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# **Engineering**, **BS**

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

#### Last edit: 02/15/22 10:38 am

Changes proposed by: Stephanie Ott-Monsivais

Mechanical Engineering, BS

Catalog Pages Using this Program

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

- 01/05/22 2:43 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 11:55 am John Wilkin

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

#### History

- 1. Dec 13, 2018 by Deb Forgacs (dforgacs)
- 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)
- 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 Mechanical Engineering, BS Name

Sponsor College	Grainger College of Engineering	
Sponsor Department	Mechanical Sci & Engineering	
Sponsor Name	Stephanie Ott-Monsivais	
Sponsor Email	ottmonsi@illinois.edu	
College Contact	<u>Jonathan Makela</u> Brooke Newell	College Contact Email
jmakela@illinois.ed	<u>u</u> <del>bsnewell@illinois.edu</del>	
College Budget Officer	<u>Tessa Hile</u>	
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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.* 

<u>Brooke Newell, bsnewell@illinois.edu, GCOE;</u> <u>Stephanie Ott-Monsivais, ottmonsi@illinois.edu, MechSE</u>

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).

Removed deactivated courses and replacement of renumbered courses to keep our program current/accurate.

Revised technical elective list text for clarity.

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 courses, CEE 445 and CEE 446.

Replaced renumbered courses, CS 241 replaced with CS 341 and NPRE 431 replaced with NPRE 330.

Revised technical elective list text for clarity.

#### 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?

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 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.

# 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).

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 Mechanical Engineering 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 <u>2021-12-20 ME Side by Side BSN.xlsx</u> 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 Mechanical Engineering program at Illinois (accredited by the Engineering Accreditation Commission of ABET, www.abet.org) is one of the most diverse engineering majors and plays a major role in advancing almost every industry. Students study physical principles behind how forces act on bodies of solids or fluids and the interaction of these bodies with their environments through exchanges of energy. Further, Mechanical Engineering students learn how to apply these basic principles in designing, manufacturing, and controlling machines and complex systems. Examples include systems that apply loads, transport matter and energy, and convert one form of energy to another. Mechanical Engineering is a broad major that is well suited for students interested in how the world around them moves and changes.

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 **<u>Technical GPA</u>** 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 OF ECON 103). ECON 103). ME 470 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	
Code Title Hour	s
ENG 100 Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)1	
ME 290 Seminar 0	
Total Hours 1	
Foundational Mathematics and Science	
Course List	
Code Title	Hours
CHEM 102 General Chemistry I	3
CHEM 103General Chemistry Lab I	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 285 Intro Differential Equations	3
PHYS 211 University Physics: Mechanics	4
PHYS 212 University Physics: Elec & Mag	4
Total Hours	29
Mechanical Engineering Technical Core	
Course List	
Code Title	Hours
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
ECE 206 Electrical and Electronic Circuits Lab	1
ME 170 Computer-Aided Design	3
ME 270 Design for Manufacturability	3

Code	Title	Hours
<u>ME 200</u>	Thermodynamics	3
<u>ME 310</u>	Fundamentals of Fluid Dynamics	4
<u>ME 320</u>	Heat Transfer	4
<u>ME 330</u>	Engineering Materials	4
<u>ME 340</u>	Dynamics of Mechanical Systems	3.5
<u>ME 360</u>	Signal Processing	3.5
<u>ME 370</u>	Mechanical Design I	3
<u>ME 371</u>	Mechanical Design II	3
<u>ME 470</u>	Senior Design Project	3
<u>TAM 210</u>	Introduction to Statics	2
<u>TAM 21</u>	2 Introductory Dynamics	3
<u>TAM 251</u>	Introductory Solid Mechanics	3
Total Ho	urs	52

## **Technical Electives**

Course List

Code	Title	Hours
Science electiv	ve(s), chosen from one of the following:	4
<u>CHEM 104</u>	General Chemistry II	
& <u>CHEM</u>	<u>105</u> and General Chemistry Lab II	
<u>MCB 150</u>	Molec & Cellular Basis of Life	
<u>PHYS 213</u>	Univ Physics: Thermal Physics	
& <u>PHYS 2</u>	and Univ Physics: Quantum Physics	
Statistics elect	ive, one course chosen from: 10	<del>3</del>
Statistics elect	ive, one course chosen from:	<u>3</u>
<u>IE 300</u>	Analysis of Data	
<u>STAT 400</u>	Statistics and Probability I	
MechSE electiv	es chosen from a departmentally approved list. See list below	<del>6</del>
Technical elect	ives chosen from a departmentally approved list below.	<del>6</del>
MechSE electiv	ves chosen from the departmentally approved list below.	<u>6</u>
All 400 level M	E courses, except 470 and potentially 497, 498 (As Approved)	
All 400 level TA	AM courses, except potentially 497, 498 (As Approved)	
Technical elect	ives chosen from the departmentally approved list below.	<u>6</u>
<u>ABE 430</u>	Project Management (As Approved)	2
<u>ABE 436</u>	Renewable Energy Systems	3 or 4
<u>ABE 445</u>	Statistical Methods	4
<u>ABE 455</u>	Erosion and Sediment Control	2
<u>ABE 456</u>	Land & Water Resources Engrg	3 or 4
<u>ABE 459</u>	Drainage and Water Management	3 or 4
<u>ABE 463</u>	Electrohydraulic Systems	3
<u>ABE 466</u>	Engineering Off-Road Vehicles	3
<u>ABE 469</u>	Industry-Linked Design Project	4
<u>ABE 474</u>	Indoor Environmental Control	3 or 4
<u>ABE 476</u>	Indoor Air Quality Engineering	4
<u>ABE 483</u>	Engineering Properties of Food Materials	3
<u>ABE 488</u>	Bioprocessing Biomass for Fuel	4
<u>ABE 497</u>	Independent Study (As Approved)	1 to 4
<u>ABE 498</u>	Special Topics (As Approved)	1 to 4

Code	Title	Hours
<u>AE 352</u>	Aerospace Dynamical Systems	3
<u>AE 402</u>	Orbital Mechanics	3 or 4
<u>AE 403</u>	Spacecraft Attitude Control	3 or 4
<u>AE 410</u>	Computational Aerodynamics	3 or 4
<u>AE 412</u>	Viscous Flow & Heat Transfer	4
<u>AE 416</u>	Applied Aerodynamics	3 or 4
<u>AE 419</u>	Aircraft Flight Mechanics	3 or 4
<u>AE 420</u>	Finite Element Analysis	3 or 4
<u>AE 428</u>	Mechanics of Composites	3
<u>AE 433</u>	Aerospace Propulsion	3 or 4
<u>AE 434</u>	Rocket Propulsion	3 or 4
<u>AE 442</u>	Aerospace Systems Design I	3
<u>AE 443</u>	Aerospace Systems Design II	3
<u>AE 451</u>	Aeroelasticity	3 or 4
<u>AE 454</u>	Systems Dynamics & Control	3 or 4
<u>AE 456</u>	Global Nav Satellite Systems	4
<u>AE 460</u>	Aerodynamics & Propulsion Lab	2
<u>AE 461</u>	Structures & Control Lab	2
<u>AE 482</u>	Introduction to Robotics	4
<u>AE 483</u>	Autonomous Systems Lab	2
<u>AE 497</u>	Independent Study (As Approved)	1 to 4
<u>AE 498</u>	Special Topics (As Approved)	1 to 4
<u>ASRM 410</u>	Investments and Financial Markets	3 or 4
<u>ASRM 461</u>	Loss Models	3
<u>ASRM 469</u>	Casualty Actuarial Mathematics	3 or 4
<u>ASRM 471</u>	Life Contingencies I	4
<u>ASRM 472</u>	Life Contingencies II	3
<u>BIOC 406</u>	Gene Expression & Regulation	3
BIOC 440	Physical Chemistry Principles	4
<u>BIOC 446</u>	Physical Biochemistry	3
<u>BIOC 455</u>	Technqs Biochem & Biotech	4
<u>BIOE 380</u>	Biomedical Imaging	3
<u>BIOE 414</u>	Biomedical Instrumentation	3
<u>BIOE 415</u>	Biomedical Instrumentation Lab	2
<u>BIOE 416</u>	Biosensors	3
<u>BIOE 461</u>	Cellular Biomechanics	4
<u>BIOE 476</u>	Tissue Engineering	3
<u>BIOE 479</u>	Cancer Nanotechnology	3
<u>BIOE 481</u>	Whole-Body Musculoskel Biomech	3 or 4
<u>BIOE 482</u>	Musculoskel Tissue Mechanics	3 or 4
<u>BIOE 497</u>	Individual Study (As Approved)	1 to 4
<u>BIOE 498</u>	Special Topics (As Approved)	1 to 4
BIOP 401	Introduction to Biophysics	3
<u>BIOP 419</u>	Brain, Behavior & Info Process	3
<u>BIOP 432</u>	Photosynthesis	3
<u>CEE 310</u>	Transportation Engineering	3
<u>CEE 330</u>	Environmental Engineering	3

Code	Title	Hours
<u>CEE 340</u>	Energy and Global Environment	3
<u>CEE 350</u>	Water Resources Engineering	3
<u>CEE 360</u>	Structural Engineering	3
<u>CEE 380</u>	Geotechnical Engineering	3
<u>CEE 398</u>	Special Topics (As Approved)	0 to 4
<u>CEE 401</u>	Concrete Materials	4
<u>CEE 405</u>	Asphalt Materials I	3 or 4
<u>CEE 406</u>	Pavement Design I	3 or 4
<u>CEE 407</u>	Airport Design	3 or 4
<u>CEE 408</u>	Railroad Transportation Engrg	3 or 4
<u>CEE 409</u>	Railroad Track Engineering	3 or 4
<u>CEE 410</u>	Railway Signaling & Control	3 or 4
<u>CEE 411</u>	RR Project Design & Constr	3 or 4
<u>CEE 412</u>	High-Speed Rail Engineering	3 or 4
<u>CEE 415</u>	Geometric Design of Roads	4
<u>CEE 416</u>	Traffic Capacity Analysis	3 or 4
<u>CEE 417</u>	Urban Transportation Planning (As Approved)	4
<u>CEE 418</u>	Public Transportation Systems	3 or 4
<u>CEE 420</u>	Construction Productivity	3 or 4
<u>CEE 421</u>	Construction Planning	3 or 4
<u>CEE 422</u>	Construction Cost Analysis	3 or 4
<u>CEE 424</u>	Sustainable Const Methods	4
<u>CEE 430</u>	Ecological Quality Engineering	2
<u>CEE 434</u>	Environmental Systems I	3
<u>CEE 437</u>	Water Quality Engineering	3
<u>CEE 438</u>	Science & Environmental Policy	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
<del>CEE 445</del>	Course CEE 445 Not Found	4
CEE 446	Air Quality Engineering	4
<u>CEE 447</u>	Atmospheric Chemistry	4
<u>CEE 449</u>	Environmental Engineering Lab	3
<u>CEE 450</u>	Surface Hydrology	3
<u>CEE 451</u>	Environmental Fluid Mechanics	3
<u>CEE 452</u>	Hydraulic Analysis and Design	3
<u>CEE 453</u>	Urban Hydrology and Hydraulics	4
<u>CEE 457</u>	Groundwater	3
<u>CEE 458</u>	Water Resources Field Methods	4
<u>CEE 460</u>	Steel Structures I	3
<u>CEE 461</u>	Reinforced Concrete I	3
<u>CEE 462</u>	Steel Structures II	3 or 4
<u>CEE 463</u>	Reinforced Concrete II	3 or 4
<u>CEE 465</u>	Design of Structural Systems	3
<u>CEE 467</u>	Masonry Structures	3 or 4
<u>CEE 468</u>	Prestressed Concrete	3 or 4

Code	Title	Hours
<u>CEE 469</u>	Wood Structures	3 or 4
<u>CEE 470</u>	Structural Analysis	4
<u>CEE 471</u>	Structural Mechanics	3 or 4
<u>CEE 472</u>	Structural Dynamics I	3 or 4
<u>CEE 483</u>	Soil Mechanics and Behavior	4
<u>CEE 484</u>	Applied Soil Mechanics	3 or 4
<u>CEE 491</u>	Decision and Risk Analysis	3 or 4
<u>CEE 497</u>	Independent Study (As Approved)	1 to 16
<u>CEE 498</u>	Special Topics (As Approved)	1 to 4
<u>CHBE 422</u>	Mass Transfer Operations	4
<u>CHBE 424</u>	Chemical Reaction Engineering	3
<u>CHBE 451</u>	Transport Phenomena	3
<u>CHBE 452</u>	Chemical Kinetics & Catalysis	3
<u>CHBE 453</u>	Electrochemical Engineering	2 or 3
<u>CHBE 456</u>	Polymer Science & Engineering	3
<u>CHBE 457</u>	Microelectronics Processing	3
<u>CHBE 471</u>	Biochemical Engineering	3 or 4
<u>CHBE 472</u>	Techniques in Biomolecular Eng	3 or 4
<u>CHBE 473</u>	Biomolecular Engineering	3 or 4
<u>CHBE 474</u>	Metabolic Engineering	3 or 4
<u>CHBE 475</u>	Tissue Engineering	3
<u>CHBE 476</u>	Biotransport	3
<u>CHEM 232</u>	Elementary Organic Chemistry I	3 or 4
<u>CHEM 233</u>	Elementary Organic Chem Lab I	2
<u>CHEM 236</u>	Fundamental Organic Chem I	4
<u>CHEM 237</u>	Structure and Synthesis	2
<u>CHEM 312</u>	Inorganic Chemistry	3
<u>CHEM 315</u>	Instrumental Chem Systems Lab	2
<u>CHEM 317</u>	Inorganic Chemistry Lab	3
<u>CHEM 332</u>	Elementary Organic Chem II	4
<u>CHEM 420</u>	Instrumental Characterization	2
<u>CHEM 436</u>	Fundamental Organic Chem II	3
<u>CHEM 437</u>	Organic Chemistry Lab	3
<u>CHEM 438</u>	Advanced Organic Chemistry	3
<u>CHEM 440</u>	Physical Chemistry Principles	4
<u>CHEM 442</u>	Physical Chemistry I	4
<u>CHEM 444</u>	Physical Chemistry II	4
<u>CHEM 445</u>	Physical Principles Lab I	2
<u>CHEM 447</u>	Physical Principles Lab II	2
<u>CHEM 450</u>	Astrochemistry	4
<u>CHEM 451</u>	Astrochemistry Laboratory	3 or 4
<u>CHEM 460</u>	Green Chemistry	3 or 4
<u>CHEM 472</u>	Physical Biochemistry	3
<u>CHEM 474</u>	Drug Discovery & Development	3
CHEM 480	Polymer Chemistry	3 or 4
CHEM 482	Polymer Physics	3 or 4
<u>CHEM 483</u>	Solid State Structural Anlys	4

Code	Title	Hours
<u>CHEM 488</u>	Surfaces and Colloids	3 or 4
<u>CHEM 497</u>	Individual Study Senior (As Approved)	1 to 3
<u>CS 225</u>	Data Structures	4
<u>CS 233</u>	Computer Architecture	4
<del>CS 241</del>	Course CS 241 Not Found	
<u>CS 242</u>	Programming Studio	3
<u>CS 341</u>	System Programming	<u>4</u>
<u>CS 357</u>	Numerical Methods I	3
<u>CS 374</u>	Introduction to Algorithms & Models of Computation	4
<u>CS 410</u>	Text Information Systems	3 or 4
<u>CS 411</u>	Database Systems	3 or 4
<u>CS 412</u>	Introduction to Data Mining	3 or 4
<u>CS 413</u>	Intro to Combinatorics	3 or 4
<u>CS 414</u>	Multimedia Systems	3 or 4
<u>CS 418</u>	Interactive Computer Graphics	3 or 4
<u>CS 419</u>	Production Computer Graphics	3 or 4
<u>CS 420</u>	Parallel Progrmg: Sci & Engrg	3 or 4
<u>CS 421</u>	Programming Languages & Compilers	3 or 4
<u>CS 422</u>	Programming Language Design	3 or 4
<u>CS 423</u>	Operating Systems Design	3 or 4
<u>CS 424</u>	Real-Time Systems	3 or 4
<u>CS 425</u>	Distributed Systems	3 or 4
<u>CS 426</u>	Compiler Construction	3 or 4
<u>CS 427</u>	Software Engineering I	3 or 4
<u>CS 428</u>	Software Engineering II	3 or 4
<u>CS 429</u>	Software Engineering II, ACP	3
<u>CS 431</u>	Embedded Systems	3 or 4
<u>CS 433</u>	Computer System Organization	3 or 4
<u>CS 436</u>	Computer Networking Laboratory	3 or 4
<u>CS 438</u>	Communication Networks	3 or 4
<u>CS 439</u>	Wireless Networks	3 or 4
<u>CS 440</u>	Artificial Intelligence	3 or 4
<u>CS 445</u>	Computational Photography	3 or 4
<u>CS 446</u>	Machine Learning	3 or 4
<u>CS 447</u>	Natural Language Processing	3 or 4
<u>CS 450</u>	Numerical Analysis	3 or 4
<u>CS 457</u>	Numerical Methods II	3
<u>CS 460</u>	Security Laboratory	3 or 4
<u>CS 461</u>	Computer Security I	4
<u>CS 463</u>	Computer Security II	3 or 4
<u>CS 465</u>	User Interface Design	4
<u>CS 466</u>	Introduction to Bioinformatics	3 or 4
<u>CS 467</u>	Social Visualization	3 or 4
<u>CS 468</u>	Tech and Advertising Campaigns	3
<u>CS 473</u>	Algorithms	4
<u>CS 475</u>	Formal Models of Computation	3 or 4
<u>CS 476</u>	Program Verification	3 or 4

