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Changes proposed by: Stephanie Ott-Monsivais

Catalog Pages Using this Program	Mechanical Engineering, BS

Proposal Type:

In Workflow

1. **U Program Review**
2. **1917 Head**
3. **KP Committee Chair**
4. **KP Dean**
5. **University Librarian**
6. **Provost**
7. **Senate EPC**
8. Senate
9. U Senate Conf
10. Board of Trustees
11. IBHE
12. HLC
13. DMI

Approval Path

1. 01/05/22 2:43 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)
2. Apr 25, 2019 by Deb Forgacs (dforgacs)
3. Aug 12, 2019 by Deb Forgacs (dforgacs)
4. Feb 26, 2020 by Brooke Newell (bsnewell)
5. Mar 31, 2020 by Deb Forgacs (dforgacs)
6. Apr 14, 2020 by Deb Forgacs (dforgacs)
7. May 10, 2021 by Stephanie Ott-Monsivais (ottmonsi)
8. Oct 8, 2021 by Brooke Newell (bsnewell)

Major (ex. Special Education)

This proposal is for a:
Revision

Administration Details

Official Program Name	Mechanical Engineering, BS

Sponsor College	Grainger College of Engineering
Sponsor Department	Mechanical Sci & Engineering
Sponsor Name	Stephanie Ott-Monsivais
Sponsor Email	ottmonsi@illinois.edu
College Contact	Jonathan Makela ~~Brooke Newell~~
College Contact Email	jmakela@illinois.edu ~~bsnewell@illinois.edu~~
College Budget Officer	Tessa Hile
College Budget Officer Email	tmhile@illinois.edu

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

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

Does this program have inter-departmental administration?

No

Proposal Title

Effective Catalog Term	Fall 2022

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.

Attach letters of support or acknowledgement from other

Letters of Acknowledgement - Liberal Education Electives.pdf

departments.

Program Regulation and Assessment

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

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.

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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 2021-12-20_ME Side by Side BSN.xlsx

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

Catalog Page Text - Overview Tab

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

The 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 **Technical GPA** to clarify requirements.

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 ~~(ECON 102~~ or ECON 103). ~~ECON 103).~~ 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	Hours
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 103	General 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
ME 200	Thermodynamics	3
ME 310	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
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
Total Hours		52

Technical Electives

Course List

Code	Title	Hours
Science elective(s), chosen from one of the following:		4
CHEM 104	General Chemistry II	
& CHEM 105	and General Chemistry Lab II	
MCB 150	Molec & Cellular Basis of Life	
PHYS 213	Univ Physics: Thermal Physics	
& PHYS 214	and Univ Physics: Quantum Physics	
~~Statistics elective, one course chosen from: 10~~		~~3~~
Statistics elective, one course chosen from:		3
IE 300	Analysis of Data	
STAT 400	Statistics and Probability I	
~~MechSE electives chosen from a departmentally approved list. See list below~~		~~6~~
~~Technical electives chosen from a departmentally approved list below.~~		~~6~~
MechSE electives chosen from the departmentally approved list below.		6
All 400 level ME courses, except 470 and potentially 497, 498 (As Approved)		
All 400 level TAM courses, except potentially 497, 498 (As Approved)		
Technical electives chosen from the departmentally approved list below.		6
ABE 430	Project Management (As Approved)	2
ABE 436	Renewable Energy Systems	3 or 4
ABE 445	Statistical Methods	4
ABE 455	Erosion and Sediment Control	2
ABE 456	Land & Water Resources Engrg	3 or 4
ABE 459	Drainage and Water Management	3 or 4
ABE 463	Electrohydraulic Systems	3
ABE 466	Engineering Off-Road Vehicles	3
ABE 469	Industry-Linked Design Project	4
ABE 474	Indoor Environmental Control	3 or 4
ABE 476	Indoor Air Quality Engineering	4
ABE 483	Engineering Properties of Food Materials	3
ABE 488	Bioprocessing Biomass for Fuel	4
ABE 497	Independent Study (As Approved)	1 to 4
ABE 498	Special Topics (As Approved)	1 to 4

Code	Title	Hours
AE 352	Aerospace Dynamical Systems	3
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
AE 416	Applied Aerodynamics	3 or 4
AE 419	Aircraft Flight Mechanics	3 or 4
AE 420	Finite Element Analysis	3 or 4
AE 428	Mechanics of Composites	3
AE 433	Aerospace Propulsion	3 or 4
AE 434	Rocket Propulsion	3 or 4
AE 442	Aerospace Systems Design I	3
AE 443	Aerospace Systems Design II	3
AE 451	Aeroelasticity	3 or 4
AE 454	Systems Dynamics & Control	3 or 4
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 483	Autonomous Systems Lab	2
AE 497	Independent Study (As Approved)	1 to 4
AE 498	Special Topics (As Approved)	1 to 4
ASRM 410	Investments and Financial Markets	3 or 4
ASRM 461	Loss Models	3
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 Topics (As Approved)	1 to 4
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

Code	Title	Hours
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
CEE 422	Construction Cost Analysis	3 or 4
CEE 424	Sustainable Const Methods	4
CEE 430	Ecological Quality Engineering	2
CEE 434	Environmental Systems I	3
CEE 437	Water Quality Engineering	3
CEE 438	Science & Environmental Policy	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 442	Environmental Engineering Principles, Physical	4
CEE 443	Env Eng Principles, Chemical	4
CEE 444	Env Eng Principles, Biological	4
~~CEE 445~~	~~Course CEE 445 Not Found~~	~~4~~
~~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	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 458	Water Resources Field Methods	4
CEE 460	Steel Structures I	3
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
CEE 467	Masonry Structures	3 or 4
CEE 468	Prestressed Concrete	3 or 4

Code	Title	Hours
CEE 469	Wood Structures	3 or 4
CEE 470	Structural Analysis	4
CEE 471	Structural Mechanics	3 or 4
CEE 472	Structural Dynamics I	3 or 4
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 (As Approved)	1 to 16
CEE 498	Special Topics (As Approved)	1 to 4
CHBE 422	Mass Transfer Operations	4
CHBE 424	Chemical Reaction Engineering	3
CHBE 451	Transport Phenomena	3
CHBE 452	Chemical Kinetics & Catalysis	3
CHBE 453	Electrochemical Engineering	2 or 3
CHBE 456	Polymer Science & Engineering	3
CHBE 457	Microelectronics Processing	3
CHBE 471	Biochemical Engineering	3 or 4
CHBE 472	Techniques in Biomolecular Eng	3 or 4
CHBE 473	Biomolecular Engineering	3 or 4
CHBE 474	Metabolic Engineering	3 or 4
CHBE 475	Tissue Engineering	3
CHBE 476	Biotransport	3
CHEM 232	Elementary Organic Chemistry I	3 or 4
CHEM 233	Elementary Organic Chem Lab I	2
CHEM 236	Fundamental Organic Chem I	4
CHEM 237	Structure and Synthesis	2
CHEM 312	Inorganic Chemistry	3
CHEM 315	Instrumental Chem Systems Lab	2
CHEM 317	Inorganic Chemistry Lab	3
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 442	Physical Chemistry I	4
CHEM 444	Physical Chemistry II	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	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

