in Civil Engineering	External transfer students take ENG 300 instead
EP.20.92	BS in Computer Engineering	External transfer students take ENG 300 instead
EP.20.93	BSAG in Agricultural and Biological Engineering	In addition to the Biological and Natural Sciences Elective hours required for Agricultural and Biological Engineering (6 hours), a further 4 hours of biological sciences must be completed to make up a total of 10 hours.
EP.20.94	BS in Agricultural and Biological Engineering	External transfer students take ENG 300 instead
EP.20.95	BS in Agricultural and Biological Engineering: Agricultural Engineering	The extra hour of credit for this course may be used to help meet free elective requirements
EP.20.96	BS in Agricultural and Biological Engineering: Biological Engineering	May be taken for 4 credit hours; the extra hour may be used to help meet free elective requirements
EP.20.97	BS in Computer Science	External transfer students take ENG 300 instead
EP.20.98	BS in Electrical Engineering	External transfer students take ENG 300 instead
EP.20.99	BS in Engineering Mechanics	External transfer students take ENG 300 instead
EP.20.100	BS in Engineering Physics	External transfer students take ENG 300 instead
EP.20.101	BS in Systems Engineering & Design	External transfer students take ENG 300 instead
EP.20.102	BS in Nuclear, Plasma and Radiological Engineering	External transfer students take ENG 300 instead
EP.20.103	BS in Mechanical Engineering	External transfer students take ENG 300 instead
EP.20.104	BS in Materials Science & Engineering	External transfer students take ENG 300 instead
EP.20.105	BS in Industrial Engineering	External transfer students take ENG 300 instead