Code	Title	Hours
<u>CS 477</u>	Formal Software Development Methods	3 or 4
<u>CS 481</u>	Advanced Topics in Stochastic Processes & Applications	3 or 4
<u>CS 483</u>	Applied Parallel Programming	4
<u>CS 484</u>	Parallel Programming	3 or 4
<u>CS 498</u>	Special Topics (As Approved)	1 to 4
<u>CSE 401</u>	Numerical Analysis	3 or 4
<u>CSE 402</u>	Parallel Progrmg: Sci & Engrg	3 or 4
<u>CSE 412</u>	Numerical Thermo-Fluid Mechs	2 to 4
<u>CSE 441</u>	Introduction to Optimization	3 or 4
<u>CSE 450</u>	Computational Mechanics	3 or 4
<u>CSE 451</u>	Finite Element Analysis	3 or 4
<u>CSE 461</u>	Computational Aerodynamics	3 or 4
ECE 329	Fields and Waves I	3
ECE 330	Power Ckts & Electromechanics	3
ECE 333	Green Electric Energy	3
ECE 340	Semiconductor Electronics	3
ECE 342	Electronic Circuits	3
ECE 343	Electronic Circuits Laboratory	1
ECE 380	, Biomedical Imaging	3
ECE 385	Digital Systems Laboratory	3
ECE 395	Advanced Digital Projects Lab	2 or 3
ECE 401	Signal and Image Analysis	4
ECE 402	Electronic Music Synthesis	3
ECE 403	Audio Engineering	3
ECE 408	Applied Parallel Programming	4
ECE 411	Computer Organization & Design	4
ECE 412	Microcomputer Laboratory	3
ECE 414	Biomedical Instrumentation	3
ECE 415	Biomedical Instrumentation Lab	2
ECE 416	Biosensors	3
ECE 417	Multimedia Signal Processing	4
ECE 418	Image & Video Processing	4
ECE 419	Security Laboratory	3 or 4
ECE 420	Embedded DSP Laboratory	2
ECE 422	Computer Security I	4
ECE 424	Computer Security II	3 or 4
ECE 425	Intro to VLSI System Design	3
ECE 428	Distributed Systems	3 or 4
ECE 431	Electric Machinery	4
ECE 432	Advanced Electric Machinery	3
ECE 435	Computer Networking Laboratory	3 or 4
ECE 437	Sensors and Instrumentation	3
ECE 438	Communication Networks	3 or 4
ECE 439	Wireless Networks	3 or 4
ECE 441	Physcs & Modeling Semicond Dev	3
ECE 444	IC Device Theory & Fabrication	4
ECE 447	Active Microwave Ckt Design	3

Code	Title	Hours
ECE 448	Artificial Intelligence	3 or 4
<u>ECE 451</u>	Adv Microwave Measurements	3
<u>ECE 452</u>	Electromagnetic Fields	3
<u>ECE 453</u>	Wireless Communication Systems	4
ECE 454	Antennas	3
ECE 455	Optical Electronics	3 or 4
ECE 456	Global Nav Satellite Systems	4
ECE 457	Microwave Devices & Circuits	3
ECE 458	Applic of Radio Wave Propag	3
ECE 459	Communications Systems	3
ECE 460	Optical Imaging	4
ECE 462	Logic Synthesis	3
ECE 463	Digital Communications Lab	2
ECE 464	Power Electronics	3
ECE 465	Optical Communications Systems	3
ECE 466	Optical Communications Lab	1
ECE 467	Biophotonics	3
ECE 468	Optical Remote Sensing	3
ECE 469	Power Electronics Laboratory	2
ECE 470	Introduction to Robotics	4
ECE 472	Biomedical Ultrasound Imaging	3
ECE 473	Fund of Engrg Acoustics	3 or 4
ECE 476	Power System Analysis	3
<u>ECE 478</u>	Formal Software Development Methods	3 or 4
ECE 480	Magnetic Resonance Imaging	3 or 4
ECE 481	Nanotechnology	4
<u>ECE 482</u>	Digital IC Design	3
ECE 483	Analog IC Design	3
<u>ECE 485</u>	MEMS Devices & Systems	3
ECE 486	Control Systems	4
<u>ECE 487</u>	Intro Quantum Electr for EEs	3
<u>ECE 488</u>	Compound Semicond & Devices	3
<u>ECE 489</u>	Robot Dynamics and Control	4
<u>ECE 490</u>	Introduction to Optimization	3 or 4
<u>ECE 491</u>	Numerical Analysis	3 or 4
<u>ECE 492</u>	Parallel Progrmg: Sci & Engrg	3 or 4
ECE 493	Advanced Engineering Math	3 or 4
ECE 495	Photonic Device Laboratory	3
<u>ECE 498</u>	Special Topics in ECE (As Approved)	0 to 4
<u>ECON 302</u>	Inter Microeconomic Theory (As Approved)	3
<u>IE 310</u>	Deterministic Models in Optimization	3
<u>IE 311</u>	Operations Research Lab	1
<u>IE 330</u>	Industrial Quality Control	3
<u>IE 340</u>	Human Factors	4
<u>IE 360</u>	Facilities Planning and Design	3
<u>IE 410</u>	Advanced Topics in Stochastic Processes & Applications	3 or 4
<u>IE 411</u>	Optimization of Large Systems	3 or 4

Code	Title	Hours
<u>IE 412</u>	OR Models for Mfg Systems	3 or 4
<u>IE 413</u>	Simulation	3 or 4
<u>IE 420</u>	Financial Engineering	3 or 4
<u>IE 430</u>	Economic Found of Quality Syst	3 or 4
<u>IE 431</u>	Design for Six Sigma	3
<u>IE 445</u>	Human Performance and Cognition in Context (As Approved)	3 or 4
<u>IE 497</u>	Independent Study (As Approved)	1 to 4
<u>IE 498</u>	Special Topics (As Approved)	1 to 4
<u>MATH 347</u>	Fundamental Mathematics	3
<u>MATH 357</u>	Numerical Methods I	3
<u>MATH 403</u>	Euclidean Geometry	3 or 4
MATH 412	Graph Theory	3 or 4
MATH 413	Intro to Combinatorics	3 or 4
MATH 414	Mathematical Logic	3 or 4
MATH 417	Intro to Abstract Algebra	3 or 4
MATH 418	Intro to Abstract Algebra II	3 or 4
MATH 423	Differential Geometry	3 or 4
MATH 424	Honors Real Analysis	3
MATH 425	Honors Advanced Analysis	3
MATH 427	Honors Abstract Algebra	3
MATH 428	Honors Topics in Mathematics (As Approved)	3
MATH 432	Set Theory and Topology	3 or 4
MATH 442	Intro Partial Diff Equations	3 or 4
MATH 444	Elementary Real Analysis	3 or 4
MATH 446	Applied Complex Variables	3 or 4
MATH 447	Real Variables	3 or 4
MATH 448	Complex Variables	3 or 4
MATH 450	Numerical Analysis	3 or 4
MATH 453	Number Theory	3 or 4
MATH 464	Statistics and Probability II	3 or 4
MATH 473	Algorithms	4
MATH 475	Formal Models of Computation	3 or 4
MATH 481	Vector and Tensor Analysis	3 or 4
MATH 482	Linear Programming	3 or 4
ΜΔΤΗ 484	Nonlinear Programming	3 or 4
<u>ΜΑΤΗ 487</u>	Advanced Engineering Math	3 or 4
<u>ΜΑΤΗ 489</u>	Dynamics & Differential Egns	3 or 4
<u>матн 490</u>	Advanced Tonics in Mathematics (As Approved)	1 to 4
<u>ΜΑΤΗ 492</u> ΜΔΤΗ 492	Lindergraduate Research in Math (As Approved)	1 to 3
MCB /01	Cellular Physiology	3
MCB 402	Sys & Integrative Physiology	3
MCB 403	Cell & Membrane Physiology	1 or 2
MCB 404	Suc & Integrative Physiology Lab	1 to 2
MCB 450	Jys & Integrative Flysion Lab Introductory Biochemistry	1 LU Z
MCB 402	Special Topics Mol Cell Biol (As Approved)	J 1 +^ 1
	Special topics into cell biol (As Approved)	I 10 4
	Electronic Droporties of Matta	С
115E 304	Electionic Properties of Matis	3

Code	Title	Hours
<u>MSE 307</u>	Materials Laboratory I	3
<u>MSE 308</u>	Materials Laboratory II	3
<u>MSE 401</u>	Thermodynamics of Materials	3
<u>MSE 402</u>	Kinetic Processes in Materials	3
<u>MSE 403</u>	Synthesis of Materials	3
<u>MSE 405</u>	Microstructure Determination	3
<u>MSE 406</u>	Thermal-Mech Behavior of Matls	3
<u>MSE 420</u>	Ceramic Materials & Properties	3
<u>MSE 421</u>	Ceramic Processing	3 or 4
<u>MSE 422</u>	Electrical Ceramics	3
<u>MSE 440</u>	Mechanical Behavior of Metals	3
<u>MSE 441</u>	Metals Processing	3
<u>MSE 443</u>	Design of Engineering Alloys	3
<u>MSE 445</u>	Corrosion of Metals	3 or 4
<u>MSE 450</u>	Polymer Science & Engineering	3 or 4
<u>MSE 453</u>	Plastics Engineering	3
MSE 455	Macromolecular Solids	3
MSE 456	Mechanics of Composites	3
MSE 457	Polymer Chemistry	3 or 4
MSE 458	Polymer Physics	3 or 4
MSE 460	Electronic Materials I	3
MSE 461	Electronic Materials II	3
MSE 466	Materials in Electrochem Syst	3
MSE 470	Design and Use of Biomaterials	3
MSE 473	Biomolecular Materials Science	3
MSE 474	Biomaterials and Nanomedicine	3
MSE 480	Surfaces and Colloids	3 or 4
MSE 481	Electron Microscopy	3 or 4
MSE 484	Composite Materials	3 or 4
MSE 485	Atomic Scale Simulations	3 or 4
MSE 487	Materials for Nanotechnology	3 or 4
MSE 488	Optical Materials	3 or 4
MSE 489	Matl Select for Sustainability	3 or 4
MSE 497	Independent Study (As Approved)	1 to 4
MSE 498	Special Topics (As Approved)	1 to 4
NPRE 330	Materials in Nuclear Engineering	3
NPRE 402	Nuclear Power Engineering	 3 or 4
NPRE 412	Nuclear Power Econ & Fuel Mgmt	3 or 4
NPRE 421	Plasma and Fusion Science	3
NPRE 423	Plasma Laboratory	2
NPRE 429	Plasma Engineering	3
NPRE 431	Course NPRE 431 Not Found	
NPRE 435	Radiological Imaging	3
NPRE 441	Radiation Protection	4
NPRE 442	Radioactive Waste Management	3
NPRE 444	Nuclear Analytical Methods Lab	2 or 3
NPRE 446	Radiation Interact w/Matter I	3

Code	Title	Hours
<u>NPRE 447</u>	Radiation Interact w/Matter II	3
<u>NPRE 448</u>	Nuclear Syst Engrg & Design	4
<u>NPRE 451</u>	NPRE Laboratory	3
<u>NPRE 455</u>	Neutron Diffusion & Transport	4
<u>NPRE 457</u>	Safety Anlys Nucl Reactor Syst	3 or 4
<u>NPRE 461</u>	Probabilistic Risk Assessment	3 or 4
<u>NPRE 470</u>	Fuel Cells & Hydrogen Sources	3
<u>NPRE 475</u>	Wind Power Systems	3 or 4
<u>NPRE 498</u>	Special Topics (As Approved)	1 to 4
<u>PHYS 330</u>	Atmospheric Dynamics II	3
<u>PHYS 401</u>	Classical Physics Lab	3
<u>PHYS 402</u>	Light	3 or 4
<u>PHYS 403</u>	Modern Experimental Physics	4 or 5
<u>PHYS 404</u>	Electronic Circuits	4 or 5
<u>PHYS 406</u>	Acoustical Physics of Music	4
<u>PHYS 427</u>	Thermal & Statistical Physics	4
<u>PHYS 435</u>	Electromagnetic Fields I	3
<u>PHYS 436</u>	Electromagnetic Fields II	3
<u>PHYS 460</u>	Condensed Matter Physics	4
<u>PHYS 466</u>	Atomic Scale Simulations	3 or 4
<u>PHYS 470</u>	Subatomic Physics	4
<u>PHYS 475</u>	Introduction to Biophysics	3 or 4
<u>PHYS 485</u>	Atomic Phys & Quantum Theory	3
<u>PHYS 486</u>	Quantum Physics I	4
<u>PHYS 487</u>	Quantum Physics II	4
<u>PHYS 496</u>	Communicating in Physics—Writing Papers and Giving Talks (As Approved)	)3
<u>PHYS 497</u>	Individual Study (As Approved)	1 to 4
<u>PHYS 498</u>	Special Topics in Physics (As Approved)	1 to 4
<u>SE 400</u>	Engineering Law (As Approved)	3 or 4
<u>SE 402</u>	Comp-Aided Product Realization	3 or 4
<u>SE 411</u>	Reliability Engineering	3 or 4
<u>SE 412</u>	Nondestructive Evaluation	3 or 4
<u>SE 413</u>	Engineering Design Optimization	3 or 4
<u>SE 420</u>	Digital Control Systems	4
<u>SE 422</u>	Robot Dynamics and Control	4
<u>SE 423</u>	Mechatronics	3
<u>SE 424</u>	State Space Design for Control	3
<u>SE 450</u>	Decision Analysis I (As Approved)	3 or 4
<u>SE 497</u>	Independent Study (As Approved)	0 to 4
<u>SE 498</u>	Special Topics (As Approved)	1 to 4
STAT 409	Actuarial Statistics II	4
<u>STAT 410</u>	Statistics and Probability II	3 or 4
<u>STAT 420</u>	Methods of Applied Statistics	3 or 4
<u>STAT 424</u>	Analysis of Variance	3 or 4
<u>STAT 425</u>	Statistical Modeling I	3 or 4
<u>STAT 426</u>	Statistical Modeling II	3 or 4
<u>STAT 428</u>	Statistical Computing	3 or 4

Code	Title	Hours	
<u>STAT 429</u>	Time Series Analysis	3 or 4	
<u>STAT 430</u>	Topics in Applied Statistics (As Approved)	3 or 4	
<u>STAT 440</u>	Statistical Data Management	3 or 4	
<u>STAT 443</u>	Professional Statistics (As Approved)	3 or 4	
<u>STAT 448</u>	Advanced Data Analysis	4	
<u>STAT 458</u>	Math Modeling in Life Sciences	3 or 4	
<u>STAT 480</u>	Data Science Foundations	3 or 4	
All 400 level TAM	courses, except potentially 497,498 12,13		
<u>TE 461</u>	Technology Entrepreneurship (As Approved)	3	
<u>TMGT 460</u>	Business Process Modeling	3	
<u>TMGT 461</u>	Tech, Eng, & Mgt Final Project	2	
<u>Free</u> Electives			
	Course List		
Code	Title		Hours
The Grainger Coll	ege of Engineering Liberal Education course list, or additional courses from	-the	<del>6</del>
campus General E	Education lists for Social and Behavioral Sciences or Humanities and the Art	<del>:s 14</del>	
Free electives. Ad	ditional unrestricted course work, subject to certain exceptions as noted by	<del>/ the</del>	<del>6</del>
College, so that the	here are at least 128 credit hours earned toward the degree. 15		
Additional course	work, subject to the Grainger College of Engineering restrictions to Free El	ectives,	<u>11</u>
so that there are	at least 128 credit hours earned toward the degree.		
Total Hours of Cu	rriculum to Graduate		128
<del>12</del>			
CHEM 103 require	ement waived for students who received test-based credit (AP, IB, or profic	<del>iency) fo</del>	F
CHEM 102, simila	rly CHEM 105 requirement waived for students who received test-based cre	edit for	
CHEM 104. Stude	nts are still required to have 128 hours minimum to graduate.		
3			
MATH 220%7C m	ay be substituted, with four of the five credit hours applying toward the de	<del>gree.</del> MA	ŦĦ
220%7C is appro	priate for students with no background in calculus.	-	
<b>4</b> MATH 415 may	be substituted for students entering prior to Fall 2021. <b>5</b> MATH 284 may be	<del>substitut</del>	<del>ed.<b>6</b></del>
CS 124 or CS 125	5 or ECE 220 may be substituted. <b>7</b>		
ECE 110 and ECE	210 (or ECE 211) combined may be substituted.8		
Advanced Compo	sition satisfied by completing ME 470%7C.9		
Transfers and Phy	rsics minor/dual degree students may substitute PHYS 325. <b>10</b>		
Transfers and ECI	E minor/dual degree students may substitute ECE 313. <b>11</b>		
A maximum of 3	hours of independent/individual study courses may be used to satisfy the M	<del>lechSE E</del>	lective
or Technical Elect	ive requirements.		
<del>12</del>			
Depending on the	technical content, some Special Topics courses may not be approved for T	- echnical	
Elective credit. Pl	ease provide a syllabus of the course to the Mechanical Science and Engine	ering	
Underaraduate Pr	ograms Office to request use of the course for Technical Elective credit nric	ə <del>r to reai</del>	<del>sterina</del>
for the course.			
<del>13</del>			
Professional Flast	ive course. No more than 2 hours of professional elective credit may be use	ad to cat	icfu

Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.

<del>14</del>

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.

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

Corresponding BS Bachelor of Science Degree

Program Featur	es
Academic Level	Undergraduate
Does this major have transcripted concentrations?	No
What is the typical ti 4 years	me to completion of this program?
What are the minimu 128	um Total Credit Hours required for this program?
CIP Code	141901 - Mechanical Engineering.
Is This a Teacher Ce	rtification Program? No
Will specialized accre	editation 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 ME 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 beyond what is c	or revision r urrently avai	require staffir ilable?	ng (faculty,	advisors, etc.)
	No			
Additional Budge	t			

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?