Code	Title	Hours
CHEM 488	Surfaces and Colloids	3 or 4
CHEM 497	Individual Study Senior (As Approved)	1 to 3
CS 225	Data Structures	4
CS 233	Computer Architecture	4
~~CS 241~~	~~Course CS 241 Not Found~~	
CS 242	Programming Studio	3
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	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	3 or 4
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 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 433	Computer System Organization	3 or 4
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
CS 446	Machine Learning	3 or 4
CS 447	Natural Language Processing	3 or 4
CS 450	Numerical Analysis	3 or 4
CS 457	Numerical Methods II	3
CS 460	Security Laboratory	3 or 4
CS 461	Computer Security I	4
CS 463	Computer Security II	3 or 4
CS 465	User Interface Design	4
CS 466	Introduction to Bioinformatics	3 or 4
CS 467	Social Visualization	3 or 4
CS 468	Tech and Advertising Campaigns	3
CS 473	Algorithms	4
CS 475	Formal Models of Computation	3 or 4
CS 476	Program Verification	3 or 4

Code	Title	Hours
CS 477	Formal Software Development Methods	3 or 4
CS 481	Advanced Topics in Stochastic Processes & Applications	3 or 4
CS 483	Applied Parallel Programming	4
CS 484	Parallel Programming	3 or 4
CS 498	Special Topics (As Approved)	1 to 4
CSE 401	Numerical Analysis	3 or 4
CSE 402	Parallel Progrmg: Sci & Engrg	3 or 4
CSE 412	Numerical Thermo-Fluid Mechs	2 to 4
CSE 441	Introduction to Optimization	3 or 4
CSE 450	Computational Mechanics	3 or 4
CSE 451	Finite Element Analysis	3 or 4
CSE 461	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
ECE 451	Adv Microwave Measurements	3
ECE 452	Electromagnetic Fields	3
ECE 453	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
ECE 478	Formal Software Development Methods	3 or 4
ECE 480	Magnetic Resonance Imaging	3 or 4
ECE 481	Nanotechnology	4
ECE 482	Digital IC Design	3
ECE 483	Analog IC Design	3
ECE 485	MEMS Devices & Systems	3
ECE 486	Control Systems	4
ECE 487	Intro Quantum Electr for EEs	3
ECE 488	Compound Semicond & Devices	3
ECE 489	Robot Dynamics and Control	4
ECE 490	Introduction to Optimization	3 or 4
ECE 491	Numerical Analysis	3 or 4
ECE 492	Parallel Progrmg: Sci & Engrg	3 or 4
ECE 493	Advanced Engineering Math	3 or 4
ECE 495	Photonic Device Laboratory	3
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 311	Operations Research Lab	1
IE 330	Industrial Quality Control	3
IE 340	Human Factors	4
IE 360	Facilities Planning and Design	3
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
IE 411	Optimization of Large Systems	3 or 4

Code	Title	Hours
IE 412	OR Models for Mfg Systems	3 or 4
IE 413	Simulation	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
IE 445	Human Performance and Cognition in Context (As Approved)	3 or 4
IE 497	Independent Study (As Approved)	1 to 4
IE 498	Special Topics (As Approved)	1 to 4
MATH 347	Fundamental Mathematics	3
MATH 357	Numerical Methods I	3
MATH 403	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
MATH 484	Nonlinear Programming	3 or 4
MATH 487	Advanced Engineering Math	3 or 4
MATH 489	Dynamics & Differential Eqns	3 or 4
MATH 490	Advanced Topics in Mathematics (As Approved)	1 to 4
MATH 492	Undergraduate Research in Math (As Approved)	1 to 3
MCB 401	Cellular Physiology	3
MCB 402	Sys & Integrative Physiology	3
MCB 403	Cell & Membrane Physiology Lab	1 or 2
MCB 404	Sys & Integrative Physiol Lab	1 to 2
MCB 450	Introductory Biochemistry	3
MCB 493	Special Topics Mol Cell Biol (As Approved)	1 to 4
~~All 400 level ME courses, except 470 and potentially 497, 498 12,13~~		
MSE 304	Electronic Properties of Matls	3

Code	Title	Hours
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	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 453	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
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 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
PHYS 435	Electromagnetic Fields I	3
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	3
PHYS 486	Quantum Physics I	4
PHYS 487	Quantum Physics II	4
PHYS 496	Communicating in Physics—Writing Papers and Giving Talks (As Approved)	3
PHYS 497	Individual Study (As Approved)	1 to 4
PHYS 498	Special Topics in Physics (As Approved)	1 to 4
SE 400	Engineering Law (As Approved)	3 or 4
SE 402	Comp-Aided Product Realization	3 or 4
SE 411	Reliability Engineering	3 or 4
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	4
SE 423	Mechatronics	3
SE 424	State Space Design for Control	3
SE 450	Decision Analysis I (As Approved)	3 or 4
SE 497	Independent Study (As Approved)	0 to 4
SE 498	Special Topics (As Approved)	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	Statistical Modeling I	3 or 4
STAT 426	Statistical Modeling II	3 or 4
STAT 428	Statistical Computing	3 or 4

Code	Title	Hours
STAT 429	Time Series Analysis	3 or 4
STAT 430	Topics in Applied Statistics (As Approved)	3 or 4
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
~~All 400 level TAM courses, except potentially 497,498 12,13~~		
TE 461	Technology Entrepreneurship (As Approved)	3
TMGT 460	Business Process Modeling	3
TMGT 461	Tech, Eng, & Mgt Final Project	2

Free Electives

Course List		
Code	Title	Hours
~~The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts 14~~		~~6~~
~~Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. 15~~		~~6~~
Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree.		11
Total Hours of Curriculum to Graduate		128

~~**12**~~

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

~~**3**~~

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

~~**4***MATH 415 may be substituted for students entering prior to Fall 2021.***5***MATH 284 may be substituted.***6***CS 124 or CS 125 or ECE 220 may be substituted.***7***~~

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

~~*Advanced Composition satisfied by completing* ME 470%7C.***9***~~

~~*Transfers and Physics minor/dual degree students may substitute* PHYS 325.***10***~~

~~*Transfers and ECE minor/dual degree students may substitute ECE 313.***11***~~

~~*A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.*~~

~~**12**~~

~~*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.*~~

~~**13**~~

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

~~**14**~~

~~*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 Degree: BS Bachelor of Science

Program Features

Academic Level: Undergraduate

Does this major have transcripted concentrations?: No

What is the typical time to completion of this program?
4 years

What are the minimum Total Credit Hours required for this program?
128

CIP Code: 141901 - Mechanical Engineering.

Is This a Teacher Certification Program?
No

Will specialized accreditation be sought for this program?

No

Delivery Method

This program is available:
On Campus - Students are required to be on campus, they may take some online courses.

Admission Requirements

Desired Effective Admissions Term: Fall 2021

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 budgetary implications for this revision?

No

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

No

Additional Budget Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

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

No

Attach letters of support

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

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

No

Resource Implications

Facilities

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

No

Technology

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

No

Non-Technical Resources

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

No

Resources

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

Attach File(s)

Faculty Resources

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

These changes will not impact our faculty resources.