### **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.22.093
Attach Rollback/Approval Notices	ep22093_response from sponsor_20220214.pdf
This proposal	No

requires	HLC
inquiry	

## DMI Documentation

Attach Final Approval Notices				
Banner/Codebook Name	BS:Mechanical Engineerng -UIUC			
Program Code:	10KP0133BS			
Minor Code 0133	Conc Code	Degree Code	BS	Major Code
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				

	]		
GREEN HIGHLIGHT = Course addition, updated hours, or added/revised/reordered footnote	-		
<b>RED HIGHLIGHT</b> = Course has been removed			
Current Requirement	Current Hours	Revised Requirements	Revised Hours
Orientation and Professional Development	0	Orientation and Professional Development	0
ENG 100: Engineering Orientation <sup>4</sup> ME 290: Seminar	0	ENG 100: Engineering Orientation <sup>4</sup> ME 290: Seminar	0
			•
Foundational Mathematics and Science	29	Foundational Mathematics and Science	29
CHEM 102: General Chemistry I	3	CHEM 102: General Chemistry I	3
CHEM 103: General Chemistry Lab I <sup>2</sup>	1	CHEM 103: General Chemistry Lab I <sup>2</sup>	1 4
MATH 221: Calculus I MATH 231: Calculus II	3	MATH 221: Calculus I MATH 231: Calculus II	3
MATH 241: Calculus III	4	MATH 241: Calculus III	4
		MATH 257: Linear Algebra with Computational Applications <sup>4</sup>	3
MATH 285: Intro Differential Equations <sup>4</sup>	3	MATH 285: Intro Differential Equations <sup>5</sup>	3
MATH 415: Applied Linear Algebra PHVS 211: University Physics: Mechanics	3 4	PHVS 211. University Physics: Mechanics	Δ
PHYS 212: University Physics: Elec & Mag	4	PHYS 212: University Physics: Elec & Mag	4
Mechanical Engineering Technical Core	52	Mechanical Engineering Technical Core	52
CS 101: Intro Computing: Engrg & Sci <sup>2</sup>	3	CS 101: Intro Computing: Engrg & Sci <sup>o</sup>	3
ECE 205: Electrical and Electronic Circuits ECE 206: Electrical and Electronic Circuits Lab	3	ECE 205: Electrical and Electronic Circuits ECE 206: Electrical and Electronic Circuits Lab	5 1
ME 170: Computer-Aided Design	3	ME 170: Computer-Aided Design	3
ME 200: Thernodynamics	3	ME 200: Thermodynamics	3
ME 270: Design for Manufacturability	3	ME 270: Design for Manufacturability	3
ME 310: Fundamentals of Fluid Dynamics ME 320: Heat Transfer	4	ME 310: Fundamentals of Fluid Dynamics ME 320: Heat Transfer	4 4
ME 330: Engineering Materials	4	ME 330: Engineering Materials	4
ME 340: Dynamics of Mechanical Systems	3.5	ME 340: Dynamics of Mechanical Systems	3.5
ME 360: Signal Processing	3.5	ME 360: Signal Processing	3.5
ME 370: Mechanical Design I ME 371: Mechanical Design II	3	ME 3/0: Mechanical Design I ME 371: Mechanical Design II	3
ME 470: Senior Design Project <sup>7</sup>	3	ME 470: Senior Design Project <sup>8</sup>	3
TAM 210: Introduction to Statics	2	TAM 210: Introduction to Statics	2
TAM 212: Introductory Dynamics <sup>8</sup>	3	TAM 212: Introductory Dynamics <sup>9</sup>	3
TAM 251: Introductory Solid Mechanics	3	TAM 251: Introductory Solid Mechanics	3
Technical Electives		Technical Electives	
Science elective, chosen from one of the following:	4	Science elective, chosen from one of the following:	4
CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II <sup>2</sup>		CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II <sup>2</sup>	
MCB 150: Molec & Cellular Basis of Life		MCB 150: Molec & Cellular Basis of Life	
Statistics elective one course chosen from: <sup>9</sup>	3	Statistics elective one course chosen from <sup>10</sup>	3
IE 300: Analysis of Data	5	IE 300: Analysis of Data	5
STAT 400: Statistics and Probability I		STAT 400: Statistics and Probability I	
MechSE electives chosen from a departmentally approved list. See list below.	6	MechSE electives chosen from a departmentally approved list. See list below.	6
Technical electives chosen from a departmentally approved list below.	6	Technical electives chosen from a departmentally approved list below.	6
AE 352. Aerospace Dynamical Systems AE 402: Orbital Mechanics	3 or 4		
AE 403: Spacecraft Attitude Control	3 or 4		
AE 410: Computational Aerodynamics	3 or 4		
AE 412: Viscous Flow & Heat Transfer	4 2 or 4		
AE 410: Applied Actorynamics AE 419: Aircraft Flight Mechanics	3 or 4		
AE 420: Finite Element Analysis	3 or 4		
AE 427: Mechanics of Polymers	3		
AE 428: Mechanics of Composites	3		
AE 435. Actospace Propulsion AE 434: Rocket Propulsion	3 or 4		
AE 442: Aerospace Systems Design I	3		
AE 443: Aerospace Systems Design II	3		
AE 451: Aeroelasticity AE 454: Systems Dynamics & Control	3 or 4		
AE 454: Systems Dynamics & Control AE 456: Global Nav Satellite Systems	4		
AE 460: Aerodynamics & Propulsion Lab	2		
AE 461: Structures & Control Lab	2		
AE 482: Introduction to Robotics	4		
AE 497: Independent Study <sup>10</sup>	1 to 4		
AE 498: Special Topics (Depending on topic) <sup>11</sup>	1 to 4		
ABE 430: Project Management <sup>12</sup>	2	ABE 430: Project Management <sup>11</sup>	2
ABE 436: Renewable Energy Systems	3 or 4	ABE 436: Renewable Energy Systems	3 or 4
ABE 445: Statistical Methods	4	ABE 445: Statistical Methods	4
ABE 455: Erosion and Sediment Control ABE 456: Land & Water Resources Engrg	2 3 or 4	ABE 455: Erosion and Sediment Control ABE 456: Land & Water Resources Engrg	2 3 or 4
ABE 459: Drainage and Water Management	3 or 4	ABE 459: Drainage and Water Management	3 or 4
ABE 463: Electrohydraulic Systems	3	ABE 463: Electrohydraulic Systems	3
ABE 466: Engineering Off-Road Vehicles	3	ABE 466: Engineering Off-Road Vehicles	3
ABE 409: Industry-Linked Design Project ABE 474: Indoor Environmental Control	4 3 or 4	ABE 409: Industry-Linked Design Project ABE 474: Indoor Environmental Control	4 3 or 4
ABE 476: Indoor Air Quality Engineering	4	ABE 476: Indoor Air Quality Engineering	4
ABE 483: Engineering Properties of Food Materials	3	ABE 483: Engineering Properties of Food Materials	3
ABE 488: Bioprocessing Biomass for Fuel	4	ABE 488: Bioprocessing Biomass for Fuel	4
ABE 497: Independent Study <sup>10</sup>	1 to 4	ABE 497: Independent Study <sup>12</sup>	1 to 4
ABE 498: Special Topics	1 10 4	ABE 498: Special Topics The Association of the Asso	3
		AE 402: Orbital Mechanics	3 or 4
		AE 403: Spacecraft Attitude Control	3 or 4
		AE 410: Computational Aerodynamics	3 or 4
	1	AE 412: VISCOUS Flow & Heat I ransfer	4 3 or 4
		AF 416: Applied Aerodynamics	
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics	3 or 4
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis	3 or 4 3 or 4
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis AE 428: Mechanics of Composites	3 or 4 3 or 4 3
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis AE 428: Mechanics of Composites AE 433: Aerospace Propulsion AE 434: Rocket Propulsion	3 or 4 3 or 4 3 or 4 3 or 4
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis AE 428: Mechanics of Composites AE 433: Aerospace Propulsion AE 434: Rocket Propulsion AE 442: Aerospace Systems Design I	3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis AE 428: Mechanics of Composites AE 433: Aerospace Propulsion AE 434: Rocket Propulsion AE 442: Aerospace Systems Design I AE 443: Aerospace Systems Design II	3 or 4 3 or 4
		AE 416: Applied Aerodynamics AE 419: Aircraft Flight Mechanics AE 420: Finite Element Analysis AE 428: Mechanics of Composites AE 433: Aerospace Propulsion AE 434: Rocket Propulsion AE 434: Rocket Propulsion AE 442: Aerospace Systems Design I AE 443: Aerospace Systems Design II AE 451: Aeroelasticity	3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 3 or 4 3 3 or 4 3 3 or 4

		AE 456: Global Nav Satellite Systems	4
	_	AE 460: Aerodynamics & Propulsion Lab AE 461: Structures & Control Lab	2
		AE 482: Introduction to Robotics	4
	_	AE 483: Autonomous Systems Lab	2 1 to 4
		AE 497: Independent Study AE 498: Special Topics (Depending on topic) <sup>13</sup>	1 to 4
ASRM 410: Investments and Financial Markets	3 or 4	ASRM 410: Investments and Financial Markets	3 or 4
ASRM 461: Loss Models ASRM 469: Casualty Actuarial Mathematics	3 3 or 4	ASRM 461: Loss Models ASRM 469: Casualty Actuarial Mathematics	3 3 or 4
ASRM 471: Life Contingencies I	4	ASRM 471: Life Contingencies I	4
ASRM 472: Life Contingencies II	3	ASRM 472: Life Contingencies II	3
BIOC 406: Gene Expression & Regulation BIOC 440: Physical Chemistry Principles	3 4	BIOC 406: Gene Expression & Regulation BIOC 440: Physical Chemistry Principles	3
BIOC 446: Physical Biochemistry	3	BIOC 446: Physical Biochemistry	3
BIOC 455: Technqs Biochem & Biotech	4	BIOC 455: Technqs Biochem & Biotech	4
BIOE 380: Biomedical Imaging BIOE 414: Biomedical Instrumentation	3	BIOE 380: Biomedical Imaging BIOE 414: Biomedical Instrumentation	3
BIOE 415: Biomedical Instrumentation Lab	2	BIOE 415: Biomedical Instrumentation Lab	2
BIOE 416: Biosensors	3	BIOE 416: Biosensors	3
BIOE 461: Cellular Biomechanics BIOE 476: Tissue Engineering	4	BIOE 461: Cellular Biomechanics BIOE 476: Tissue Engineering	3
BIOE 479: Cancer Nanotechnology	3	BIOE 479: Cancer Nanotechnology	3
BIOE 481: Whole-Body Musculoskel Biomech	3 or 4	BIOE 481: Whole-Body Musculoskel Biomech	3 or 4
SIOE 482: Musculoskel Tissue Mechanics	1 to 4	BIOE 482: Musculoskel Lissue Mechanics BIOE 497: Individual Study <sup>12</sup>	1 to 4
BIOE 498: Special Topics <sup>11</sup>	1 to 4	BIOE 498: Special Topics <sup>13</sup>	1 to 4
BIOP 401: Introduction to Biophysics	3	BIOP 401: Introduction to Biophysics	3
BIOP 419: Brain, Behavior & Info Process BIOP 432: Photosynthesis	3	BIOP 419: Brain, Behavior & Info Process BIOP 432: Photosynthesis	3
	5	CEE 310: Transportation Engineering	3
		CEE 330: Environmental Engineering	3
	_	CEE 340: Energy and Global Environment CEE 350: Water Resources Engineering	3
		CEE 360: Structural Engineering	3
		CEE 380: Geotechnical Engineering	3
		CEE 398: Special Topics <sup>13</sup> CEE 401: Concrete Materials	0 to 4
		CEE 405: Asphalt Materials I	3 or 4
		CEE 406: Pavement Design I	3 or 4
		CEE 407: Airport Design CEE 408: Railroad Transportation Engrg	3 or 4 3 or 4
		CEE 409: Railroad Track Engineering	3 or 4
		CEE 410: Railway Signaling & Control	3 or 4
		CEE 411: RR Project Design & Constr CEE 412: High-Speed Rail Engineering	3 or 4
		CEE 415: Geometric Design of Roads	4
		CEE 416: Traffic Capacity Analysis	3 or 4
	_	CEE 417: Urban Transportation Planning " CEE 418: Public Transportation Systems	4 3 or 4
		CEE 420: Construction Productivity	3 or 4
		CEE 421: Construction Planning	3 or 4
		CEE 422: Construction Cost Analysis CEE 424: Sustainable Const Methods	4
		CEE 430: Ecological Quality Engineering	2
		CEE 434: Environmental Systems I	3
		CEE 437: water Quality Engineering CEE 438: Science & Environmental Policy	3
		CEE 440: Fate Cleanup Environ Pollutant	4
	_	CEE 442: Environmental Engineering Principles, Physical	4
		CEE 444: Env Eng Principles, Biological	4
		CEE 445: Air Quality Modeling	4
	_	CEE 446: Air Quality Engineering	4
		CEE 449: Environmental Engineering Lab	3
		CEE 450: Surface Hydrology	3
		CEE 451: Environmental Fluid Mechanics CEE 452: Hydraulic Analysis and Design	3
	_	CEE 453: Urban Hydrology and Hydraulics	4
		CEE 457: Groundwater	3
		CEE 458: water Kesources Field Methods CEE 460: Steel Structures I	4
		CEE 461: Reinforced Concrete I	3
		CEE 462: Steel Structures II	3 or 4
		CEE 405: Reinforced Concrete II CEE 465: Design of Structural Systems	3 or 4
		CEE 467: Masonry Structures	3 or 4
		CEE 468: Prestressed Concrete	3 or 4
		CEE 409: wood Structures CEE 470: Structural Analysis	3 or 4 4
		CEE 471: Structural Mechanics	3 or 4
		CEE 472: Structural Dynamics I CEE 483: Soil Mechanics and Behavior	3 or 4
		CEE 484: Applied Soil Mechanics	3 or 4
		CEE 491: Decision and Risk Analysis	3 or 4
		CEE 497: Independent Study <sup>12</sup>	1 to 16
CHBE 422: Mass Transfer Operations	4	CEE 498: Special Topics <sup>20</sup> CHBE 422: Mass Transfer Operations	4
CHBE 424: Chemical Reaction Engineering	3	CHBE 424: Chemical Reaction Engineering	3
CHBE 451: Transport Phenomena	3	CHBE 451: Transport Phenomena	3
CHBE 452: Unemical Kinetics & Catalysis CHBE 453: Electrochemical Engineering	3 2 or 3	CHBE 452: Chemical Kinetics & Catalysis CHBE 453: Electrochemical Engineering	3 2 or 3
CHBE 456: Polymer Science & Engineering	3	CHBE 456: Polymer Science & Engineering	3
CHBE 457: Microelectronics Processing	3	CHBE 457: Microelectronics Processing	3
CHBE 471: Biochemical Engineering	3 or 4	CHBE 4/1: Biochemical Engineering CHBE 472: Techniques in Biomolecular Eng	3 or 4
CHBE 473: Biomolecular Engineering	3 or 4	CHBE 473: Biomolecular Engineering	3 or 4
	3 or 4	CHBE 474: Metabolic Engineering	3 or 4
CHBE 474: Metabolic Engineering	-		10
CHBE 474: Metabolic Engineering         CHBE 475: Tissue Engineering         CHBE 476: Biotransport	3	CHBE 475: Tissue Engineering CHBE 476: Biotransport	3
CHBE 474: Metabolic Engineering         CHBE 475: Tissue Engineering         CHBE 476: Biotransport         CHEM 232: Elementary Organic Chemistry I	3 3 3 or 4	CHBE 475: Tissue Engineering         CHBE 476: Biotransport         CHEM 232: Elementary Organic Chemistry I	3 3 3 or 4

CHEM 237: Structure and Synthesis	2	CHEM 237: Structure and Synthesis	2
CHEM 312: Inorganic Chemistry	3	CHEM 312: Inorganic Chemistry	3
CHEM 315: Instrumental Chem Systems Lab	2	CHEM 315: Instrumental Chem Systems Lab	3
CHEM 332: Elementary Organic Chem II	4	CHEM 332: Elementary Organic Chem II	4
CHEM 420: Instrumental Characterization	2	CHEM 420: Instrumental Characterization	2
CHEM 436: Fundamental Organic Chem II	3	CHEM 436: Fundamental Organic Chem II	3
CHEM 437: Organic Chemistry Lab CHEM 438: Advanced Organic Chemistry	3	CHEM 437: Organic Chemistry Lab CHEM 438: Advanced Organic Chemistry	3
CHEM 440: Physical Chemistry Principles	4	CHEM 440: Physical Chemistry Principles	4
CHEM 442: Physical Chemistry I	4	CHEM 442: Physical Chemistry I	4
CHEM 444: Physical Chemistry II CHEM 445: Physical Principles Lab L	4	CHEM 444: Physical Chemistry II CHEM 445: Physical Principles Lab L	4
CHEM 447: Physical Principles Lab I	2	CHEM 447: Physical Principles Lab I	2
CHEM 450: Astrochemistry	4	CHEM 450: Astrochemistry	4
CHEM 451: Astrochemistry Laboratory	3 or 4	CHEM 451: Astrochemistry Laboratory	3 or 4
CHEM 460: Green Chemistry CHEM 472: Physical Biochemistry	3 or 4	CHEM 460: Green Chemistry CHEM 472: Physical Biochemistry	3 or 4
CHEM 474: Drug Discovery & Development	3	CHEM 474: Drug Discovery & Development	3
CHEM 480: Polymer Chemistry	3 or 4	CHEM 480: Polymer Chemistry	3 or 4
CHEM 482: Polymer Physics	3 or 4	CHEM 482: Polymer Physics	3 or 4
CHEM 483: Solid State Structural Anilys CHEM 488: Surfaces and Colloids	4 3 or 4	CHEM 485: Solid State Structural Aniys CHEM 488: Surfaces and Colloids	4 3 or 4
CHEM 497: Individual Study Senior <sup>10</sup>	1 to 3	CHEM 497: Individual Study Senior <sup>12</sup>	1 to 3
CEE 310: Transportation Engineering	3		
CEE 330: Environmental Engineering	3		_
CEE 340: Energy and Global Environment CEE 350: Water Resources Engineering	3		
CEE 360: Structural Engineering	3		
CEE 380: Geotechnical Engineering	3		
CEE 398: Special Topics <sup>11</sup>	0 to 4		
CEE 401. Concrete Materials CEE 405: Asphalt Materials I	4 3 or 4		-
CEE 406: Pavement Design I	3 or 4		
CEE 407: Airport Design	3 or 4		
CEE 408: Railroad Transportation Engrg	3 or 4		
CEE 409: Kairoad Track Engineering CEE 410: Railway Signaling & Control	3 or 4		
CEE 411: RR Project Design & Constr	3 or 4		
CEE 412: High-Speed Rail Engineering	3 or 4		
CEE 415: Geometric Design of Roads	4		
CEE 410: Traine Capacity Analysis CEE 417: Urban Transportation Planning <sup>12</sup>	3 or 4		
CEE 417. Orban Transportation Framming CEE 418: Public Transportation Systems	3 or 4		
CEE 420: Construction Productivity	3 or 4		
CEE 421: Construction Planning	3 or 4		_
CEE 422: Construction Cost Analysis CEE 424: Sustainable Const Methods	3 or 4		_
CEE 430: Ecological Quality Engineering	2		
CEE 434: Environmental Systems I	3		
CEE 437: Water Quality Engineering	3		_
CEE 438: Science & Environmental Policy CEE 440: Fate Cleanup Environ Pollutant	3		_
CEE 442: Environmental Engineering Principles, Physical	4		
CEE 443: Env Eng Principles, Chemical	4		
CEE 444: Env Eng Principles, Biological	4		
CEE 445: Air Quality Modeling CEE 446: Air Quality Engineering	4		_
CEE 447: Atmospheric Chemistry	4		
CEE 449: Environmental Engineering Lab	3		
CEE 450: Surface Hydrology	3		_
CEE 451: Environmental Fluid Mechanics CEE 452: Hydraulic Analysis and Design	3		_
CEE 453: Urban Hydrology and Hydraulics	4		
CEE 457: Groundwater	3		
CEE 458: Water Resources Field Methods CEE 460: Steel Structures I	4		_
CEE 461: Reinforced Concrete I	3		_
CEE 462: Steel Structures II	3 or 4		
CEE 463: Reinforced Concrete II	3 or 4		
CEE 465: Design of Structural Systems	3 3 or 4		
CEE 468: Prestressed Concrete	3 or 4		
CEE 469: Wood Structures	3 or 4		
CEE 470: Structural Analysis	4		
CEE 471: Structural Mechanics	3 or 4		
CEE 480: Foundation Engineering	3		
CEE 483: Soil Mechanics and Behavior	4		
CEE 484: Applied Soil Mechanics	3 or 4		
CEE 491: Decision and Risk Analysis	3 or 4		
CEE 497: Independent Study <sup>10</sup>	1 to 16		
CEE 456. Special Topics	4	CS 225: Data Structures	4
CS 233: Computer Architecture	4	CS 233: Computer Architecture	4
CS 241: System Programming	4	CS 241: System Programming	4
CS 242: Programming Studio		ICS 242. Programming Studio	3
UN 55 /: Numerical Methods I	3	CS 357: Numerical Methods I	3
CS 35 /: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation	3 3 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation	3 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems	3 3 4 3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems	3 4 3 or 4
CS 357: Numerical Methods 1 CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems	3 3 4 3 or 4 3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems	3 4 3 or 4 3 or 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics	3 3 4 3 or 4 3 or 4 3 or 4 3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatories	3 4 3 or 4 3 or 4 3 or 4 3 or 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems	3 3 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems	3 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4
CS 35 /: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics	3 3 4 3 or 4 3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics	3 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4
CS 357: Numerical Methods 1 CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics	3 3 4 3 or 4 3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics	3 4 3 or 4 3 or 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Programs: Sci & Engrg	3         3         4         3 or 4	CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Councilers	3 4 3 or 4 3 or 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Progrmg: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design	3         3         4         3 or 4	CS 212: Programming locate CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design	3 4 3 or 4 3 or 4
CS 35 /: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Progrmg: Sci & Engrg CS 421: Programming Languages & Compilers CS 423: Operating Systems Design	3         3         4         3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design	3         4         3 or 4
CS 35 /: Numerical Methods 1         CS 374: Introduction to Algorithms & Models of Computation         CS 410: Text Information Systems         CS 411: Database Systems         CS 411: Database Systems         CS 412: Introduction to Data Mining         CS 413: Intro to Combinatorics         CS 414: Multimedia Systems         CS 418: Interactive Computer Graphics         CS 419: Production Computer Graphics         CS 420: Parallel Progrmg: Sci & Engrg         CS 421: Programming Languages & Compilers         CS 422: Programming Language Design         CS 423: Operating Systems         CS 424: Real-Time Systems	3         3         4         3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program; Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems	3         4         3 or 4
CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 425: Distributed Systems	3         3         4         3 or 4          3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program; Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 425: Distributed Systems	3         4         3 or 4
CS 357: Numerical Methods 1 CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Programs: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 426: Compiler Construction CS 427: Software Engineering I	3         3         4         3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Programg: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 426: Compiler Construction CS 427: Software Engineering I	3         4         3 or 4
CS 357: Numerical Methods 1 CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 414: Multimedia Systems CS 419: Production Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 425: Distributed Systems CS 426: Compiler Construction CS 427: Software Engineering I CS 428: Software Engineering I	3         3         4         3 or 4	CS 357: Numerical Methods I CS 357: Numerical Methods I CS 374: Introduction to Algorithms & Models of Computation CS 410: Text Information Systems CS 411: Database Systems CS 412: Introduction to Data Mining CS 413: Intro to Combinatorics CS 414: Multimedia Systems CS 414: Multimedia Systems CS 418: Interactive Computer Graphics CS 419: Production Computer Graphics CS 420: Parallel Program: Sci & Engrg CS 420: Parallel Program: Sci & Engrg CS 421: Programming Languages & Compilers CS 422: Programming Language Design CS 423: Operating Systems Design CS 424: Real-Time Systems CS 425: Distributed Systems CS 426: Compiler Construction CS 427: Software Engineering I CS 428: Software Engineering II	3         4         3 or 4

CS 429: Software Engineering II, ACP	3	CS 429: Software Engineering II, ACP	3
CS 433: Computer System Organization	3 or 4 3 or 4	CS 431: Embedded Systems CS 433: Computer System Organization	3 or 4
CS 436: Computer Networking Laboratory	3 or 4	CS 436: Computer Networking Laboratory	3 or 4
CS 438: Communication Networks CS 439: Wireless Networks	3 or 4 3 or 4	CS 438: Communication Networks CS 439: Wireless Networks	3 or 4 3 or 4
CS 440: Artificial Intelligence	3 or 4	CS 440: Artificial Intelligence	3 or 4
CS 445: Computational Photography CS 446: Machine Learning	3 or 4 3 or 4	CS 445: Computational Photography CS 446: Machine Learning	3 or 4 3 or 4
CS 447: Natural Language Processing	3 or 4	CS 447: Natural Language Processing	3 or 4
CS 450: Numerical Analysis CS 457: Numerical Methods II	3 or 4 3	CS 450: Numerical Analysis CS 457: Numerical Methods II	3 or 4 3
CS 460: Security Laboratory	3 or 4	CS 460: Security Laboratory	3 or 4
CS 461: Computer Security I CS 463: Computer Security II	4 3 or 4	CS 461: Computer Security I CS 463: Computer Security II	4 3 or 4
CS 465: User Interface Design	3 or 4	CS 465: User Interface Design	3 or 4
CS 466: Introduction to Bioinformatics CS 467: Social Visualization	3 or 4 3 or 4	CS 466: Introduction to Bioinformatics CS 467: Social Visualization	3 or 4 3 or 4
CS 468: Tech and Advertising Campaigns	3	CS 468: Tech and Advertising Campaigns	3
CS 473: Algorithms CS 475: Formal Models of Computation	4 3 or 4	CS 473: Algorithms CS 475: Formal Models of Computation	4 3 or 4
CS 476: Program Verification	3 or 4	CS 476: Program Verification	3 or 4
CS 477: Formal Software Development Methods CS 481: Advanced Topics in Stochastic Processes & Applications	3 or 4	CS 477: Formal Software Development Methods CS 481: Advanced Topics in Stochastic Processes & Applications	3 or 4
CS 483: Applied Parallel Programming	4	CS 483: Applied Parallel Programming	4
CS 484: Parallel Programming	3 or 4	CS 484: Parallel Programming	3 or 4
CSE 401: Numerical Analysis	3 or 4	CSE 401: Numerical Analysis	3 or 4
CSE 402: Parallel Progrmg: Sci & Engrg	3 or 4	CSE 402: Parallel Progrmg: Sci & Engrg	3 or 4
CSE 441: Introduction to Optimization	3 or 4	CSE 441: Introduction to Optimization	3 or 4
CSE 450: Computational Mechanics	3 or 4	CSE 450: Computational Mechanics	3 or 4
CSE 451: Finite Element Analysis CSE 461: Computational Aerodynamics	3 or 4	CSE 451: Finite Element Analysis CSE 461: Computational Aerodynamics	3 or 4
ECE 329: Fields and Waves I	3	ECE 329: Fields and Waves I	3
ECE 330: Power Ckts & Electromechanics ECE 333: Green Electric Energy	3	ECE 330: Power Ckts & Electromechanics ECE 333: Green Electric Energy	3
ECE 340: Semiconductor Electronics	3	ECE 340: Semiconductor Electronics	3
ECE 342: Electronic Circuits ECE 343: Electronic Circuits Laboratory	3	ECE 342: Electronic Circuits ECE 343: Electronic Circuits Laboratory	3
ECE 380: Biomedical Imaging	3	ECE 380: Biomedical Imaging	3
ECE 385: Digital Systems Laboratory ECE 395: Advanced Digital Projects Lab	3 2 or 3	ECE 385: Digital Systems Laboratory ECE 395: Advanced Digital Projects Lab	3 2 or 3
ECE 401: Signal and Image Analysis	4	ECE 401: Signal and Image Analysis	4
ECE 402: Electronic Music Synthesis ECE 403: Audio Engineering	3	ECE 402: Electronic Music Synthesis ECE 403: Audio Engineering	3
ECE 408: Applied Parallel Programming	4	ECE 408: Applied Parallel Programming	4
ECE 411: Computer Organization & Design	4	ECE 411: Computer Organization & Design	4
ECE 414: Biomedical Instrumentation	3	ECE 412: Merocomputer Easonatory ECE 414: Biomedical Instrumentation	3
ECE 415: Biomedical Instrumentation Lab	2	ECE 415: Biomedical Instrumentation Lab	2
ECE 417: Multimedia Signal Processing	4	ECE 417: Multimedia Signal Processing	4
ECE 418: Image & Video Processing	4 2 or 4	ECE 418: Image & Video Processing	4 2 or 4
ECE 419. Security Laboratory ECE 420: Embedded DSP Laboratory	2	ECE 420: Embedded DSP Laboratory	2
ECE 422: Computer Security I	4 2 or 4	ECE 422: Computer Security I	4 2 or 4
ECE 424: Computer Security II ECE 425: Intro to VLSI System Design	3 01 4	ECE 424: Computer Security II ECE 425: Intro to VLSI System Design	3 01 4
ECE 428: Distributed Systems	3 or 4	ECE 428: Distributed Systems	3 or 4
ECE 431: Electric Machinery ECE 432: Advanced Electric Machinery	3	ECE 431: Electric Machinery ECE 432: Advanced Electric Machinery	3
ECE 435: Computer Networking Laboratory	3 or 4	ECE 435: Computer Networking Laboratory	3 or 4
ECE 437: Sensors and instrumentation ECE 438: Communication Networks	3 3 or 4	ECE 437: Sensors and instrumentation ECE 438: Communication Networks	3 or 4
ECE 439: Wireless Networks	3 or 4	ECE 439: Wireless Networks	3 or 4
ECE 441: Physics & Modeling Semicond Dev ECE 444: IC Device Theory & Fabrication	3	ECE 441: Physics & Modeling Semicond Dev ECE 444: IC Device Theory & Fabrication	3 4
ECE 447: Active Microwave Ckt Design	3	ECE 447: Active Microwave Ckt Design	3
ECE 448: Artificial Intelligence ECE 451: Adv Microwave Measurements	3 or 4 3	ECE 448: Artificial Intelligence ECE 451: Adv Microwave Measurements	3 or 4 3
ECE 452: Electromagnetic Fields	3	ECE 452: Electromagnetic Fields	3
ECE 453: wireless Communication Systems ECE 454: Antennas	3	ECE 453: wireless Communication Systems ECE 454: Antennas	3
ECE 455: Optical Electronics	3 or 4	ECE 455: Optical Electronics	3 or 4
ECE 456: Global Nav Satellite Systems ECE 457: Microwave Devices & Circuits	3	ECE 456: Global Nav Satellite Systems ECE 457: Microwave Devices & Circuits	3
ECE 458: Applic of Radio Wave Propag	3	ECE 458: Applic of Radio Wave Propag	3
ECE 459: Communications Systems ECE 460: Optical Imaging	3	ECE 459: Communications Systems ECE 460: Optical Imaging	3 4
ECE 462: Logic Synthesis	3	ECE 462: Logic Synthesis	3
ECE 463: Digital Communications Lab ECE 464: Power Electronics	2 3	ECE 463: Digital Communications Lab ECE 464: Power Electronics	2 3
ECE 465: Optical Communications Systems	3	ECE 465: Optical Communications Systems	3
ECE 466: Optical Communications Lab ECE 467: Biophotonics	1 3	ECE 466: Optical Communications Lab ECE 467: Biophotonics	3
ECE 468: Optical Remote Sensing	3	ECE 468: Optical Remote Sensing	3
ECE 469: Power Electronics Laboratory ECE 470: Introduction to Robotics	2	ECE 469: Power Electronics Laboratory ECE 470: Introduction to Robotics	2 4
ECE 472: Biomedical Ultrasound Imaging	3	ECE 472: Biomedical Ultrasound Imaging	3
ECE 473: Fund of Engrg Acoustics ECE 476: Power System Analysis	3 or 4	ECE 473: Fund of Engrg Acoustics ECE 476: Power System Analysis	3 or 4
ECE 478: Formal Software Development Methods	3 or 4	ECE 478: Formal Software Development Methods	3 or 4
ECE 480: Magnetic Resonance Imaging	3 or 4	ECE 480: Magnetic Resonance Imaging	3 or 4
ECE 482: Digital IC Design	3	ECE 482: Digital IC Design	3
ECE 483: Analog IC Design	3	ECE 483: Analog IC Design	3
ECE 486: Control Systems	4	ECE 486: Control Systems	4
ECE 487: Intro Quantum Electr for EEs	3	ECE 487: Intro Quantum Electr for EEs	3
	3	ECE 188. Compound Somicond & Davison	1
ECE 489: Robot Dynamics and Control	3 4	ECE 488: Compound Semicond & Devices ECE 489: Robot Dynamics and Control	4
ECE 488: Compound Semicond & Devices ECE 489: Robot Dynamics and Control ECE 490: Introduction to Optimization ECE 491: Numerical Analysis	3 4 3 or 4 3 or 4	ECE 488: Compound Semicond & Devices ECE 489: Robot Dynamics and Control ECE 490: Introduction to Optimization ECE 491: Numerical Analysis	3 4 3 or 4 3 or 4