Library Resources

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

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

EP Documentation

EP Control Number	EP.22.093
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	Conc Code	Degree Code	BS	Major Code
0133				

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

Key: 120

Key
GREEN HIGHLIGHT = Course addition, updated hours, or added/revised/reordered footnote
YELLOW HIGHLIGHT = Course has been reordered (to alphabetized list)
RED HIGHLIGHT = 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[1]	0	ENG 100: Engineering Orientation[1]	0
ME 290: Seminar	0	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[2]	1	CHEM 103: General Chemistry Lab I[2]	1
MATH 221: Calculus I[3]	4	MATH 221: Calculus I[3]	4
MATH 231: Calculus II	3	MATH 231: Calculus II	3
MATH 241: Calculus III	4	MATH 241: Calculus III	4
		MATH 257: Linear Algebra with Computational Applications[4]	3
MATH 285: Intro Differential Equations[4]	3	MATH 285: Intro Differential Equations[5]	3
MATH 415: Applied Linear Algebra	3		
PHYS 211: University Physics: Mechanics	4	PHYS 211: University Physics: Mechanics	4
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[5]	3	CS 101: Intro Computing: Engrg & Sci[6]	3
ECE 205: Electrical and Electronic Circuits[6]	3	ECE 205: Electrical and Electronic Circuits[7]	3
ECE 206: Electrical and Electronic Circuits Lab	1	ECE 206: Electrical and Electronic Circuits Lab	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	4	ME 310: Fundamentals of Fluid Dynamics	4
ME 320: Heat Transfer	4	ME 320: Heat Transfer	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	3	ME 370: Mechanical Design I	3
ME 371: Mechanical Design II	3	ME 371: Mechanical Design II	3
ME 470: Senior Design Project[7]	3	ME 470: Senior Design Project[8]	3
TAM 210: Introduction to Statics	2	TAM 210: Introduction to Statics	2
TAM 212: Introductory Dynamics[8]	3	TAM 212: Introductory Dynamics[9]	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[2]		CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II[2]	
MCB 150: Molec & Cellular Basis of Life		MCB 150: Molec & Cellular Basis of Life	
PHYS 213: Univ Physics: Thermal Physics & PHYS 214: Univ Physics: Quantum Physics		PHYS 213: Univ Physics: Thermal Physics & PHYS 214: Univ Physics: Quantum Physics	
Statistics elective, one course chosen from:[9]	3	**Statistics elective, one course chosen from:[10]**	3
IE 300: Analysis of Data		IE 300: Analysis of Data	
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	3		
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		
AE 416: Applied Aerodynamics	3 or 4		
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 433: Aerospace Propulsion	3 or 4		
AE 434: Rocket Propulsion	3 or 4		
AE 442: Aerospace Systems Design I	3		
AE 443: Aerospace Systems Design II	3		
AE 451: Aeroelasticity	3 or 4		
AE 454: Systems Dynamics & Control	3 or 4		
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 483: Autonomous Systems Lab	2		
AE 497: Independent Study [10]	1 to 4		
AE 498: Special Topics (Depending on topic) [11]	1 to 4		
ABE 430: Project Management [12]	2	ABE 430: Project Management [11]	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	2	ABE 455: Erosion and Sediment Control	2
ABE 456: Land & Water Resources Engrg	3 or 4	ABE 456: Land & Water Resources Engrg	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 469: Industry-Linked Design Project	4	ABE 469: Industry-Linked Design Project	4
ABE 474: Indoor Environmental Control	3 or 4	ABE 474: Indoor Environmental Control	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 [10]	1 to 4	ABE 497: Independent Study [12]	1 to 4
ABE 498: Special Topics [11]	1 to 4	ABE 498: Special Topics [13]	1 to 4
		AE 352: Aerospace Dynamical Systems	3
		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
		AE 416: Applied Aerodynamics	3 or 4
		AE 419: Aircraft Flight Mechanics	3 or 4
		AE 420: Finite Element Analysis	3 or 4
		AE 428: Mechanics of Composites	3
		AE 433: Aerospace Propulsion	3 or 4
		AE 434: Rocket Propulsion	3 or 4
		AE 442: Aerospace Systems Design I	3
		AE 443: Aerospace Systems Design II	3
		AE 451: Aeroelasticity	3 or 4
		AE 454: Systems Dynamics & Control	3 or 4