ECE 493: Advanced Engineering Math	3 or 4	ECE 493: Advanced Engineering Math	3 or 4
ECE 495: Photonic Device Laboratory ECE 498: Special Topics in ECE <sup>11</sup>	0 to 4	ECE 495: Photonic Device Laboratory ECE 498: Special Topics in ECE <sup>13</sup>	0 to 4
ECON 302: Inter Microeconomic Theory <sup>12</sup>	3	ECON 302: Inter Microeconomic Theory <sup>11</sup>	3
SE 402: Comp-Aided Product Realization	3 or 4		
SE 411: Kendomy Engineering SE 412: Nondestructive Evaluation	3 or 4		
SE 413: Engineering Design Optimization	3 or 4		
SE 420: Digital Control Systems SE 422: Robot Dynamics and Control	4		
SE 423: Mechatronics	3		
SE 424: State Space Design for Control	3		
SE 450: Decision Analysis I <sup>12</sup>	3  or  4		_
SE 497: Independent Study	1 to 4		
IE 310: Deterministic Models in Optimization	3	IE 310: Deterministic Models in Optimization	3
IE 311: Operations Research Lab	1	IE 311: Operations Research Lab	1
IE 340: Human Factors	3	IE 340: Human Factors	3
IE 360: Facilities Planning and Design	3	IE 360: Facilities Planning and Design	3
IE 410: Advanced Topics in Stochastic Processes & Applications	3 or 4	IE 410: Advanced Topics in Stochastic Processes & Applications	3 or 4
IE 411: Optimization of Large Systems IE 412: OR Models for Mfg Systems	3 or 4	IE 411: Optimization of Large Systems IE 412: OR Models for Mfg Systems	3 or 4
IE 413: Simulation	3 or 4	IE 413: Simulation	3 or 4
IE 420: Financial Engineering IE 430: Economic Found of Quality Syst	3 or 4	IE 420: Financial Engineering IE 430: Economic Found of Quality Syst	3 or 4
IE 431: Design for Six Sigma	3	IE 431: Design for Six Sigma	3
IE 445: Human Performance and Cognition in Context <sup>12</sup>	3 or 4	IE 445: Human Performance and Cognition in Context <sup>11</sup>	3 or 4
IE 497: Independent Study <sup>10</sup>	1 to 4	IE 497: Independent Study <sup>12</sup>	1 to 4
IE 498: Special Topics T MATH 347: Fundamental Mathematics	3	IE 498: Special Topics T MATH 347: Fundamental Mathematics	3
MATH 357: Numerical Methods I	3	MATH 357: Numerical Methods I	3
MATH 403: Euclidean Geometry	3 or 4	MATH 403: Euclidean Geometry	3 or 4
MATH 412: Graph Theory MATH 413: Intro to Combinatorics	3 or 4	MATH 412: Graph Theory MATH 413: Intro to Combinatorics	3 or 4
MATH 414: Mathematical Logic	3 or 4	MATH 414: Mathematical Logic	3 or 4
MATH 417: Intro to Abstract Algebra	3 or 4	MATH 417: Intro to Abstract Algebra	3 or 4
MATH 418: Intro to Adstract Algebra II MATH 423: Differential Geometry	3 or 4	MATH 418: Intro to Abstract Algebra II MATH 423: Differential Geometry	3 or 4
MATH 424: Honors Real Analysis	3	MATH 424: Honors Real Analysis	3
MATH 425: Honors Advanced Analysis	3	MATH 425: Honors Advanced Analysis	3
MATH 42/: Honors Abstract Algebra	3	MATH 427: Honors Abstract Algebra	3
MATH 420: Honory and Topology	3 or 4	MATH 432: Set Theory and Topology	3 or 4
MATH 442: Intro Partial Diff Equations	3 or 4	MATH 442: Intro Partial Diff Equations	3 or 4
MATH 444: Elementary Real Analysis MATH 446: Applied Complex Variables	3 or 4	MATH 444: Elementary Real Analysis MATH 446: Applied Complex Variables	3 or 4
MATH 447: Real Variables	3 or 4	MATH 447: Real Variables	3 or 4
MATH 448: Complex Variables	3 or 4	MATH 448: Complex Variables	3 or 4
MATH 450: Numerical Analysis MATH 453: Elementary Theory of Numbers	3 or 4	MATH 450: Numerical Analysis MATH 453: Elementary Theory of Numbers	3 or 4
MATH 464: Statistics and Probability II	3 or 4	MATH 464: Statistics and Probability II	3 or 4
MATH 473: Algorithms	4 2 or 4	MATH 473: Algorithms	4 2 or 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis	4 3 or 4 3 or 4	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis	4 3 or 4 3 or 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming	4 3 or 4 3 or 4 3 or 4	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming	4 3 or 4 3 or 4 3 or 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math	4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math	4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns	4 3 or 4	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns	4 3 or 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup>	4 3 or 4 1 to 4	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup>	4       3 or 4       1 to 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Lonear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup>	4 3 or 4 1 to 4 1 to 3	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup>	4       3         3 or 4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 4       1         1 to 3       2
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology	4 3 or 4 1 to 4 1 to 3 3 3	MATH 473: Algorithms         MATH 475: Formal Models of Computation         MATH 481: Vector and Tensor Analysis         MATH 481: Vector and Tensor Analysis         MATH 482: Linear Programming         MATH 484: Nonlinear Programming         MATH 487: Advanced Engineering Math         MATH 489: Dynamics & Differential Eqns         MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology         MCB 402: Sys & Integrative Physiology	4       3       or 4         3       or 4       3         1       to 4       1         1       to 3       3         3       3       3
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Lonear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 403: Cell & Membrane Physiology Lab	4 3 or 4 1 to 4 1 to 3 3 3 1 or 2	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab	4       3       or 4         3       or 4       3         1       to 4       1         1       to 3       3         3       1       or 2
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 404: Sys & Integrative Physiol Lab	4 3 or 4 1 to 4 1 to 3 3 3 1 or 2 1 to 2 2	MATH 473: Algorithms MATH 473: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 404: Sys & Integrative Physiol Lab	4       3       or 4         3       or 4       3         1       to 4       1         1       to 3       3         3       1       or 2         1       to 2       2
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 4050: Introductory Biochemistry MCB 403: Special Topics Mal Cell Biol <sup>11</sup>	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4	MATH 473: Algorithms         MATH 475: Formal Models of Computation         MATH 481: Vector and Tensor Analysis         MATH 481: Vector and Tensor Analysis         MATH 482: Linear Programming         MATH 482: Nonlinear Programming         MATH 487: Advanced Engineering Math         MATH 489: Dynamics & Differential Eqns         MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology         MCB 402: Sys & Integrative Physiology Lab         MCB 403: Cell & Membrane Physiology Lab         MCB 404: Sys & Integrative Physiol Lab         MCB 403: Cell & Membrane Physiology Lab         MCB 404: Sys & Integrative Physiol Lab         MCB 403: Centrol Engineering Mathematics	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         1       to 4       1         1       to 3       3         3       1       or 2         1       to 2       3         1       to 4       1
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup>	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4	MATH 473: AlgorithmsMATH 475: Formal Models of ComputationMATH 481: Vector and Tensor AnalysisMATH 481: Vector and Tensor AnalysisMATH 482: Linear ProgrammingMATH 482: Linear ProgrammingMATH 484: Nonlinear ProgrammingMATH 487: Advanced Engineering MathMATH 489: Dynamics & Differential EqnsMATH 490: Advanced Topics in Mathematics 13MATH 492: Undergraduate Research in Math 12MCB 401: Cell & Membrane PhysiologyMCB 402: Sys & Integrative PhysiologyMCB 403: Cell & Membrane Physiology LabMCB 404: Sys & Integrative Physiol LabMCB 4050: Introductory BiochemistryMCB 493: Special Topics Mol Cell Biol 13ME All 400 level ME courses, except 470 and potentially 497, 498 12,13	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup> MSE 304: Electronic Properties of Matls	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4         1 to 4         3         1 to 2         3         1 to 4         3         1 to 4         3         1 to 4         3         1 to 4         3	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 493: Special Topics Mol Cell Biol <sup>13</sup> ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup> MES 304: Electronic Properties of Matls	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         3       or 4       1         1       to 4       1         1       to 3       3         3       1       or 2         1       to 4       1         3       1       to 4         3       3       1         1       to 4       1         3       3       3         1       to 4       3
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4         1 to 4         3         1 to 2         3         1 to 4         3         1 to 4         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 493: Special Topics Mol Cell Biol <sup>13</sup> ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory I	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         3       or 4       1         1       to 4       1         1       to 3       3         3       1       or 2         1       to 4       1         3       1       to 4         3       3       1         3       3       3         3       3       3         3       3       3
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory II MSE 401: Thermodynamics of Materials	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4         1 to 4         3         1 to 4         3	MATH 473: Algorithms         MATH 475: Formal Models of Computation         MATH 475: Formal Models of Computation         MATH 481: Vector and Tensor Analysis         MATH 481: Vector and Tensor Analysis         MATH 482: Linear Programming         MATH 484: Nonlinear Programming         MATH 487: Advanced Engineering Math         MATH 489: Dynamics & Differential Eqns         MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology         MCB 402: Sys & Integrative Physiology         MCB 403: Cell & Membrane Physiology Lab         MCB 404: Sys & Integrative Physiol Lab         MCB 405: Introductory Biochemistry         MCB 493: Special Topics Mol Cell Biol <sup>13</sup> ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup> MSE 307: Materials Laboratory I         MSE 308: Materials Laboratory II         MSE 308: Materials Laboratory II         MSE 401: Thermodynamics of Materials	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         3       or 4       1         1       to 4       1         1       to 3       3         3       1       to 2         3       1       to 4         3       3       3         3       3       3         3       3       3         3       3       3
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory I MSE 401: Thermodynamics of Materials MSE 402: Kinetic Processes in Materials	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4         1 to 4         3	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lab MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>13</sup> ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory I MSE 401: Thermodynamics of Materials MSE 402: Kinetic Processes in Materials	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         3       or 4       1         1       to 4       1         1       to 3       3         3       1       or 2         1       to 4       1         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3
MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>11</sup> All 400 level ME courses, except 470 and potentially 497, 498 <sup>10,11</sup> MES 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory II MSE 401: Thermodynamics of Materials MSE 403: Synthesis of Materials MSE 405: Microstructure Determination	4         3 or 4         1 to 4         1 to 3         3         1 to 2         3         1 to 2         3         1 to 4         1 to 2         3         1 to 4         3         1 to 4         3	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 482: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 450: Introductory Biochemistry MCB 493: Special Topics Mol Cell Biol <sup>13</sup> ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup> MSE 304: Electronic Properties of Matls MSE 307: Materials Laboratory I MSE 308: Materials Laboratory I MSE 401: Thermodynamics of Materials MSE 402: Kinetic Processes in Materials MSE 403: Synthesis of Materials MSE 405: Microstructure Determination	4       3       or 4         3       or 4       3         3       or 4       3         3       or 4       3         3       or 4       1         3       or 4       1         1       to 4       1         1       to 3       3         3       1       or 2         1       to 2       3         1       to 4       1         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3         3       3       3
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MATH 473: Agordims MATH 473: Agordims MATH 473: Agordims MATH 475: Incar Programming MATH 481: Vector and Tensor Analysis MATH 481: Vector and Tensor Analysis MATH 482: Unear Programming MATH 482: Unear Programming MATH 487: Advanced Engineering Math MATH 487: Advanced Engineering Math MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns MATH 487: Advanced Topics in Mathematics <sup>11</sup> MATH 489: Dynamics & Differential Eqns MATH 492: Undergraduate Research in Math <sup>100</sup> MCB 401; Cell & Membrane Physiology MCB 403: Cell & Membrane Physiology MCB 403: Cell & Membrane Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol I ab MCB 405: Sys & Integrative Physiol I ab MCB 404: Centrals Laboratory I MCB 404: Sys & Integrative Physiol I ab MSE 304: Itectronic Properties of Matrials MSE 403: Centrals Laboratory II MSE 401: Thermadynamiss of Materials MSE 402: Kinetie Processes in Materials MSE 403: Microstructure Determination MSE 400: Centrals Materials & Properties MSE 421: Ceramic Materials & Properties MSE 424: Mathematical Behavior of Matis MSE 425: Micromodecular Solds MSE 435: Micromodecular Solds MSE 444: Mathematical Behavior of Matis MSE 445: Microssing MS	4       3         3 or 4       3         3 or 4       3         3 or 4       3         3 or 4       1         3 or 4       1         3 or 4       1         3 or 4       1         1 to 4       1         1 to 3       3         3       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         1 to 2       1         3       1         1 to 4       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 487: Advanced Engineering Math MATH 487: Advanced Engineering Math MATH 487: Dynamics & Differential Eqns MATH 490: Advanced Topics in Mathematics <sup>13</sup> MATH 490: Advanced Topics in Math <sup>14</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology MCB 403: Cell & Membrane Physiology Lab MCB 403: Introductory Biochemistry MCB 403: Seg & Integrative Physiol Lab MCC 430: Introductory Biochemistry MCB 403: Seg & Integrative Physiol Lab MSE 304: Sys & Integrative Physiol Lab MSE 304: Sys & Integrative Physiol Lab MSE 305: Materials Laboratory I MSE 304: Sys & Integrative Physiol Mathematics MSE 307: Materials Laboratory I MSE 308: Materials Laboratory I MSE 309: Muterials Laboratory I MSE 301: Entermodynamics of Maths MSE 402: Kinetic Processes in Materials MSE 403: Synthesis of Mathematics MSE 403: Synthesis of Mathematics MSE 404: Sys Kenterials Materials MSE 404: Metrials Laboratory I MSE 304: Intermodynamics of Maths MSE 404: Settical Ceramics MSE 420: Ceramic Materials MSE 421: Ceramic Processing MSE 422: Ceramic Processing MSE 422: Ceramic Processing MSE 423: Ceramic Processing MSE 424: Cercamics MSE 440: Mechanical Behavior of Maths MSE 440: Mechanical Behavior of Maths MSE 441: Metals Processing MSE 443: Polymer Science & Engineering MSE 443: Polymer Science & Engineering MSE 443: Corrosion of Metals MSE 445: Polymer Chemistry MSE 446: Electronic Materials I MSE 446: Electronic Ma	4       3         3 or 4       3         3 or 4       3         3 or 4       3         3 or 4       1         3 or 4       1         3 or 4       1         3 or 4       1         1 to 4       1         1 to 3       1         3       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         3       1
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MATH 473: Caperidans MATH 473: Agoridans MATH 473: Caparitation MATH 473: Caparitation MATH 475: Advanced Tonsor Analysis MATH 481: Vicentr and Tensor Analysis MATH 481: Vicentr and Tensor Analysis MATH 481: Vicentr Programming MATH 481: Aboninear Programming MATH 487: Advanced Topics in Mathematics <sup>11</sup> MATH 487: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics in Mathematics <sup>11</sup> MATH 492: Undergnaduate Research in Math <sup>10</sup> MCB 403: Cell & Membrane Physiology Lab MCB 403: Cell & Membrane Physiology Lab MCB 403: See integrative Physiology 1 MSE 307: Materials Laboratory 1 MSE 308: Materials Laboratory 1 MSE 308: Materials Laboratory 1 MSE 308: Materials Laboratory 1 MSE 400: Thermodynamics of Materials MSE 402: Carchie Processes in Materials MSE 403: Objeting Materials MSE 404: Mechanical Behavior of Matls MSE 404: Mechanical Behavior of Matls MSE 404: Concounter P	4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 3       1         3 or 4       1         1 to 3       1         3       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         3       1	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 475: Formal Models of Computation MATH 475: Formal Models of Computation MATH 482: Linear Programming MATH 483: Nonlinear Programming MATH 484: Nonlinear Programming MATH 484: Nonlinear Programming MATH 484: Advanced Engineering Math MATH 489: Dynamis & Differential Eqns MATH 489: Dynamis & Differential Eqns MATH 480: Advanced Topics in Mathematics <sup>11</sup> MATH 490: Advanced Topics July MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology Lub MCB 404: Sys & Integrative Physiolog Lub MCB 404: Sys & Integrative Physiol Lab MCB 404: Center Keener Advance Center July 497, 498 <sup>13,11</sup> MSE 304: Electronic Properties of Matls MSE 405: Micrials Laboratory I MSE 405: Micrials Laboratory I MSE 405: Micrials Laboratory II MSE 406: Thermal-Meeds Behavior of Matls MSE 407: Micrials Laboratory II MSE 406: Thermal-Meeds Behavior of Matls MSE 407: Microstructure Determination MSE 406: Thermal-Meeds Behavior of Matls MSE 421: Ceramic Materials MSE 422: Electrical Ceramics MSE 422: Electrical Ceramics MSE 422: Electrical Ceramics MSE 423: Design of Trapincering Alloys MSE 443: Design of Composites MSE 445: Corrosion of Metals MSE 445: Orosion of Metals MSE 445: Polymer Science & Engineering MSE 445: Nonlinear Hanvior of Metals MSE 445: Microsin of Composites MSE 445: Nonlinear Hanvior Metals MSE 445:	4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 4       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         3       1
MATH 473: Agoriflams MATH 473: Agoriflams MATH 473: Agoriflams MATH 473: Agoriflams MATH 481: Vector and Tensor Analysis MATH 481: Aboninear Programming MATH 487: Advanced Engineering Math MATH 487: Advanced Engineering Math MATH 487: Advanced Tengics in Mathematics <sup>11</sup> MATH 487: Advanced Tengics in Mathematics <sup>11</sup> MATH 487: Advanced Tengics in Mathematics <sup>11</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MATH 492: Undergraduate Research in Math <sup>10</sup> MATH 492: Undergraduate Research in Math <sup>11</sup> MATH 493: Special Topics Mot Cell Biol <sup>11</sup> MATH 494 MATH 493: Special Topics Mot Cell Biol <sup>11</sup> MATH 494	4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 3       1         1 to 3       1         3       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         3       1	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Vector and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 483: Nationated Engineering Math MATH 487: Nationated Engineering Math MATH 487: Nationated Engineering Math MATH 487: Advanced Engineering Math MATH 489: Advanced Engineering Math MATH 490: Advanced Topics in Mathematics <sup>41</sup> MATH 490: Advanced Engineering 1ab MCB 401: Cell & Membrane Physiology 1ab MCB 402: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 404: Sys & Integrative Physiol Lab MCB 405: Electronic Properties of Math MSE 407: Interview Biochemistry MSE 407: Interview Learning Mathematics MSE 403: Micrials Laboratory I MSE 404: Synthesis of Materials MSE 403: Micrials Laboratory I MSE 404: Mathematics of Maths MSE 405: Micrial Commiss of Materials MSE 405: Micrials Composition MSE 414: Maths Processing MSE 421: Ceramic Mathematics MSE 421: Ceramic Mathematics MSE 421: Ceramic Mathematics MSE 435: Plastics Engineering MSE 435: Plastics Engineering MSE 445: Corossing of Materials MSE 445: Corossing of MSE 445: Micrials I MSE 445: Micrials I Micrials MSE 445: Deletonic Materials I MSE 445: Deletonic Materials I MSE 445: Deletonic Materia	4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 4       1         1 to 3       1         3       1         1 to 2       1         3       1         1 to 2       3         1 to 4       1         3       1
MATH 475: Agerditus MATH 475: Agerditus MATH 475: Carnal Models of Computation MATH 481: Vestor and Tensor Analysis MATH 481: Vestor and Tensor Analysis MATH 481: Vestor and Tensor Analysis MATH 482: Linear Programming MATH 487: A Moninear Programming MATH 497: Mathematics A Differential Figs MATH 492: Undergraduate Kesarch in Math <sup>10</sup> MATH 495: Other Materiale Kesarch in Math <sup>10</sup> MATH 492: Undergraduate Kesarch in Math <sup>10</sup> MATH 492: Undergraduate Kesarch in Math <sup>10</sup> MATH 493: Discontrastic Programming Of Biol <sup>11</sup> All 400 level MT: courses, except 470 and potentially 497, 498 <sup>301</sup> MISE 400: Eventoria Programis of Materials MSE 400: Eventoria Frogramis of Materials MSE 400: Eventoria Frogramis of Materials MSE 401: Chemanofymmis of Materials MSE 402: Chemine Materials Kesarch 198 MSE 403: Synthesis of Materials MSE 403: Synthesis of Materials MSE 403: Chemine Materials & Programis MSE 404: Chemine Materials & Programis MSE 405: Professing MINTS & General & Programis MSE 405: Profesing Alloys MSE 445: Convolution of Matals MSE 445: Convolution o	4       3         3 or 4       3         3 or 4       3         3 or 4       1         1 to 3       1         1 to 3       1         3       1         1 to 2       1         3       1         1 to 2       1         3       1         1 to 4       1         3       1	MATH 473: Algorithms MATH 475: Formal Models of Computation MATH 481: Uctor and Tensor Analysis MATH 482: Linear Programming MATH 482: Linear Programming MATH 484: Nonlinear Programming MATH 484: Nonlinear Programming MATH 484: Nonlinear Programming MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Equs MSE 402: Kinetic Processes in Materials MSE 403: Synthesis of Materials MSE 404: Exercisenture Determination MSE 404: Exercisenture Determination MSE 404: Exercisenture Determination MSE 404: Exercisenture Determination MSE 404: Exercisent Exercisent MSE 412: Electrical Ceramics MSE 412: Electrical Ceramics MSE 413: Design of Materials MSE 4143: Materials MSE 422: Electrical Ceramics MSE 443: Design of Materials MSE 443: De	4       3         3 or 4       3         3 or 4       3         3 or 4       1         3 or 4       1         3 or 4       1         3 or 4       1         1 to 4       1         1 to 3       3         3       1         1 to 2       3         1 to 2       3         1 to 4       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1         3       1 <td< td=""></td<>

MSE 498: Special Topics <sup>11</sup>	1 to 4	MSE 498: Special Topics <sup>13</sup>	1 to 4
NPRE 402: Nuclear Power Engineering	3 or 4	NPRE 402: Nuclear Power Engineering	3 or 4
NPRE 412: Nuclear Power Econ & Fuel Mgmt	3 or 4	NPRE 412: Nuclear Power Econ & Fuel Mgmt	3 or 4
NPRE 421: Plasma and Fusion Science	3	NPRE 421: Plasma and Fusion Science	3
NPRE 429: Plasma Engineering	3	NPRE 429: Plasma Engineering	3
NPRE 431: Materials in Nuclear Engrg	3	NPRE 431: Materials in Nuclear Engrg	3
NPRE 435: Radiological Imaging	3	NPRE 435: Radiological Imaging	3
NPRE 441: Radiation Protection	4	NPRE 441: Radiation Protection	4
NPRE 444: Nuclear Analytical Methods Lab	2 or 3	NPRE 444: Nuclear Analytical Methods Lab	2 or 3
NPRE 446: Radiation Interact w/Matter I	3	NPRE 446: Radiation Interact w/Matter I	3
NPRE 447: Radiation Interact w/Matter II	3	NPRE 447: Radiation Interact w/Matter II	3
NPRE 448: Nuclear Syst Engrg & Design	4	NPRE 448: Nuclear Syst Engrg & Design	4
NPRE 451: NPRE Laboratory NPRE 455: Neutron Diffusion & Transport	3 4	NPRE 451: NPRE Laboratory NPRE 455: Neutron Diffusion & Transport	3 4
NPRE 457: Safety Anlys Nucl Reactor Syst	3 or 4	NPRE 457: Safety Anlys Nucl Reactor Syst	3 or 4
NPRE 461: Probabilistic Risk Assessment	3 or 4	NPRE 461: Probabilistic Risk Assessment	3 or 4
NPRE 470: Fuel Cells & Hydrogen Sources	3	NPRE 470: Fuel Cells & Hydrogen Sources	3
NPRE 475: Wind Power Systems	3 or 4	NPRE 4/5: Wind Power Systems	3 or 4
PHYS 330: Atmospheric Dynamics II	3	PHYS 330: Atmospheric Dynamics II	3
PHYS 401: Classical Physics Lab	3	PHYS 401: Classical Physics Lab	3
PHYS 402: Light	3 or 4	PHYS 402: Light	3 or 4
PHYS 403: Modern Experimental Physics	4 or 5	PHYS 403: Modern Experimental Physics	4 or 5
PHYS 406: Acoustical Physics of Music	4 or 5	PHYS 406: Acoustical Physics of Music	4 or 5 4
PHYS 427: Thermal & Statistical Physics	4	PHYS 427: Thermal & Statistical Physics	4
PHYS 435: Electromagnetic Fields I	3	PHYS 435: Electromagnetic Fields I	3
PHYS 436: Electromagnetic Fields II PHYS 460: Condensed Matter Physics	3	PHYS 436: Electromagnetic Fields II PHYS 460: Condensed Matter Physics	3
PHYS 466: Atomic Scale Simulations	4 3 or 4	PHYS 466: Atomic Scale Simulations	
PHYS 470: Subatomic Physics	4	PHYS 470: Subatomic Physics	4
PHYS 475: Introduction to Biophysics	3 or 4	PHYS 475: Introduction to Biophysics	3 or 4
PHYS 485: Atomic Phys & Quantum Theory	3	PHYS 485: Atomic Phys & Quantum Theory	3
PHYS 487: Quantum Physics I PHYS 487: Quantum Physics II	4	PHYS 480: Quantum Physics I PHYS 487: Quantum Physics II	4
PHYS 496: Intro to Physics Research <sup>12</sup>	3	PHYS 496: Intro to Physics Research <sup>11</sup>	3
PHYS 497: Individual Study <sup>10</sup>	1 to 4	PHYS 497: Individual Study <sup>12</sup>	1 to 4
PHYS 498: Special Topics in Physics <sup>11</sup>	1 to 4	PHYS 498: Special Topics in Physics <sup>13</sup>	1 to 4
		SE 400: Engineering Law <sup>11</sup>	3 or 4
		SE 402: Comp-Aided Product Realization	3 or 4
		SE 411: Kendolity Engineering SE 412: Nondestructive Evaluation	3 or 4
		SE 413: Engineering Design Optimization	3 or 4
		SE 420: Digital Control Systems	4
	_	SE 422: Robot Dynamics and Control SE 423: Mechatronics	4
		SE 424: State Space Design for Control	3
		SE 450: Decision Analysis I <sup>11</sup>	3 or 4
		SE 497: Independent Study <sup>12</sup>	0 to 4
STAT 400: Actuarial Statistics II	Λ	SE 498: Special Topics <sup>13</sup>	1 to 4
STAT 409. Actualian Statistics In STAT 410: Statistics and Probability II	4 3 or 4	STAT 409. Actualian Statistics in STAT 410: Statistics and Probability II	4 3 or 4
STAT 420: Methods of Applied Statistics	3 or 4	STAT 420: Methods of Applied Statistics	3 or 4
STAT 424: Analysis of Variance	3 or 4	STAT 424: Analysis of Variance	3 or 4
STAT 425: Applied Regression and Design	3 or 4	STAT 425: Applied Regression and Design	3 or 4
STAT 426: Sampling and Categorical Data STAT 428: Statistical Computing	3 or 4	STAT 426: Sampling and Categorical Data STAT 428: Statistical Computing	3 or 4
STAT 429: Time Series Analysis	3 or 4	STAT 429: Time Series Analysis	3 or 4
STAT 430: Topics in Applied Statistics <sup>11</sup>	3 or 4	STAT 430: Topics in Applied Statistics <sup>13</sup>	3 or 4
STAT 440: Statistical Data Management	3 or 4	STAT 440: Statistical Data Management	3 or 4
STAT 443: Professional Statistics <sup>12</sup> STAT 448: Advanced Data Analysis	3 or 4 4	STAT 443: Professional Statistics '' STAT 448: Advanced Data Analysis	3 or 4
STAT 458: Math Modeling in Life Sciences	3 or 4	STAT 458: Math Modeling in Life Sciences	3 or 4
STAT 480: Data Science Foundations	3 or 4	STAT 480: Data Science Foundations	3 or 4
All 400 level TAM courses, except 499 and potentially 497,498 <sup>10,11</sup>	2	TAM All 400 level TAM courses, except potentially 497,498 <sup>12,13</sup>	2
1E 461: Lechnology Entrepreneurship	3	TMGT 460: Business Process Modeling	3
TMGT 461: Tech, Eng, & Mgt Final Project	2	TMGT 461: Tech, Eng, & Mgt Final Project	2
		·	
<b>Electives</b> The Grainger College of Engineering Liberal Education course list or additional courses from the campus General Education lists for	6	Electives The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General	6
Social and Behavioral Sciences or Humanities and the Arts <sup>13</sup>		Education lists for Social and Behavioral Sciences or Humanities and the Arts <sup>14</sup>	
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128	6	Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that	6
credit hours earned toward the degree. <sup>14</sup>	120	there are at least 128 credit hours earned toward the degree. <sup>15</sup>	120
i otal nours of Curriculum to Graduate	120	1 otal nours of Curriculum to Graduate	120
Footnotes		Footnotes	
<sup>1</sup> External transfer students take ENG 300 instead		<sup>1</sup> External transfer students take ENG 300 instead	
<sup>2</sup> CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102, similarly		<sup>2</sup> CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM	
hours minimum to graduate.		Students are still required to have 128 hours minimum to graduate.	
<sup>3</sup> MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for		<sup>3</sup> MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is	
students with no background in calculus.		appropriate for students with no background in calculus.	
$^{4}$ MATH 284 may be substituted.		<sup>5</sup> MATH 284 may be substituted.	
<sup>5</sup> CS 125 or ECE 220 may be substituted.		<sup>6</sup> CS 124 or CS 125 or ECE 220 may be substituted.	
<sup>6</sup> ECE 110 and ECE 210 (or ECE 211) combined may be substituted.		<sup>7</sup> ECE 110 and ECE 210 (or ECE 211) combined may be substituted.	
<sup>6</sup> Advanced Composition satisfied by completing ME 470.		<sup>o</sup> Advanced Composition satisfied by completing ME 470.	
<sup>9</sup> Transfers and ECE minor/dual degree students may substitute ECE 313.		<sup>10</sup> Transfers and ECE minor/dual degree students may substitute ECE 313.	
<sup>10</sup> A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective		<sup>11</sup> Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the	
requirements.		Technical Electives requirements.	
Depending on the technical content, some Special Topics courses may not be approved for Technical Elective credit. Please provide a syllabus of the course to the Mechanical Science and Engineering Undergraduate Programs Office to request use of the		A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective reauirements.	
course for Technical Elective credit prior to registering for the course.			
<sup>12</sup> Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives		<sup>13</sup> Depending on the technical content, some Special Topics courses may not be approved for Technical Elective	
requirements.		Programs Office to request use of the course for Technical Elective credit prior to registering for the course.	
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		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	
	I	requirements.	

<sup>14</sup> The Grainger College of Engineering restrictions to free electives can be found here.	<sup>15</sup> The Grainger College of Engineering restrictions to free electives can be found here.	



## Current Program of Study

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.

Current Requirements	Current Hours
Orientation and Professional Development	0
ENG 100: Engineering Orientation <sup>1</sup>	0
MF 290. Seminar	0
	×
Foundational Mathematics and Science	29
CHEM 102: General Chemistry I	3
CHEM 103: General Chemistry Lab I <sup>2</sup>	1
MATH 221: Calculus I <sup>3</sup>	4
MATH 231: Calculus II	3
MATH 241: Calculus II	1
	4
MATH 257: Linear Algebra with Computational Applications <sup>4</sup>	3
MATH 285: Intro Differential Equations <sup>5</sup>	3
PHYS 211: University Physics: Mechanics	4
PHYS 212: University Physics: Elec & Mag	4
	52
Mechanical Engineering Technical Core	52
CS 101: Intro Computing: Engrg & Sci <sup>6</sup>	3
ECE 205: Electrical and Electronic Circuits <sup>7</sup>	3
ECE 206: Electrical and Electronic Circuits Lab	1
ME 170: Computer-Aided Design	3
ME 200: Thermodynamics	3
ME 270: Design for Manufacturability	3
	3
IVIE 510: Fundamentals of Fluid Dynamics	4
ME 320: Heat Transfer	4
ME 330: Engineering Materials	4
ME 340: Dynamics of Mechanical Systems	3.5
ME 360: Signal Processing	3.5
MF 370: Mechanical Design I	3
ME 271: Machanical Design I	2
IVIE 5/1: IVIECNANICAI DESIGN II	3
ME 470: Senior Design Project <sup>8</sup>	3
TAM 210: Introduction to Statics	2
TAM 212. Introductory Dynamics <sup>9</sup>	3
TAM 251: Introductory Solid Mechanics	3
	5
Technical Electives	
Science elective, chosen from one of the following:	4
CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II <sup>2</sup>	
MCP 150: Molea & Collular Desig of Life	
PHYS 213: Univ Physics: Thermal Physics & PHYS 214: Univ Physics: Quantum Physics	
	2
Statistics elective, one course chosen from: <sup>10</sup>	3
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data	3
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I	3
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	6
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	6
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	6
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	6
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.         Technical electives chosen from a departmentally approved list below.	3       6       6       6
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.         Technical electives chosen from a departmentally approved list below.         ABE 430: Project Management <sup>11</sup>	3       6       6       6       2
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.         Technical electives chosen from a departmentally approved list below.         ABE 430: Project Management <sup>11</sup> ABE 436: Renewable Energy Systems	3       6       6       2       3 or 4
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.         Technical electives chosen from a departmentally approved list below.         ABE 430: Project Management <sup>11</sup> ABE 436: Renewable Energy Systems         ABE 445: Statistical Methods	3 6 6 2 3 or 4 4
Statistics elective, one course chosen from: <sup>10</sup> IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	3       6       6       2       3 or 4       4       2
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## New Program of Study

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). ME 470 will satisfy a core course requirement and the Campus General Education Advanced Composition requirement.