		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 483: Autonomous Systems Lab	2
		AE 497: Independent Study [12]	1 to 4
		AE 498: Special Topics (Depending on topic) [13]	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	3	ASRM 461: Loss Models	3
ASRM 469: Casualty Actuarial Mathematics	3 or 4	ASRM 469: Casualty Actuarial Mathematics	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	3	BIOC 406: Gene Expression & Regulation	3
BIOC 440: Physical Chemistry Principles	4	BIOC 440: Physical Chemistry Principles	4
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	3	BIOE 380: Biomedical Imaging	3
BIOE 414: Biomedical Instrumentation	3	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	4	BIOE 461: Cellular Biomechanics	4
BIOE 476: Tissue Engineering	3	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
BIOE 482: Musculoskel Tissue Mechanics	3 or 4	BIOE 482: Musculoskel Tissue Mechanics	3 or 4
BIOE 497: Individual Study [10]	1 to 4	BIOE 497: Individual Study [12]	1 to 4
BIOE 498: Special Topics [11]	1 to 4	BIOE 498: Special Topics [13]	1 to 4
BIOP 401: Introduction to Biophysics	3	BIOP 401: Introduction to Biophysics	3
BIOP 419: Brain, Behavior & Info Process	3	BIOP 419: Brain, Behavior & Info Process	3
BIOP 432: Photosynthesis	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	3
		CEE 380: Geotechnical Engineering	3
		CEE 398: Special Topics [13]	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 [11]	4
		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	3 or 4
		CEE 424: Sustainable Const Methods	4
		CEE 430: Ecological Quality Engineering	2
		CEE 434: Environmental Systems I	3
		CEE 437: Water Quality Engineering	3
		CEE 438: Science & Environmental Policy	3
		CEE 440: Fate Cleanup Environ Pollutant	4
		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	4
		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	3
		CEE 452: Hydraulic Analysis and Design	3
		CEE 453: Urban Hydrology and Hydraulics	4
		CEE 457: Groundwater	3
		CEE 458: Water Resources Field Methods	4
		CEE 460: Steel Structures I	3
		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
		CEE 467: Masonry Structures	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 472: Structural Dynamics I	3 or 4
		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 [12]	1 to 16
		CEE 498: Special Topics [13]	1 to 4
CHBE 422: Mass Transfer Operations	4	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: Chemical Kinetics & Catalysis	3	CHBE 452: Chemical Kinetics & Catalysis	3
CHBE 453: Electrochemical Engineering	2 or 3	CHBE 453: Electrochemical Engineering	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 471: Biochemical Engineering	3 or 4
CHBE 472: Techniques in Biomolecular Eng	3 or 4	CHBE 472: Techniques in Biomolecular Eng	3 or 4
CHBE 473: Biomolecular Engineering	3 or 4	CHBE 473: Biomolecular Engineering	3 or 4
CHBE 474: Metabolic Engineering	3 or 4	CHBE 474: Metabolic Engineering	3 or 4
CHBE 475: Tissue Engineering	3	CHBE 475: Tissue Engineering	3
CHBE 476: Biotransport	3	CHBE 476: Biotransport	3
CHEM 232: Elementary Organic Chemistry I	3 or 4	CHEM 232: Elementary Organic Chemistry I	3 or 4
CHEM 233: Elementary Organic Chem Lab I	2	CHEM 233: Elementary Organic Chem Lab I	2
CHEM 236: Fundamental Organic Chem I	4	CHEM 236: Fundamental Organic Chem I	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	2
CHEM 317: Inorganic Chemistry Lab	3	CHEM 317: Inorganic Chemistry 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	3	CHEM 437: Organic Chemistry Lab	3
CHEM 438: Advanced Organic Chemistry	3	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	4	CHEM 444: Physical Chemistry II	4
CHEM 445: Physical Principles Lab I	2	CHEM 445: Physical Principles Lab I	2
CHEM 447: Physical Principles Lab II	2	CHEM 447: Physical Principles Lab II	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	3 or 4	CHEM 460: Green Chemistry	3 or 4
CHEM 472: Physical Biochemistry	3	CHEM 472: Physical Biochemistry	3
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 Anlys	4	CHEM 483: Solid State Structural Anlys	4
CHEM 488: Surfaces and Colloids	3 or 4	CHEM 488: Surfaces and Colloids	3 or 4
CHEM 497: Individual Study Senior [10]	1 to 3	CHEM 497: Individual Study Senior [12]	1 to 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	3		
CEE 380: Geotechnical Engineering	3		
CEE 398: Special Topics [11]	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 [12]	4		
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	3 or 4		
CEE 424: Sustainable Const Methods	4		
CEE 430: Ecological Quality Engineering	2		
CEE 434: Environmental Systems I	3		
CEE 437: Water Quality Engineering	3		
CEE 438: Science & Environmental Policy	3		
CEE 440: Fate Cleanup Environ Pollutant	4		
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	4		
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	3		
CEE 452: Hydraulic Analysis and Design	3		
CEE 453: Urban Hydrology and Hydraulics	4		
CEE 457: Groundwater	3		
CEE 458: Water Resources Field Methods	4		
CEE 460: Steel Structures I	3		
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		
CEE 467: Masonry Structures	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 472: Structural Dynamics I	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 [10]	1 to 16		
CEE 498: Special Topics [11]	1 to 4		
CS 225: Data Structures	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	3	CS 242: Programming Studio	3
CS 357: Numerical Methods I	3	CS 357: Numerical Methods I	3
CS 374: Introduction to Algorithms & Models of Computation	4	CS 374: Introduction to Algorithms & Models of Computation	4
CS 410: Text Information Systems	3 or 4	CS 410: Text Information Systems	3 or 4
CS 411: Database Systems	3 or 4	CS 411: Database Systems	3 or 4
CS 412: Introduction to Data Mining	3 or 4	CS 412: Introduction to Data Mining	3 or 4
CS 413: Intro to Combinatorics	3 or 4	CS 413: Intro to Combinatorics	3 or 4
CS 414: Multimedia Systems	3 or 4	CS 414: Multimedia Systems	3 or 4
CS 418: Interactive Computer Graphics	3 or 4	CS 418: Interactive Computer Graphics	3 or 4
CS 419: Production Computer Graphics	3 or 4	CS 419: Production Computer Graphics	3 or 4
CS 420: Parallel Progrmg: Sci & Engrg	3 or 4	CS 420: Parallel Progrmg: Sci & Engrg	3 or 4
CS 421: Programming Languages & Compilers	3 or 4	CS 421: Programming Languages & Compilers	3 or 4
CS 422: Programming Language Design	3 or 4	CS 422: Programming Language Design	3 or 4
CS 423: Operating Systems Design	3 or 4	CS 423: Operating Systems Design	3 or 4
CS 424: Real-Time Systems	3 or 4	CS 424: Real-Time Systems	3 or 4
CS 425: Distributed Systems	3 or 4	CS 425: Distributed Systems	3 or 4
CS 426: Compiler Construction	3 or 4	CS 426: Compiler Construction	3 or 4
CS 427: Software Engineering I	3 or 4	CS 427: Software Engineering I	3 or 4
CS 428: Software Engineering II	3 or 4	CS 428: Software Engineering II	3 or 4

CS 429: Software Engineering II, ACP	3		CS 429: Software Engineering II, ACP	3
CS 431: Embedded Systems	3 or 4		CS 431: Embedded Systems	3 or 4
CS 433: Computer System Organization	3 or 4		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	3 or 4		CS 438: Communication Networks	3 or 4
CS 439: Wireless Networks	3 or 4		CS 439: Wireless Networks	3 or 4
CS 440: Artificial Intelligence	3 or 4		CS 440: Artificial Intelligence	3 or 4
CS 445: Computational Photography	3 or 4		CS 445: Computational Photography	3 or 4
CS 446: Machine Learning	3 or 4		CS 446: Machine Learning	3 or 4
CS 447: Natural Language Processing	3 or 4		CS 447: Natural Language Processing	3 or 4
CS 450: Numerical Analysis	3 or 4		CS 450: Numerical Analysis	3 or 4
CS 457: Numerical Methods II	3		CS 457: Numerical Methods II	3
CS 460: Security Laboratory	3 or 4		CS 460: Security Laboratory	3 or 4
CS 461: Computer Security I	4		CS 461: Computer Security I	4
CS 463: Computer Security II	3 or 4		CS 463: Computer Security II	3 or 4
CS 465: User Interface Design	3 or 4		CS 465: User Interface Design	3 or 4
CS 466: Introduction to Bioinformatics	3 or 4		CS 466: Introduction to Bioinformatics	3 or 4
CS 467: Social Visualization	3 or 4		CS 467: Social Visualization	3 or 4
CS 468: Tech and Advertising Campaigns	3		CS 468: Tech and Advertising Campaigns	3
CS 473: Algorithms	4		CS 473: Algorithms	4
CS 475: Formal Models of Computation	3 or 4		CS 475: Formal Models of Computation	3 or 4
CS 476: Program Verification	3 or 4		CS 476: Program Verification	3 or 4
CS 477: Formal Software Development Methods	3 or 4		CS 477: Formal Software Development Methods	3 or 4
CS 481: Advanced Topics in Stochastic Processes & Applications	3 or 4		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
CS 498: Special Topics [11]	1 to 4		CS 498: Special Topics [13]	1 to 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 412: Numerical Thermo-Fluid Mechs	2 to 4		CSE 412: Numerical Thermo-Fluid Mechs	2 to 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	3 or 4		CSE 451: Finite Element Analysis	3 or 4
CSE 461: Computational Aerodynamics	3 or 4		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	3		ECE 330: Power Ckts & Electromechanics	3
ECE 333: Green Electric Energy	3		ECE 333: Green Electric Energy	3
ECE 340: Semiconductor Electronics	3		ECE 340: Semiconductor Electronics	3
ECE 342: Electronic Circuits	3		ECE 342: Electronic Circuits	3
ECE 343: Electronic Circuits Laboratory	1		ECE 343: Electronic Circuits Laboratory	1
ECE 380: Biomedical Imaging	3		ECE 380: Biomedical Imaging	3
ECE 385: Digital Systems Laboratory	3		ECE 385: Digital Systems Laboratory	3
ECE 395: Advanced Digital Projects Lab	2 or 3		ECE 395: Advanced Digital Projects Lab	2 or 3
ECE 401: Signal and Image Analysis	4		ECE 401: Signal and Image Analysis	4
ECE 402: Electronic Music Synthesis	3		ECE 402: Electronic Music Synthesis	3
ECE 403: Audio Engineering	3		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 412: Microcomputer Laboratory	3		ECE 412: Microcomputer Laboratory	3
ECE 414: Biomedical Instrumentation	3		ECE 414: Biomedical Instrumentation	3
ECE 415: Biomedical Instrumentation Lab	2		ECE 415: Biomedical Instrumentation Lab	2
ECE 416: Biosensors	3		ECE 416: Biosensors	3
ECE 417: Multimedia Signal Processing	4		ECE 417: Multimedia Signal Processing	4
ECE 418: Image & Video Processing	4		ECE 418: Image & Video Processing	4
ECE 419: Security Laboratory	3 or 4		ECE 419: Security Laboratory	3 or 4
ECE 420: Embedded DSP Laboratory	2		ECE 420: Embedded DSP Laboratory	2
ECE 422: Computer Security I	4		ECE 422: Computer Security I	4
ECE 424: Computer Security II	3 or 4		ECE 424: Computer Security II	3 or 4
ECE 425: Intro to VLSI System Design	3		ECE 425: Intro to VLSI System Design	3
ECE 428: Distributed Systems	3 or 4		ECE 428: Distributed Systems	3 or 4
ECE 431: Electric Machinery	4		ECE 431: Electric Machinery	4
ECE 432: Advanced Electric Machinery	3		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	3		ECE 437: Sensors and Instrumentation	3
ECE 438: Communication Networks	3 or 4		ECE 438: Communication Networks	3 or 4
ECE 439: Wireless Networks	3 or 4		ECE 439: Wireless Networks	3 or 4
ECE 441: Physcs & Modeling Semicond Dev	3		ECE 441: Physcs & Modeling Semicond Dev	3
ECE 444: IC Device Theory & Fabrication	4		ECE 444: IC Device Theory & Fabrication	4
ECE 447: Active Microwave Ckt Design	3		ECE 447: Active Microwave Ckt Design	3
ECE 448: Artificial Intelligence	3 or 4		ECE 448: Artificial Intelligence	3 or 4
ECE 451: Adv Microwave Measurements	3		ECE 451: Adv Microwave Measurements	3
ECE 452: Electromagnetic Fields	3		ECE 452: Electromagnetic Fields	3
ECE 453: Wireless Communication Systems	4		ECE 453: Wireless Communication Systems	4
ECE 454: Antennas	3		ECE 454: Antennas	3
ECE 455: Optical Electronics	3 or 4		ECE 455: Optical Electronics	3 or 4
ECE 456: Global Nav Satellite Systems	4		ECE 456: Global Nav Satellite Systems	4
ECE 457: Microwave Devices & Circuits	3		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	3		ECE 459: Communications Systems	3
ECE 460: Optical Imaging	4		ECE 460: Optical Imaging	4
ECE 462: Logic Synthesis	3		ECE 462: Logic Synthesis	3
ECE 463: Digital Communications Lab	2		ECE 463: Digital Communications Lab	2
ECE 464: Power Electronics	3		ECE 464: Power Electronics	3
ECE 465: Optical Communications Systems	3		ECE 465: Optical Communications Systems	3
ECE 466: Optical Communications Lab	1		ECE 466: Optical Communications Lab	1
ECE 467: Biophotonics	3		ECE 467: Biophotonics	3
ECE 468: Optical Remote Sensing	3		ECE 468: Optical Remote Sensing	3
ECE 469: Power Electronics Laboratory	2		ECE 469: Power Electronics Laboratory	2
ECE 470: Introduction to Robotics	4		ECE 470: Introduction to Robotics	4
ECE 472: Biomedical Ultrasound Imaging	3		ECE 472: Biomedical Ultrasound Imaging	3
ECE 473: Fund of Engrg Acoustics	3 or 4		ECE 473: Fund of Engrg Acoustics	3 or 4
ECE 476: Power System Analysis	3		ECE 476: Power System Analysis	3
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 481: Nanotechnology	4		ECE 481: Nanotechnology	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 485: MEMS Devices & Systems	3		ECE 485: MEMS Devices & Systems	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
ECE 488: Compound Semicond & Devices	3		ECE 488: Compound Semicond & Devices	3
ECE 489: Robot Dynamics and Control	4		ECE 489: Robot Dynamics and Control	4
ECE 490: Introduction to Optimization	3 or 4		ECE 490: Introduction to Optimization	3 or 4
ECE 491: Numerical Analysis	3 or 4		ECE 491: Numerical Analysis	3 or 4
ECE 492: Parallel Progrmg: Sci & Engrg	3 or 4		ECE 492: Parallel Progrmg: Sci & Engrg	3 or 4