Revised Requirements	Revised Hou	ırs
Orientation and Professional Development	1	
ENG 100: Engineering Orientation (External transfer students take ENG 300.)	1	
ME 290: Seminar	0	
Foundational Mathematics and Science	29	
CHEM 102: General Chemistry I	3	
MATH 221, Colorian Chemistry Lab I	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 285: Intro Differential Equations	3	
PHYS 211: University Physics: Mechanics	4	
PHYS 212: University Physics: Elec & Mag	4	
Mechanical Engineering Technical Core	52	
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	3	
be substituted.)		
ECE 206: Electrical and Electronic Circuits Lab	1	
ME 170: Computer-Aided Design	3	
ME 200: Thermodynamics	3	
ME 210: Design for Manufacturability	з 4	
ME 310. Fundamentals of Fund Dynamics ME 320. Heat Transfer	т 4	
ME 330: Engineering Materials	4	
ME 340: Dynamics of Mechanical Systems	3.5	
ME 360: Signal Processing	3.5	
ME 370: Mechanical Design I	3	
ME 371: Mechanical Design II	3	
ME 470: Senior Design Project	3	
TAM 210: Introduction to Statics	2	
TAM 212: Introductory Dynamics	3	
TAM 251: Introductory Solid Mechanics	3	
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Technical Electives		
Science elective, chosen from one of the following:	4	
CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II		
MCB 150: Molec & Cellular Basis of Life		
PHYS 213: Univ Physics: Thermal Physics & PHYS 214: Univ Physics: Quantum Physics		
	2	
Statistics elective, one course chosen from:	3	
Statistics elective, one course chosen from: IE 300: Analysis of Data	3	
Statistics elective, one course chosen from:         IE 300: Analysis of Data         STAT 400: Statistics and Probability I	3	
Statistics elective, one course chosen from:         IE 300: Analysis of Data         STAT 400: Statistics and Probability I         MechSE electives chosen from a departmentally approved list. See list below.	6	
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ASRM 410: Investments and Financial Markets	3 or 4	
ASRM 461: Loss Models	3 3 or 4	
ASRM 407. Casuary Actuarian Mathematics ASRM 471: Life Contingencies I	4	
ASRM 472: Life Contingencies II	3	
BIOC 406: Gene Expression & Regulation	3	
BIOC 440: Physical Chemistry Principles	4	
BIOC 446: Physical Biochemistry	3	
BIOC 455: Technqs Biochem & Biotech	4	
BIOE 380: Biomedical Imaging BIOE 414: Biomedical Instrumentation	3	
BIOE 415: Biomedical Instrumentation Lab	2	
BIOE 416: Biosensors	3	
BIOE 461: Cellular Biomechanics	4	
BIOE 476: Tissue Engineering	3	
BIOE 479: Cancer Nanotechnology	3	
BIOE 481: Whole-Body Musculoskel Biomech	3 or 4	
BIOE 482: Musculoskel Tissue Mechanics	3  or  4	
BIOE 497: Individual Study <sup>12</sup>	1 to 4	
BIOE 498: Special Topics BIOP 401: Introduction to Biophysics	3	
BIOP 419: Brain, Behavior & Info Process	3	
BIOP 432: Photosynthesis	3	
CEE 310: Transportation Engineering	3	
CEE 330: Environmental Engineering	3	
CEE 340: Energy and Global Environment	3	
CEE 350: Water Resources Engineering	3	
CEE 360: Structural Engineering CEE 380: Geotechnical Engineering	3	
CEE 398: Special Topics <sup>13</sup>	0 to 4	
CEE 401: Concrete Materials	4	
CEE 405: Asphalt Materials I	3 or 4	
CEE 406: Pavement Design I	3 or 4	
CEE 407: Airport Design	3 or 4	
CEE 408: Railroad Transportation Engrg	3 or 4	
CEE 409: Kallroad Track Engineering CEE 410: Railway Signaling & Control	3  or  4	
CEE 410. Kanway Signaming & Control	3 or 4	
CEE 412: High-Speed Rail Engineering	3 or 4	
CEE 415: Geometric Design of Roads	4	
CEE 416: Traffic Capacity Analysis	3 or 4	
CEE 417: Urban Transportation Planning <sup>11</sup>	4	
CEE 418: Public Transportation Systems	3 or 4	
CEE 420: Construction Productivity	3 or 4	
CEE 421: Construction Planning CEE 422: Construction Cost Analysis	3 or 4	
CEE 422: Construction Cost Analysis	4	
CEE 430: Ecological Quality Engineering	2	_
CEE 434: Environmental Systems I	3	
CEE 437: Water Quality Engineering	3	
CEE 437: Water Quality Engineering CEE 438: Science & Environmental Policy	3 3	
CEE 437: Water Quality Engineering CEE 438: Science & Environmental Policy CEE 440: Fate Cleanup Environ Pollutant	3 3 4	
CEE 437: Water Quality Engineering CEE 438: Science & Environmental Policy CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical	3 3 4 4 4	
CEE 437: Water Quality Engineering CEE 438: Science & Environmental Policy CEE 440: Fate Cleanup Environ Pollutant CEE 442: Environmental Engineering Principles, Physical CEE 443: Env Eng Principles, Chemical CEE 444: Env Eng Principles, Biological	3 3 4 4 4 4 4	
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CEE 437: Water Quality Engineering         CEE 438: Science & Environmental Policy         CEE 442: Environmental Engineering Principles, Physical         CEE 442: Environmental Engineering Principles, Physical         CEE 444: Env Eng Principles, Biological         CEE 444: Environmental Engineering Composition         CEE 444: Environmental Engineering Lab         CEE 444: Environmental Engineering Lab         CEE 447: Atmospheric Chemistry         CEE 449: Environmental Fluid Mechanics         CEE 443: Environmental Fluid Mechanics         CEE 443: Environmental Fluid Mechanics         CEE 451: Environmental Fluid Mechanics         CEE 452: Hydraulic Analysis and Design         CEE 453: Commdwater         CEE 454: Swater Resources Field Methods         CEE 455: Surface E Virotures I         CEE 466: Steel Structures I         CEE 467: Masonry Structuras         CEE 468: Reinforced Concrete I         CEE 467: Masonry Structuras         CEE 457: Structural Systems         CEE 458: Structures I         CEE 459: Wood Structures         CEE 450: Structural Systems         CEE 451: Structural Analysis         CEE 452: Hydraulic Analysis         CEE 451: Structural Analysis         CEE 451: Structural Analysis         CEE 451: Structural Analysi	3         3         4         4         4         4         4         4         4         4         4         3         4         3         3         4         3         3         4         3         3         3 <td< td=""><td></td></td<>	
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ASRM 461. Loss Models	
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ASRM 469: Casualty Actuarial Mathematics	3 or 4
ASRM 471: Life Contingencies I	4
ASRM 472: Life Contingencies II	3
BIOC 406: Gene Expression & Regulation	3
BIOC 440: Physical Chemistry Principles	4
BIOC 446: Physical Biochemistry	3
BIOC 455: Technqs Biochem & Biotech	4
BIOE 380: Biomedical Imaging	3
BIOE 414: Biomedical Instrumentation	3
BIOE 415: Biomedical Instrumentation Lab	2
BIOE 416: Biosensors	3
BIOE 461: Cellular Biomechanics	4
BIOE 476: Tissue Engineering	3
BIOE 479: Cancer Nanotechnology	3
BIOE 481: Whole-Body Musculoskel Biomech	3 or 4
BIOE 482: Musculoskel Tissue Mechanics	3 or 4
BIOE 497: Individual Study (As Approved)	1 to 4
BIOE 498: Special Tonics (As Approved)	1 to 4
DIOD 401. Introduction to Diomburies	2
BIOF 401. Introduction to Biophysics	2
DIOP 419. Dialit, Denavior & line flocess	2
CEE 210: Transportation Engineering	2
CEE 310: Transportation Engineering	3
CEE 330: Environmental Engineering	3
CEE 340: Energy and Global Environment	3
CEE 350: Water Resources Engineering	3
CEE 360: Structural Engineering	3
CEE 380: Geotechnical Engineering	3
CEE 398: Special Topics (As Approved)	0 to 4
CEE 401: Concrete Materials	4
CEE 405: Asphalt Materials I	3 or 4
CEE 406: Pavement Design I	3 or 4
CEE 407: Airport Design	3 or 4
CEE 408: Railroad Transportation Engrg	3 or 4
CEE 409: Railroad Track Engineering	3 or 4
CEE 410: Railway Signaling & Control	3 or 4
CEE 411: RR Project Design & Constr	3 or 4
CEE 412: High-Speed Rail Engineering	3 or 4
CEE 415: Geometric Design of Roads	4
CEE 416: Traffic Capacity Analysis	3 or 4
CEE 417: Urban Transportation Planning (As Approved)	4
CEE 418: Public Transportation Systems	3 or 4
CEE 420: Construction Productivity	3 or 4
CEE 421: Construction Planning	3 or 4
CEF 422: Construction Cost Analysis	3 or 4
CEF 424: Sustainable Const Methods	4
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CFF 437: Water Quality Engineering	3
CEE 457. Water Quanty Engineering	3
CEE 438: Science & Environmental Policy	0
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CHEM 332: Elementary Organic Chem II	4
CHEM 420: Instrumental Characterization CHEM 436: Fundamental Organic Chem II	3
CHEM 437: Organic Chemistry Lab	3
CHEM 438: Advanced Organic Chemistry	3
CHEM 440: Physical Chemistry Principles CHEM 442: Physical Chemistry I	4
CHEM 444: Physical Chemistry II	4
CHEM 445: Physical Principles Lab I	2
CHEM 447: Physical Principles Lab II CHEM 450: Astrochomistry	2
CHEM 450: Astrochemistry Laboratory	3 or 4
CHEM 460: Green Chemistry	3 or 4
CHEM 472: Physical Biochemistry	3
CHEM 4/4: Drug Discovery & Development CHEM 480: Polymer Chemistry	3 3 or 4
CHEM 482: Polymer Physics	3 or 4
CHEM 483: Solid State Structural Anlys	4
CHEM 488: Surfaces and Colloids	3 or 4
CHEM 497: Individual Study Senior <sup>22</sup> CS 225: Data Structures	4
CS 233: Computer Architecture	4
CS 241: System Programming	4
CS 242: Programming Studio	3
CS 357: Numerical Methods I	3
CS 374: Introduction to Algorithms & Models of Computation	4
CS 410: Text Information Systems	3 or 4
CS 411: Database Systems	3 or 4
CS 412. Introduction to Data Mining CS 413: Intro to Combinatorics	3 or 4
CS 414: Multimedia Systems	3 or 4
CS 418: Interactive Computer Graphics	3 or 4
CS 419: Production Computer Graphics	3 or 4
CS 420: Parallel Progrmg: Sci & Engrg CS 421: Programming Languages & Compilers	3 or 4
CS 422: Programming Language Design	3 or 4
CS 423: Operating Systems Design	3 or 4
CS 424: Real-Time Systems	3 or 4
CS 425: Distributed Systems	3 or 4
CS 427: Software Engineering I	3 or 4
CS 428: Software Engineering II	3 or 4
CS 429: Software Engineering II, ACP	3
CS 431: Embedded Systems	3 or 4
CS 435: Computer System Organization CS 436: Computer Networking Laboratory	3 or 4
CS 438: Communication Networks	3 or 4
CS 439: Wireless Networks	3 or 4
CS 440: Artificial Intelligence	3 or 4
CS 445: Computational Photography	3 or 4
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CHEM 332: Elementary Organic Chem II	4
CHEM 420: Instrumental Characterization	2
CHEM 436: Fundamental Organic Chem II	3
CHEM 437: Organic Chemistry Lab	3
CHEM 438: Advanced Organic Chemistry	3
CHEM 440: Physical Chemistry Principles	4
CHEM 44? Physical Chemistry I	4
CHEM 444: Divisional Chemistry II	1
CHEM 445 DL - LD - LL LL	4
CHEM 445: Physical Principles Lab I	2
CHEM 447: Physical Principles Lab II	2
CHEM 450: Astrochemistry	4
CHEM 451: Astrochemistry Laboratory	3 or 4
CHEM 460: Green Chemistry	3 or 4
CHEM 472: Physical Biochemistry	3
CHEM 474 D D' P 1 4	2
CHEM 4/4: Drug Discovery & Development	3
CHEM 480: Polymer Chemistry	3 or 4
CHEM 482: Polymer Physics	3 or 4
CHEM 483: Solid State Structural Anlys	4
CHEM 488: Surfaces and Colloids	3 or 4
CHEM 407. In dividual Study Series (As Assessed)	1 4- 2
CHEM 49/: Individual Study Senior (As Approved)	1 to 3
CS 225: Data Structures	4
CS 233: Computer Architecture	4
CS 242: Programming Studio	3
CS 241: System Decommunica	4
CS 341: System Programming	4
CS 357: Numerical Methods I	3
CS 374: Introduction to Algorithms & Models of Computation	4
CS 410: Text Information Systems	3 or 4
CS 411: Database Systems	3 or 4
CS 412: Introduction to Data Mining	3 or 4
CS 413: Intro to Combinatorics	5 or 4
CS 414: Multimedia Systems	3 or 4
CS 418: Interactive Computer Graphics	3 or 4
CS 419: Production Computer Graphics	3 or 4
CS 420: Parallel Programa: Sci & Engra	3 or 4
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C5 4/1: Programming Languages & Compilers	5 or 4
CS 422: Programming Language Design	3 or 4
CS 423: Operating Systems Design	3 or 4
CS 424: Real-Time Systems	3 or 4
CS 425: Distributed Systems	3 or 4
	2 4
CS 426: Compiler Construction	3 or 4
CS 427: Software Engineering I	3 or 4
CS 428: Software Engineering II	3 or 4
CS 429: Software Engineering II, ACP	3
CS 431: Embedded Systems	3 or 4
CS 422: Computer Systems	2 or 4
CS 435: Computer System Organization	3 or 4
CS 436: Computer Networking Laboratory	3 or 4
CS 438: Communication Networks	3 or 4
	3  or  4
CS 439: Wireless Networks	5 01 4
CS 439: Wireless Networks CS 440: Artificial Intelligence	3 or 4
CS 439: Wireless Networks CS 440: Artificial Intelligence CS 445: Computational Photography	3 or 4
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ECE 492: Parallel Progrmg: Sci & Engrg	3 or 4
ECE 493: Advanced Engineering Math	3 or 4
ECE 498: Special Topics in ECE <sup>13</sup>	0 to 4
ECON 302: Inter Microeconomic Theory <sup>11</sup>	3
IE 310: Deterministic Models in Optimization	3
IE 330: Industrial Quality Control	3
IE 340: Human Factors	4
IE 360: Facilities Planning and Design IE 410: Advanced Topics in Stochastic Processes & Applications	3 3 or 4
IE 411: Optimization of Large Systems	3 or 4
IE 412: OR Models for Mfg Systems	3 or 4
IE 420: Financial Engineering	3 or 4
IE 430: Economic Found of Quality Syst	3 or 4
IE 431: Design for Six Sigma	3 3 or 4
IE 443. Futurian Performance and Cognition in Context IE 497: Independent Study <sup>12</sup>	1 to 4
IE 498: Special Topics <sup>13</sup>	1 to 4
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MATH 412: Graph Theory	3 or 4
MATH 413: Intro to Combinatorics MATH 414: Mathematical Logic	3 or 4
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MATH 442: Intro Partial Diff Equations	3 or 4
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MATH 487: Advanced Engineering Math MATH 489: Dynamics & Differential Eqns	3 or 4 3 or 4
MATH 490: Advanced Topics in Mathematics <sup>13</sup>	1 to 4
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MATH 492: Undergraduate Research in Math <sup>12</sup>	
MATH 492: Undergraduate Research in Math <sup>12</sup> MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology	3

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ECE 452: Electromagnetic Fields	3	
ECE 453: Wireless Communication Systems	4	
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ECE 459: Communications Systems	3	
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ECE 463: Digital Communications Lab	2	
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ECE 465: Optical Communications Systems	3	
ECE 466: Optical Communications Lab	1	
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ECE 473: Fund of Engrg Acoustics	3 or 4	
ECE 470. Fower System Analysis ECE 478: Formal Software Development Methods	3 or 4	
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ECE 481: Nanotechnology	4	
ECE 482: Digital IC Design	3	
ECE 483: Analog IC Design	3	
ECE 485: MEMS Devices & Systems ECE 486: Control Systems	3	
ECE 487: Intro Quantum Electr for EEs	3	
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ECE 498: Special Topics in ECE (As Approved)	0 to 4	
ECON 302: Inter Microeconomic Theory (As Approved)	3	
IE 310: Deterministic Models in Optimization	3	
IE 330: Industrial Ouality Control	3	
IE 340: Human Factors	4	_
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IE 410: Advanced Topics in Stochastic Processes & Applications	3 or 4	
IE 411: Optimization of Large Systems IE 412: OR Models for Mfg Systems	3 or 4	
IE 413: Simulation	3 or 4	
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IE 431: Design for Six Sigma	3	
IE 445. Human Ferformance and Cognition in Context (As Approved)	1 to 4	
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MATH 423: Differential Geometry	3 or 4	
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MATH 432: Set Theory and Topology	3 or 4	
MATH 442: Intro Partial Diff Equations	3 or 4	
MATH 444: Elementary Real Analysis	3 or 4	
MATH 447: Real Variables	3 or 4	
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MATH 490: Advanced Tonics in Mathematics (Ac Annroyed)	1 to 4	
MATH 490: Advanced Topics in Mathematics (As Approved) MATH 492: Undergraduate Research in Math (As Approved)	1 to 4	_
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MATH 490: Advanced Topics in Mathematics (As Approved) MATH 492: Undergraduate Research in Math (As Approved) MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology	1 to 4 1 to 3 3 3	
MATH 490: Advanced Topics in Mathematics (As Approved) MATH 492: Undergraduate Research in Math (As Approved) MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab	1 to 4 1 to 3 3 3 1 or 2	
MATH 490: Advanced Topics in Mathematics (As Approved) MATH 492: Undergraduate Research in Math (As Approved) MCB 401: Cell & Membrane Physiology MCB 402: Sys & Integrative Physiology MCB 403: Cell & Membrane Physiology Lab MCB 404: Sys & Integrative Physiol Lab	1 to 4 1 to 3 3 1 or 2 1 to 2	

MCB 450: Introductory Biochemistry	3
MCB 493: Special Topics Mol Cell Biol <sup>13</sup>	1 to 4
ME All 400 level ME courses, except 470 and potentially 497, 498 <sup>12,13</sup>	3
MSE 307: Materials Laboratory I	3
MSE 308: Materials Laboratory II	3
MSE 401: Thermodynamics of Materials	3
MSE 402: Kinetic Processes in Materials	3
MSE 403: Synthesis of Materials MSE 405: Microstructure Determination	3
MSE 405: Microstructure Determination MSE 406: Thermal-Mech Behavior of Matls	3
MSE 420: Ceramic Materials & Properties	3
MSE 421: Ceramic Processing	3 or 4
MSE 422: Electrical Ceramics	3
MSE 440: Mechanical Behavior of Metals	3
MSE 441: Metals Processing MSE 443: Design of Engineering Alloys	3
MSE 445: Corrosion of Metals	3 or 4
MSE 450: Polymer Science & Engineering	3 or 4
MSE 453: Plastics Engineering	3
MSE 455: Macromolecular Solids	3
MSE 456: Mechanics of Composites	3 3 or 4
MSE 457.1 orymer Chemistry MSE 458: Polymer Physics	3 or 4
MSE 460: Electronic Materials I	3
MSE 461: Electronic Materials II	3
MSE 466: Materials in Electrochem Syst	3
MSE 470: Design and Use of Biomaterials	3
MSE 475. Biomolecular Materials Science MSE 474: Biomaterials and Nanomedicine	3
MSE 480: Surfaces and Colloids	3 or 4
MSE 481: Electron Microscopy	3 or 4
MSE 484: Composite Materials	3 or 4
MSE 485: Atomic Scale Simulations	3 or 4
MSE 48 /: Materials for Nanotechnology MSE 488: Optical Materials	3 or 4
MSE 489: Matl Select for Sustainability	3 or 4
MSE 497: Independent Study <sup>12</sup>	1 to 4
MSE 498: Special Topics <sup>13</sup>	1 to 4
NPRE 402: Nuclear Power Engineering	3 or 4
NPRE 412: Nuclear Power Econ & Fuel Mgmt	3 or 4
NPRE 423: Plasma Laboratory	2
NPRE 429: Plasma Engineering	3
NPRE 431: Materials in Nuclear Engrg	3
NPRE 435: Radiological Imaging	3
NPRE 441: Radiation Protection	4
NPRE 442: Radioactive waste Management NPRE 444: Nuclear Analytical Methods Lab	2 or 3
NPRE 446: Radiation Interact w/Matter I	3
NPRE 447: Radiation Interact w/Matter II	3
NPRE 448: Nuclear Syst Engrg & Design	4
NPRE 451: NPRE Laboratory	3
NPRE 455: Neutron Diffusion & Transport NPRE 457: Safety Anlys Nucl Reactor Syst	4 3 or 4
NPRE 461: Probabilistic Risk Assessment	3 or 4
NPRE 470: Fuel Cells & Hydrogen Sources	3
NPRE 475: Wind Power Systems	3 or 4
NPRE 498: Special Topics <sup>13</sup>	1 to 4
PHYS 330: Atmospheric Dynamics II	3
PHYS 401: Classical Physics Lab PHYS 402: Light	3 or 4
PHYS 403: Modern Experimental Physics	4 or 5
PHYS 404: Electronic Circuits	4 or 5
PHYS 406: Acoustical Physics of Music	4
PHYS 427: Thermal & Statistical Physics	4
рнух 436: Electromagnetic Fields I PHYS 436: Electromagnetic Fields II	3
PHYS 460: Condensed Matter Physics	4
PHYS 466: Atomic Scale Simulations	3 or 4
PHYS 470: Subatomic Physics	4
PHYS 475: Introduction to Biophysics	3 or 4
PHYS 485: Atomic Phys & Quantum Theory PHVS 486: Quantum Physics I	3
PHYS 487: Quantum Physics I	4
PHYS 496: Intro to Physics Research <sup>11</sup>	3
PHYS 497: Individual Study <sup>12</sup>	1 to 4
PHYS 498: Special Topics in Physics <sup>13</sup>	1 to 4
SE 400: Engineering Law <sup>11</sup>	3 or 4
SE 402: Comp-Aided Product Realization	3 or 4
SE 411: Kellability Engineering SE 412: Nondestructive Evaluation	3 or 4
SE 112. Regineering Design Optimization	3 or 4
SE 420: Digital Control Systems	4
SE 422: Robot Dynamics and Control	4
SE 423: Mechatronics	3
SE 424: State Space Design for Control	3 2 or 4
SE 450: Decision Analysis I	3  or  4
SE 49/: Independent Study <sup>72</sup>	1 to 4
STAT 409: Actuarial Statistics II	4
STAT 410: Statistics and Probability II	3 or 4
STAT 420: Methods of Applied Statistics	3 or 4
STAT 424: Analysis of Variance	3 or 4
STAT 425: Applied Regression and Design	3 or 4
STAT 426: Sampling and Categorical Data	3 or 4
STAT 429: Time Series Analysis	3 or 4
STAT 430: Topics in Applied Statistics $^{13}$	3 or 4
STAT 450. Topics in Applica Statistics	