ECE 493: Advanced Engineering Math	3 or 4	ECE 493: Advanced Engineering Math	3 or 4
ECE 495: Photonic Device Laboratory	3	ECE 495: Photonic Device Laboratory	3
ECE 498: Special Topics in ECE [11]	0 to 4	ECE 498: Special Topics in ECE [13]	0 to 4
ECON 302: Inter Microeconomic Theory [12]	3	ECON 302: Inter Microeconomic Theory [11]	3
SE 402: Comp-Aided Product Realization	3 or 4		
SE 411: Reliability Engineering	3 or 4		
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	4		
SE 423: Mechatronics	3		
SE 424: State Space Design for Control	3		
SE 450: Decision Analysis I [12]	3 or 4		
SE 497: Independent Study [10]	0 to 4		
SE 498: Special Topics [11]	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 330: Industrial Quality Control	3	IE 330: Industrial Quality Control	3
IE 340: Human Factors	4	IE 340: Human Factors	4
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	3 or 4	IE 411: Optimization of Large Systems	3 or 4
IE 412: OR Models for Mfg Systems	3 or 4	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	3 or 4	IE 420: Financial Engineering	3 or 4
IE 430: Economic Found of Quality Syst	3 or 4	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 [12]	3 or 4	IE 445: Human Performance and Cognition in Context [11]	3 or 4
IE 497: Independent Study [10]	1 to 4	IE 497: Independent Study [12]	1 to 4
IE 498: Special Topics [11]	1 to 4	IE 498: Special Topics [13]	1 to 4
MATH 347: Fundamental Mathematics	3	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	3 or 4	MATH 412: Graph Theory	3 or 4
MATH 413: Intro to Combinatorics	3 or 4	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 Abstract Algebra II	3 or 4	MATH 418: Intro to Abstract Algebra II	3 or 4
MATH 423: Differential Geometry	3 or 4	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 427: Honors Abstract Algebra	3	MATH 427: Honors Abstract Algebra	3
MATH 428: Honors Topics in Mathematics [11]	3	MATH 428: Honors Topics in Mathematics [13]	3
MATH 432: Set Theory 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	3 or 4	MATH 444: Elementary Real Analysis	3 or 4
MATH 446: Applied Complex Variables	3 or 4	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	3 or 4	MATH 450: Numerical Analysis	3 or 4
MATH 453: Elementary Theory of Numbers	3 or 4	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	MATH 473: Algorithms	4
MATH 475: Formal Models of Computation	3 or 4	MATH 475: Formal Models of Computation	3 or 4
MATH 481: Vector and Tensor Analysis	3 or 4	MATH 481: Vector and Tensor Analysis	3 or 4
MATH 482: Linear Programming	3 or 4	MATH 482: Linear Programming	3 or 4
MATH 484: Nonlinear Programming	3 or 4	MATH 484: Nonlinear Programming	3 or 4
MATH 487: Advanced Engineering Math	3 or 4	MATH 487: Advanced Engineering Math	3 or 4
MATH 489: Dynamics & Differential Eqns	3 or 4	MATH 489: Dynamics & Differential Eqns	3 or 4
MATH 490: Advanced Topics in Mathematics [11]	1 to 4	MATH 490: Advanced Topics in Mathematics [13]	1 to 4
MATH 492: Undergraduate Research in Math [10]	1 to 3	MATH 492: Undergraduate Research in Math [12]	1 to 3
MCB 401: Cell & Membrane Physiology	3	MCB 401: Cell & Membrane Physiology	3
MCB 402: Sys & Integrative Physiology	3	MCB 402: Sys & Integrative Physiology	3
MCB 403: Cell & Membrane Physiology Lab	1 or 2	MCB 403: Cell & Membrane Physiology Lab	1 or 2
MCB 404: Sys & Integrative Physiol Lab	1 to 2	MCB 404: Sys & Integrative Physiol Lab	1 to 2
MCB 450: Introductory Biochemistry	3	MCB 450: Introductory Biochemistry	3
MCB 493: Special Topics Mol Cell Biol [11]	1 to 4	MCB 493: Special Topics Mol Cell Biol [13]	1 to 4
All 400 level ME courses, except 470 and potentially 497, 498 [10,11]		ME All 400 level ME courses, except 470 and potentially 497, 498 [12,13]	
MSE 304: Electronic Properties of Matls	3	MSE 304: Electronic Properties of Matls	3
MSE 307: Materials Laboratory I	3	MSE 307: Materials Laboratory I	3
MSE 308: Materials Laboratory II	3	MSE 308: Materials Laboratory II	3
MSE 401: Thermodynamics of Materials	3	MSE 401: Thermodynamics of Materials	3
MSE 402: Kinetic Processes in Materials	3	MSE 402: Kinetic Processes in Materials	3
MSE 403: Synthesis of Materials	3	MSE 403: Synthesis of Materials	3
MSE 405: Microstructure Determination	3	MSE 405: Microstructure Determination	3
MSE 406: Thermal-Mech Behavior of Matls	3	MSE 406: Thermal-Mech Behavior of Matls	3
MSE 420: Ceramic Materials & Properties	3	MSE 420: Ceramic Materials & Properties	3
MSE 421: Ceramic Processing	3 or 4	MSE 421: Ceramic Processing	3 or 4
MSE 422: Electrical Ceramics	3	MSE 422: Electrical Ceramics	3
MSE 440: Mechanical Behavior of Metals	3	MSE 440: Mechanical Behavior of Metals	3
MSE 441: Metals Processing	3	MSE 441: Metals Processing	3
MSE 443: Design of Engineering Alloys	3	MSE 443: Design of Engineering Alloys	3
MSE 445: Corrosion of Metals	3 or 4	MSE 445: Corrosion of Metals	3 or 4
MSE 450: Polymer Science & Engineering	3 or 4	MSE 450: Polymer Science & Engineering	3 or 4
MSE 453: Plastics Engineering	3	MSE 453: Plastics Engineering	3
MSE 454: Mechanics of Polymers	3		
MSE 455: Macromolecular Solids	3	MSE 455: Macromolecular Solids	3
MSE 456: Mechanics of Composites	3	MSE 456: Mechanics of Composites	3
MSE 457: Polymer Chemistry	3 or 4	MSE 457: Polymer Chemistry	3 or 4
MSE 458: Polymer Physics	3 or 4	MSE 458: Polymer Physics	3 or 4
MSE 460: Electronic Materials I	3	MSE 460: Electronic Materials I	3
MSE 461: Electronic Materials II	3	MSE 461: Electronic Materials II	3
MSE 466: Materials in Electrochem Syst	3	MSE 466: Materials in Electrochem Syst	3
MSE 470: Design and Use of Biomaterials	3	MSE 470: Design and Use of Biomaterials	3
MSE 473: Biomolecular Materials Science	3	MSE 473: Biomolecular Materials Science	3
MSE 474: Biomaterials and Nanomedicine	3	MSE 474: Biomaterials and Nanomedicine	3
MSE 480: Surfaces and Colloids	3 or 4	MSE 480: Surfaces and Colloids	3 or 4
MSE 481: Electron Microscopy	3 or 4	MSE 481: Electron Microscopy	3 or 4
MSE 484: Composite Materials	3 or 4	MSE 484: Composite Materials	3 or 4
MSE 485: Atomic Scale Simulations	3 or 4	MSE 485: Atomic Scale Simulations	3 or 4
MSE 487: Materials for Nanotechnology	3 or 4	MSE 487: Materials for Nanotechnology	3 or 4
MSE 488: Optical Materials	3 or 4	MSE 488: Optical Materials	3 or 4
MSE 489: Matl Select for Sustainability	3 or 4	MSE 489: Matl Select for Sustainability	3 or 4
MSE 497: Independent Study [10]	1 to 4	MSE 497: Independent Study [12]	1 to 4

MSE 498: Special Topics [11]	1 to 4		MSE 498: Special Topics [13]	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 423: Plasma Laboratory	2		NPRE 423: Plasma Laboratory	2	
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 442: Radioactive Waste Management	3		NPRE 442: Radioactive Waste Management	3	
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	3		NPRE 451: NPRE Laboratory	3	
NPRE 455: Neutron Diffusion & Transport	4		NPRE 455: Neutron Diffusion & Transport	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 475: Wind Power Systems	3 or 4	
NPRE 498: Special Topics [11]	1 to 4		NPRE 498: Special Topics [13]	1 to 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 404: Electronic Circuits	4 or 5		PHYS 404: Electronic Circuits	4 or 5	
PHYS 406: Acoustical Physics of Music	4		PHYS 406: Acoustical Physics of Music	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	3		PHYS 436: Electromagnetic Fields II	3	
PHYS 460: Condensed Matter Physics	4		PHYS 460: Condensed Matter Physics	4	
PHYS 466: Atomic Scale Simulations	3 or 4		PHYS 466: Atomic Scale Simulations	3 or 4	
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 486: Quantum Physics I	4		PHYS 486: Quantum Physics I	4	
PHYS 487: Quantum Physics II	4		PHYS 487: Quantum Physics II	4	
PHYS 496: Intro to Physics Research [12]	3		PHYS 496: Intro to Physics Research [11]	3	
PHYS 497: Individual Study [10]	1 to 4		PHYS 497: Individual Study [12]	1 to 4	
PHYS 498: Special Topics in Physics [11]	1 to 4		PHYS 498: Special Topics in Physics [13]	1 to 4	
			SE 400: Engineering Law[11]	3 or 4	
			SE 402: Comp-Aided Product Realization	3 or 4	
			SE 411: Reliability Engineering	3 or 4	
			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	4	
			SE 423: Mechatronics	3	
			SE 424: State Space Design for Control	3	
			SE 450: Decision Analysis I [11]	3 or 4	
			SE 497: Independent Study [12]	0 to 4	
			SE 498: Special Topics [13]	1 to 4	
STAT 409: Actuarial Statistics II	4		STAT 409: Actuarial Statistics II	4	
STAT 410: Statistics and Probability II	3 or 4		STAT 410: Statistics and Probability II	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	3 or 4		STAT 426: Sampling and Categorical Data	3 or 4	
STAT 428: Statistical Computing	3 or 4		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 [11]	3 or 4		STAT 430: Topics in Applied Statistics [13]	3 or 4	
STAT 440: Statistical Data Management	3 or 4		STAT 440: Statistical Data Management	3 or 4	
STAT 443: Professional Statistics [12]	3 or 4		STAT 443: Professional Statistics [11]	3 or 4	
STAT 448: Advanced Data Analysis	4		STAT 448: Advanced Data Analysis	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 [10,11]			TAM All 400 level TAM courses, except potentially 497,498 [12,13]		
TE 461: Technology Entrepreneurship [12]	3		TE 461: Technology Entrepreneurship [11]	3	
TMGT 460: Business Process Modeling	3		TMGT 460: Business Process Modeling	3	
TMGT 461: Tech, Eng, & Mgt Final Project	2		TMGT 461: Tech, Eng, & Mgt Final Project	2	
Electives			**Electives**		
The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts [13]	6		The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts [14]	6	
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. [14]	6		Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. [15]	6	
Total Hours of Curriculum to Graduate	**128**		**Total Hours of Curriculum to Graduate**	**128**	
Footnotes			**Footnotes**		
[1] *External transfer students take ENG 300 instead*			[1] *External transfer students take ENG 300 instead*		
[2] *CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102, similarly CHEM 105 requirement wavied for students who received test-based credit for CHEM 104. Students are still required to have 128 hours minimum to graduate.*			[2] *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.*		
[3] *MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.*			[3] *MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.*		
[4] *MATH 284 may be substituted.*			[4] *MATH 415 may be substituted for students entering prior to fall 2022.*		
[5] *CS 125 or ECE 220 may be substituted.*			[5] *MATH 284 may be substituted.*		
[6] *ECE 110 and ECE 210 (or ECE 211) combined may be substituted.*			[6] *CS 124 or CS 125 or ECE 220 may be substituted.*		
[7] *Advanced Composition satisfied by completing ME 470.*			[7] *ECE 110 and ECE 210 (or ECE 211) combined may be substituted.*		
[8] *Transfers and Physics minor/dual degree students may substitute PHYS 325.*			[8] *Advanced Composition satisfied by completing ME 470.*		
[9] *Transfers and ECE minor/dual degree students may substitute ECE 313.*			[9] *Transfers and Physics minor/dual degree students may substitute PHYS 325.*		
[10] *A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.*			[10] *Transfers and ECE minor/dual degree students may substitute ECE 313.*		
[11] *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.*			[11] *Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.*		
[12] *Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.*			[12] *A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.*		
[13] *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.*			[13] *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 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.*		

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

Addition
Removal
Revision

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[1]	0
ME 290: Seminar	0
Foundational Mathematics and Science	**29**
CHEM 102: General Chemistry I	3
CHEM 103: General Chemistry Lab I[2]	1
MATH 221: Calculus I[3]	4
MATH 231: Calculus II	3
MATH 241: Calculus III	4
MATH 257: Linear Algebra with Computational Applications[4]	3
MATH 285: Intro Differential Equations[5]	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[6]	3
ECE 205: Electrical and Electronic Circuits[7]	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
ME 310: 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
ME 370: Mechanical Design I	3
ME 371: Mechanical Design II	3
ME 470: Senior Design Project[8]	3
TAM 210: Introduction to Statics	2
TAM 212: Introductory Dynamics[9]	3
TAM 251: Introductory Solid Mechanics	3
Technical Electives	
Science elective, chosen from one of the following:	4
CHEM 104: General Chemistry II & CHEM 105: General Chemistry Lab II[2]	
MCB 150: Molec & Cellular Basis of Life	
PHYS 213: Univ Physics: Thermal Physics & PHYS 214: Univ Physics: Quantum Physics	
Statistics elective, one course chosen from:[10]	3
IE 300: Analysis of Data	
STAT 400: Statistics and Probability I	
MechSE electives chosen from a departmentally approved list. See list below.	6
Technical electives chosen from a departmentally approved list below.	6
ABE 430: Project Management [11]	2
ABE 436: Renewable Energy Systems	3 or 4
ABE 445: Statistical Methods	4
ABE 455: Erosion and Sediment Control	2
ABE 456: Land & Water Resources Engrg	3 or 4
ABE 459: Drainage and Water Management	3 or 4
ABE 463: Electrohydraulic Systems	3
ABE 466: Engineering Off-Road Vehicles	3
ABE 469: Industry-Linked Design Project	4
ABE 474: Indoor Environmental Control	3 or 4
ABE 476: Indoor Air Quality Engineering	4
ABE 483: Engineering Properties of Food Materials	3
ABE 488: Bioprocessing Biomass for Fuel	4
ABE 497: Independent Study [12]	1 to 4
ABE 498: Special Topics [13]	1 to 4
AE 352: Aerospace Dynamical Systems	3
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
AE 416: Applied Aerodynamics	3 or 4
AE 419: Aircraft Flight Mechanics	3 or 4
AE 420: Finite Element Analysis	3 or 4
AE 428: Mechanics of Composites	3
AE 433: Aerospace Propulsion	3 or 4
AE 434: Rocket Propulsion	3 or 4
AE 442: Aerospace Systems Design I	3
AE 443: Aerospace Systems Design II	3
AE 451: Aeroelasticity	3 or 4
AE 454: Systems Dynamics & Control	3 or 4
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 483: Autonomous Systems Lab	2
AE 497: Independent Study [12]	1 to 4
AE 498: Special Topics (Depending on topic) [13]	1 to 4

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 Hours
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
CHEM 103: General 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 be substituted.)	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
ME 310: 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
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
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	
Statistics elective, one course chosen from:	3
IE 300: Analysis of Data	
STAT 400: Statistics and Probability I	
MechSE electives chosen from a departmentally approved list. See list below.	6
All 400 level ME courses, except 470 and potentially 497, 498 (As Approved)	
All 400 level TAM courses, except potentially 497, 498 (As Approved)	
Technical electives chosen from a departmentally approved list below.	6
ABE 430: Project Management (As Approved)	2
ABE 436: Renewable Energy Systems	3 or 4
ABE 445: Statistical Methods	4
ABE 455: Erosion and Sediment Control	2
ABE 456: Land & Water Resources Engrg	3 or 4
ABE 459: Drainage and Water Management	3 or 4
ABE 463: Electrohydraulic Systems	3
ABE 466: Engineering Off-Road Vehicles	3
ABE 469: Industry-Linked Design Project	4
ABE 474: Indoor Environmental Control	3 or 4
ABE 476: Indoor Air Quality Engineering	4
ABE 483: Engineering Properties of Food Materials	3
ABE 488: Bioprocessing Biomass for Fuel	4
ABE 497: Independent Study (As Approved)	1 to 4
ABE 498: Special Topics (As Approved)	1 to 4
AE 352: Aerospace Dynamical Systems	3
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
AE 416: Applied Aerodynamics	3 or 4
AE 419: Aircraft Flight Mechanics	3 or 4
AE 420: Finite Element Analysis	3 or 4
AE 428: Mechanics of Composites	3
AE 433: Aerospace Propulsion	3 or 4
AE 434: Rocket Propulsion	3 or 4
AE 442: Aerospace Systems Design I	3
AE 443: Aerospace Systems Design II	3
AE 451: Aeroelasticity	3 or 4
AE 454: Systems Dynamics & Control	3 or 4
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 483: Autonomous Systems Lab	2
AE 497: Independent Study (As Approved)	1 to 4
AE 498: Special Topics (As Approved)	1 to 4