MCB 450: Introductory Biochemistry	3	
MCB 493: Special Topics Mol Cell Biol (As Approved)	1 to 4	
MSE 304: Electronic Properties of Matls	3	
MSE 307: Materials Laboratory I	3	
MSE 308: Materials Laboratory II	3	
MSE 401: Thermodynamics of Materials	3	
MSE 402: Kinetic Processes in Materials MSE 403: Synthesis of Materials	3	
MSE 405: Microstructure Determination	3	
MSE 406: Thermal-Mech Behavior of Matls	3	
MSE 420: Ceramic Materials & Properties	3	
MSE 421: Ceramic Processing	3 or 4	
MSE 422: Electrical Ceramics	3	
MSE 440: Mechanical Behavior of Metals	3	
MSE 441: Metals Processing	3	
MSE 443: Design of Engineering Alloys	3	
MSE 445: Corrosion of Metals	3 or 4	
MSE 450: Polymer Science & Engineering	3 or 4	
MSE 455: Plastics Engineering MSE 455: Magramalagular Solida	3	
MSE 455: Mactoniolecular solids	3	
MSE 457: Polymer Chemistry	3 or 4	
MSE 458: Polymer Physics	3 or 4	
MSE 460: Electronic Materials I	3	
MSE 461: Electronic Materials II	3	
MSE 466: Materials in Electrochem Syst	3	
MSE 470: Design and Use of Biomaterials	3	
MSE 473: Biomolecular Materials Science	3	
MSE 474: Biomaterials and Nanomedicine	3	
MSE 480: Surfaces and Colloids	3 or 4	
MSE 481: Electron Microscopy	3 or 4	
MSE 484: Composite Materials	3 or 4	
MSE 485: Atomic Scale Simulations	3 or 4	
MSE 487: Materials for Nanotechnology	3 or 4	
MSE 488: Optical Materials	3 or 4	
MSE 489: Matl Select for Sustainability	3 or 4	
MSE 497: Independent Study (As Approved)	1 to 4	
MSE 498: Special Topics (As Approved)	1 to 4	
NPRE 330: Materials in Nuclear Engrg	3	
NPRE 402: Nuclear Power Engineering	3 or 4	
NPRE 412: Nuclear Power Econ & Fuel Mgmt	3 or 4	
NPRE 421: Plasma and Fusion Science	3	
NPRE 423: Plasma Laboratory	2	
NPRE 429: Plasma Engineering	3	
NPRE 451: Materials in Nuclear Engrg	3	
NPRE 455: Radiological imaging	5 Л	
NPRF 442: Radioactive Waste Management	3	
NPRE 444: Nuclear Analytical Methods Lab	2 or 3	
NPRE 446: Radiation Interact w/Matter I	3	
NPRE 447: Radiation Interact w/Matter II	3	
NPRE 448: Nuclear Syst Engrg & Design	4	
NPRE 451: NPRE Laboratory	3	
NPRE 455: Neutron Diffusion & Transport	4	
NPRE 457: Safety Anlys Nucl Reactor Syst	3 or 4	
NPRE 461: Probabilistic Risk Assessment	3 or 4	
NPRE 470: Fuel Cells & Hydrogen Sources	3	
NPRE 475: Wind Power Systems	3 or 4	
NPRE 498: Special Topics (As Approved)	1 to 4	
PHYS 330: Atmospheric Dynamics II	3	
PHYS 401: Classical Physics Lab	3	
PHYS 402: Light	3 or 4	
PHYS 404: Electronic Circuits	4 or 5	
PHYS 404: Electronic Circuits	4 or 5	
PHVS 427: Thermal & Statistical Dhysics	+ 4	
PHYS 435: Electromagnetic Fields I	т 3	
PHYS 436: Electromagnetic Fields II	~	
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PHYS 460: Condensed Matter Physics	3	
PHYS 460: Condensed Matter Physics PHYS 466: Atomic Scale Simulations	3 4 3 or 4	
PHYS 460: Condensed Matter Physics         PHYS 466: Atomic Scale Simulations         PHYS 470: Subatomic Physics	3 4 3 or 4 4	
PHYS 460: Condensed Matter Physics         PHYS 466: Atomic Scale Simulations         PHYS 470: Subatomic Physics         PHYS 475: Introduction to Biophysics	3 4 3 or 4 4 3 or 4	
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PHYS 460: Condensed Matter PhysicsPHYS 460: Atomic Scale SimulationsPHYS 470: Subatomic PhysicsPHYS 470: Subatomic PhysicsPHYS 475: Introduction to BiophysicsPHYS 485: Atomic Phys & Quantum TheoryPHYS 486: Quantum Physics IPHYS 487: Quantum Physics IIPHYS 496: Intro to Physics Research (As Approved)PHYS 497: Individual Study (As Approved)PHYS 498: Special Topics in Physics (As Approved)	3 4 3 or 4 4 3 or 4 3 4 4 3 1 to 4 1 to 4	
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PHYS 400: Condensed Matter PhysicsPHYS 460: Atomic Scale SimulationsPHYS 470: Subatomic PhysicsPHYS 470: Subatomic PhysicsPHYS 475: Introduction to BiophysicsPHYS 485: Atomic Phys & Quantum TheoryPHYS 486: Quantum Physics IPHYS 487: Quantum Physics IIPHYS 496: Intro to Physics Research (As Approved)PHYS 497: Individual Study (As Approved)PHYS 498: Special Topics in Physics (As Approved)SE 400: Engineering Law (As Approved)SE 402: Comp-Aided Product Realization	3 4 3 or 4 4 3 or 4 3 4 4 3 1 to 4 1 to 4 3 or 4 3 or 4 3 or 4	
PHYS 460: Condensed Matter Physics         PHYS 460: Atomic Scale Simulations         PHYS 470: Subatomic Physics         PHYS 475: Introduction to Biophysics         PHYS 485: Atomic Phys & Quantum Theory         PHYS 486: Quantum Physics I         PHYS 487: Quantum Physics II         PHYS 496: Intro to Physics Research (As Approved)         PHYS 497: Individual Study (As Approved)         PHYS 498: Special Topics in Physics (As Approved)         SE 400: Engineering Law (As Approved)         SE 402: Comp-Aided Product Realization         SE 411: Reliability Engineering	3 4 3 or 4 4 3 or 4 3 4 4 4 3 1 to 4 1 to 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4 3 or 4	
<ul> <li>PHYS 460: Condensed Matter Physics</li> <li>PHYS 460: Atomic Scale Simulations</li> <li>PHYS 470: Subatomic Physics</li> <li>PHYS 475: Introduction to Biophysics</li> <li>PHYS 485: Atomic Phys &amp; Quantum Theory</li> <li>PHYS 486: Quantum Physics I</li> <li>PHYS 487: Quantum Physics II</li> <li>PHYS 496: Intro to Physics Research (As Approved)</li> <li>PHYS 497: Individual Study (As Approved)</li> <li>PHYS 498: Special Topics in Physics (As Approved)</li> <li>SE 400: Engineering Law (As Approved)</li> <li>SE 402: Comp-Aided Product Realization</li> <li>SE 411: Reliability Engineering</li> <li>SE 412: Nondestructive Evaluation</li> </ul>	3 4 3 or 4 4 3 or 4 3 4 4 3 1 to 4 1 to 4 3 or 4 5	
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<ul> <li>PHYS 460: Condensed Matter Physics</li> <li>PHYS 460: Condensed Matter Physics</li> <li>PHYS 466: Atomic Scale Simulations</li> <li>PHYS 470: Subatomic Physics</li> <li>PHYS 475: Introduction to Biophysics</li> <li>PHYS 485: Atomic Phys &amp; Quantum Theory</li> <li>PHYS 485: Atomic Phys &amp; Quantum Theory</li> <li>PHYS 486: Quantum Physics I</li> <li>PHYS 487: Quantum Physics II</li> <li>PHYS 496: Intro to Physics Research (As Approved)</li> <li>PHYS 496: Intro to Physics Research (As Approved)</li> <li>PHYS 497: Individual Study (As Approved)</li> <li>PHYS 498: Special Topics in Physics (As Approved)</li> <li>SE 400: Engineering Law (As Approved)</li> <li>SE 402: Comp-Aided Product Realization</li> <li>SE 411: Reliability Engineering</li> <li>SE 412: Nondestructive Evaluation</li> <li>SE 413: Engineering Design Optimization</li> <li>SE 420: Digital Control Systems</li> </ul>	3 4 3 or 4 4 3 or 4 3 4 4 3 1 to 4 1 to 4 3 or 4 4 4 3 or 4 3 or 4 4 or 4 3 or 4 3 or 4 3 or 4 3 or 4 4 or 4 4 or 4 3 or 4 4 or 4 4 or 4 3 or 4 4 or 4 4 or 4 5 o	
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PHYS 460: Condensed Matter Physics PHYS 466: Atomic Scale Simulations PHYS 470: Subatomic Physics PHYS 475: Introduction to Biophysics PHYS 485: Atomic Phys & Quantum Theory PHYS 486: Quantum Physics I PHYS 486: Quantum Physics II PHYS 496: Intro to Physics Research (As Approved) PHYS 496: Intro to Physics Research (As Approved) PHYS 497: Individual Study (As Approved) PHYS 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 402: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 407: Laboration Analysis I (As Approved)	3 4 3 or 4 4 3 or 4 3 4 4 4 3 1 to 4 1 to 4 3 or 4 1 or 4	
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PHYS 400: Condensed Matter Physics PHYS 400: Condensed Matter Physics PHYS 470: Subatomic Physics PHYS 470: Subatomic Physics PHYS 475: Introduction to Biophysics PHYS 485: Atomic Phys & Quantum Theory PHYS 486: Quantum Physics I PHYS 486: Quantum Physics I PHYS 497: Quantum Physics Research (As Approved) PHYS 496: Intro to Physics Research (As Approved) PHYS 497: Individual Study (As Approved) PHYS 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 402: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 450: Decision Analysis I (As Approved) SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved)	3         4         3 or 4         4         3 or 4         3         4         3         1 to 4         3 or 4         1 to 4         4         4         3 or 4         1 to 4         4         3 or 4         0 to 4         1 to 4         4	
PHY'S 460: Condensed Matter Physics PHY'S 460: Condensed Matter Physics PHY'S 470: Subatomic Physics PHY'S 470: Subatomic Physics PHY'S 475: Introduction to Biophysics PHY'S 485: Atomic Phys & Quantum Theory PHY'S 486: Quantum Physics I PHY'S 486: Quantum Physics I PHY'S 496: Intro to Physics Research (As Approved) PHY'S 497: Individual Study (As Approved) PHY'S 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 400: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved) SE 409: Actuarial Statistics II STAT 409: Actuarial Statistics II STAT 410: Statistics and Probability II	3         4         3 or 4         4         3 or 4         3         4         3         1 to 4         1 to 4         3 or 4         1 to 4         4         3 or 4          3 or 4          3 or 4          3 or 4          3 or 4	
PHY'S 460: Condensed Matter Physics PHY'S 460: Condensed Matter Physics PHY'S 470: Subatomic Physics PHY'S 470: Subatomic Physics PHY'S 475: Introduction to Biophysics PHY'S 485: Atomic Phys & Quantum Theory PHY'S 486: Quantum Physics I PHY'S 486: Quantum Physics I PHY'S 497: Individual Study (As Approved) PHY'S 497: Individual Study (As Approved) PHY'S 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 400: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved) STAT 409: Actuarial Statistics II STAT 410: Statistics and Probability II STAT 420: Methods of Applied Statistics	3         4         3 or 4         4         3 or 4         3         4         3         1 to 4         1 to 4         3 or 4         4         4         3 or 4         0 to 4         1 to 4         4         3 or 4          3 or 4	
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PHY'S 460: Condensed Matter Physics PHY'S 466: Atomic Scale Simulations PHY'S 470: Subatomic Physics PHY'S 475: Introduction to Biophysics PHY'S 485: Atomic Phys & Quantum Theory PHY'S 486: Quantum Physics I PHY'S 486: Quantum Physics I PHY'S 496: Intro to Physics Research (As Approved) PHY'S 496: Intro to Physics Research (As Approved) PHY'S 497: Individual Study (As Approved) PHY'S 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 402: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 430: Decision Analysis I (As Approved) SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved) SE 410: Statistics and Probability II STAT 410: Statistics and Probability II STAT 420: Methods of Applied Statistics STAT 425: Applied Regression and Design STAT 425: Applied Regression and Design	3         4         3 or 4         4         3 or 4         3         4         3         1 to 4         1 to 4         3 or 4         4         4         3 or 4          3 or 4          3 or 4          3 or 4          3 or 4	
PHYS 460: Condensed Matter Physics PHYS 466: Atomic Scale Simulations PHYS 470: Subatomic Physics PHYS 475: Introduction to Biophysics PHYS 485: Atomic Physic & Quantum Theory PHYS 486: Quantum Physics I PHYS 487: Quantum Physics II PHYS 496: Intro to Physics Research (As Approved) PHYS 497: Individual Study (As Approved) PHYS 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 402: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 430: Decision Analysis I (As Approved) SE 497: Independent Study (As Approved) SE 497: Independent Study (As Approved) SE 498: Special Topies (As Approved) SE 497: Independent Study (As Approved) SE 497: Independent Study (As Approved) SE 497: Independent Study (As Approved) SE 444: Statistics and Probability II STAT 409: Actuarial Statistics II STAT 420: Methods of Applied Statistics STAT 424: Analysis of Variance STAT 425: Sampling and Categorical Data STAT 426: Sampling and Categorical Data STAT 426: Sampling and Categorical Data	3 4 3 or 4 4 3 or 4 3 4 4 3 1 to 4 3 or 4 3	
PHYS 460: Condensed Matter Physics PHYS 466: Atomic Scale Simulations PHYS 470: Subatomic Physics PHYS 475: Introduction to Biophysics PHYS 485: Atomic Phys & Quantum Theory PHYS 486: Quantum Physics I PHYS 486: Quantum Physics I PHYS 487: Quantum Physics II PHYS 496: Intro to Physics Research (As Approved) PHYS 497: Individual Study (As Approved) PHYS 498: Special Topics in Physics (As Approved) PHYS 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 401: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved) STAT 409: Actuarial Statistics II STAT 410: Statistics and Probability II STAT 424: Analysis of Variance STAT 425: Applied Regression and Design STAT 426: Sampling and Categorical Data STAT 429: Time Series Analysis	3         4         3 or 4         4         3 or 4         3         4         3         1 to 4         1 to 4         3 or 4 <tr< td=""><td></td></tr<>	
PHYS 460: Condensed Matter Physics PHYS 466: Atomic Scale Simulations PHYS 470: Subatomic Physics PHYS 475: Introduction to Biophysics PHYS 485: Atomic Physics Quantum Theory PHYS 485: Quantum Physics I PHYS 487: Quantum Physics I PHYS 487: Quantum Physics Research (As Approved) PHYS 487: Quantum Physics Research (As Approved) PHYS 496: Intro to Physics Research (As Approved) PHYS 497: Individual Study (As Approved) PHYS 498: Special Topics in Physics (As Approved) SE 400: Engineering Law (As Approved) SE 400: Engineering Law (As Approved) SE 401: Comp-Aided Product Realization SE 411: Reliability Engineering SE 412: Nondestructive Evaluation SE 413: Engineering Design Optimization SE 420: Digital Control Systems SE 422: Robot Dynamics and Control SE 423: Mechatronics SE 424: State Space Design for Control SE 497: Independent Study (As Approved) SE 498: Special Topics (As Approved) STAT 409: Actuarial Statistics II STAT 410: Statistics and Probability II STAT 420: Methods of Applied Statistics STAT 424: Analysis of Variance STAT 425: Applied Regression and Design STAT 426: Sampling and Categorical Data STAT 428: Statistical Computing STAT 429: Topics in Annalied Statistics (As Approved)	3         4         3 or 4         3 or 4         3         4         3         4         3         1 to 4         3 or 4          3 or 4          3 or 4 <td></td>	

STAT 440: Statistical Data Management	3 or 4	
STAT 443: Professional Statistics <sup>11</sup>	3 or 4	
STAT 448: Advanced Data Analysis	4	
STAT 458: Math Modeling in Life Sciences	3 or 4	
STAT 480: Data Science Foundations	3 or 4	
TAM All 400 level TAM courses, except potentially 497,498 <sup>12,13</sup>		
TE 461: Technology Entrepreneurship <sup>11</sup>	3	
TMGT 460: Business Process Modeling	3	
TMGT 461: Tech, Eng, & Mgt Final Project	2	
Electives		
The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General	6	
Education lists for Social and Behavioral Sciences or Humanities and the Arts <sup>14</sup>		
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that	6	
there are at least 128 credit hours earned toward the degree. <sup>15</sup>		
Total Hours of Curriculum to Graduate	128	
Footnotes		
<sup>1</sup> External transfer students take ENG 300 instead		
<sup>2</sup> CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM		
102, similarly CHEM 105 requirement wavied for students who received test-based credit for CHEM 104.		
Students are still required to have 128 hours minimum to graduate.		
<sup>3</sup> 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.		
<sup>4</sup> MATH 415 may be substituted for students entering prior to fall 2022.		
<sup>3</sup> MATH 284 may be substituted.		
<sup>6</sup> CS 124 or CS 125 or ECE 220 may be substituted.		
' ECE 110 and ECE 210 (or ECE 211) combined may be substituted.		
<sup>b</sup> Advanced Composition satisfied by completing ME 470.		
<sup>9</sup> Transfers and Physics minor/dual degree students may substitute PHYS 325.		
<sup>10</sup> Transfers and ECE minor/dual degree students may substitute ECE 313.		
<sup>11</sup> Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.		
<sup>12</sup> A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.		
<sup>13</sup> Depending on the technical content, some Special Topics courses may not be approved for Technical Elective		
credit. Please provide a syllabus of the course to the Mechanical Science and Engineering Undergraduate		
Programs Office to request use of the course for Technical Elective credit prior to registering for the course.		
14 The Chainean Callere of Engineering annual librard at a single the strength of the Strength of the		
rne Granger Conege of Engineering approved operated accuration course list can be jound here. Note that these credit hours could carry the required cultural studies designation required for campus general education		
requirements,		
<sup>15</sup> The Grainger College of Engineering restrictions to free electives can be found here.		

STAT 440: Statistical Data Management	3 or 4
STAT 443: Professional Statistics (As Approved)	3 or 4
STAT 448: Advanced Data Analysis	4
STAT 458: Math Modeling in Life Sciences	3 or 4
STAT 480: Data Science Foundations	3 or 4
FE 461: Technology Entrepreneurship (As Approved)	3
FMGT 460: Business Process Modeling	3
FMGT 461: Tech, Eng, & Mgt Final Project	2
Free Electives	
Additional course work subject to the Grainger College of Engineering restrictions to Free Electives so that there are at least 128 gradit hours correct toward the degree	11
(https://go.grainger.illinois.edu/FreeElectives)	
Fotal 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.

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 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.

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.

Kevin Hamiltan

Kevin Hamilton Dean and Professor



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.

metrie Rollin

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.

Shary huk

Tracy Sulkin Dean, College of Media



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.

Jeffrey R. Brown Dean, Gies College of Business



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.

Eunice Santos

Eunice Santos Professor and Dean

From: Hanley-Maxwell, Cheryl D <<u>cherylhm@illinois.edu</u>>
Sent: Monday, February 14, 2022 3:57 PM
To: Miller, Nolan H <<u>nmiller@illinois.edu</u>>
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 | <u>cherylhm@illinois.edu</u> 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 <<u>nmiller@illinois.edu</u>>
Sent: Monday, February 14, 2022 1:49 PM
To: Hanley-Maxwell, Cheryl D <<u>cherylhm@illinois.edu</u>>
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 <<u>cherylhm@illinois.edu</u>>
Sent: Thursday, February 10, 2022 1:49 PM
To: Miller, Nolan H <<u>nmiller@illinois.edu</u>>
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 | <u>cherylhm@illinois.edu</u> 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



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