ASRM 410: Investments and Financial Markets	3 or 4	
ASRM 461: Loss Models	3	
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 [12]	1 to 4	
BIOE 498: Special Topics [13]	1 to 4	
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	3	
CEE 380: Geotechnical Engineering	3	
CEE 398: Special Topics [13]	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 [11]	4	
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	3 or 4	
CEE 424: Sustainable Const Methods	4	
CEE 430: Ecological Quality Engineering	2	
CEE 434: Environmental Systems I	3	
CEE 437: Water Quality Engineering	3	
CEE 438: Science & Environmental Policy	3	
CEE 440: Fate Cleanup Environ Pollutant	4	
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	4	
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	3	
CEE 452: Hydraulic Analysis and Design	3	
CEE 453: Urban Hydrology and Hydraulics	4	
CEE 457: Groundwater	3	
CEE 458: Water Resources Field Methods	4	
CEE 460: Steel Structures I	3	
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	
CEE 467: Masonry Structures	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 472: Structural Dynamics I	3 or 4	
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 [12]	1 to 16	
CEE 498: Special Topics [13]	1 to 4	
CHBE 422: Mass Transfer Operations	4	
CHBE 424: Chemical Reaction Engineering	3	
CHBE 451: Transport Phenomena	3	
CHBE 452: Chemical Kinetics & Catalysis	3	
CHBE 453: Electrochemical Engineering	2 or 3	
CHBE 456: Polymer Science & Engineering	3	
CHBE 457: Microelectronics Processing	3	
CHBE 471: Biochemical Engineering	3 or 4	
CHBE 472: Techniques in Biomolecular Eng	3 or 4	
CHBE 473: Biomolecular Engineering	3 or 4	
CHBE 474: Metabolic Engineering	3 or 4	
CHBE 475: Tissue Engineering	3	
CHBE 476: Biotransport	3	
CHEM 232: Elementary Organic Chemistry I	3 or 4	
CHEM 233: Elementary Organic Chem Lab I	2	
CHEM 236: Fundamental Organic Chem I	4	
CHEM 237: Structure and Synthesis	2	
CHEM 312: Inorganic Chemistry	3	
CHEM 315: Instrumental Chem Systems Lab	2	
CHEM 317: Inorganic Chemistry Lab	3	

ASRM 410: Investments and Financial Markets	3 or 4	
ASRM 461: Loss Models	3	
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 Topics (As Approved)	1 to 4	
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	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	
CEE 422: Construction Cost Analysis	3 or 4	
CEE 424: Sustainable Const Methods	4	
CEE 430: Ecological Quality Engineering	2	
CEE 434: Environmental Systems I	3	
CEE 437: Water Quality Engineering	3	
CEE 438: Science & Environmental Policy	3	
CEE 440: Fate Cleanup Environ Pollutant	4	
CEE 442: Environmental Engineering Principles, Physical	4	
CEE 443: Env Eng Principles, Chemical	4	
CEE 444: Env Eng Principles, Biological	4	
CEE 447: Atmospheric Chemistry	4	
CEE 449: Environmental Engineering Lab	3	
CEE 450: Surface Hydrology	3	
CEE 451: Environmental Fluid Mechanics	3	
CEE 452: Hydraulic Analysis and Design	3	
CEE 453: Urban Hydrology and Hydraulics	4	
CEE 457: Groundwater	3	
CEE 458: Water Resources Field Methods	4	
CEE 460: Steel Structures I	3	
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	
CEE 467: Masonry Structures	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 472: Structural Dynamics I	3 or 4	
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 (As Approved)	1 to 16	
CEE 498: Special Topics (As Approved)	1 to 4	
CHBE 422: Mass Transfer Operations	4	
CHBE 424: Chemical Reaction Engineering	3	
CHBE 451: Transport Phenomena	3	
CHBE 452: Chemical Kinetics & Catalysis	3	
CHBE 453: Electrochemical Engineering	2 or 3	
CHBE 456: Polymer Science & Engineering	3	
CHBE 457: Microelectronics Processing	3	
CHBE 471: Biochemical Engineering	3 or 4	
CHBE 472: Techniques in Biomolecular Eng	3 or 4	
CHBE 473: Biomolecular Engineering	3 or 4	
CHBE 474: Metabolic Engineering	3 or 4	
CHBE 475: Tissue Engineering	3	
CHBE 476: Biotransport	3	
CHEM 232: Elementary Organic Chemistry I	3 or 4	
CHEM 233: Elementary Organic Chem Lab I	2	
CHEM 236: Fundamental Organic Chem I	4	
CHEM 237: Structure and Synthesis	2	
CHEM 312: Inorganic Chemistry	3	
CHEM 315: Instrumental Chem Systems Lab	2	
CHEM 317: Inorganic Chemistry Lab	3	

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 442: Physical Chemistry I	4	
CHEM 444: Physical Chemistry II	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: 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 497: Individual Study Senior [12]	1 to 3	
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	3 or 4	
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	3 or 4	
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 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 433: Computer System Organization	3 or 4	
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	
CS 446: Machine Learning	3 or 4	
CS 447: Natural Language Processing	3 or 4	
CS 450: Numerical Analysis	3 or 4	
CS 457: Numerical Methods II	3	
CS 460: Security Laboratory	3 or 4	
CS 461: Computer Security I	4	
CS 463: Computer Security II	3 or 4	
CS 465: User Interface Design	3 or 4	
CS 466: Introduction to Bioinformatics	3 or 4	
CS 467: Social Visualization	3 or 4	
CS 468: Tech and Advertising Campaigns	3	
CS 473: Algorithms	4	
CS 475: Formal Models of Computation	3 or 4	
CS 476: Program Verification	3 or 4	
CS 477: Formal Software Development Methods	3 or 4	
CS 481: Advanced Topics in Stochastic Processes & Applications	3 or 4	
CS 483: Applied Parallel Programming	4	
CS 484: Parallel Programming	3 or 4	
CS 498: Special Topics [13]	1 to 4	
CSE 401: Numerical Analysis	3 or 4	
CSE 402: Parallel Progrmg: Sci & Engrg	3 or 4	
CSE 412: Numerical Thermo-Fluid Mechs	2 to 4	
CSE 441: Introduction to Optimization	3 or 4	
CSE 450: Computational Mechanics	3 or 4	
CSE 451: Finite Element Analysis	3 or 4	
CSE 461: 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	

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 442: Physical Chemistry I	4	
CHEM 444: Physical Chemistry II	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: 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 497: Individual Study Senior (As Approved)	1 to 3	
CS 225: Data Structures	4	
CS 233: Computer Architecture	4	
CS 242: Programming Studio	3	
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	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	3 or 4	
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 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 433: Computer System Organization	3 or 4	
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	
CS 446: Machine Learning	3 or 4	
CS 447: Natural Language Processing	3 or 4	
CS 450: Numerical Analysis	3 or 4	
CS 457: Numerical Methods II	3	
CS 460: Security Laboratory	3 or 4	
CS 461: Computer Security I	4	
CS 463: Computer Security II	3 or 4	
CS 465: User Interface Design	3 or 4	
CS 466: Introduction to Bioinformatics	3 or 4	
CS 467: Social Visualization	3 or 4	
CS 468: Tech and Advertising Campaigns	3	
CS 473: Algorithms	4	
CS 475: Formal Models of Computation	3 or 4	
CS 476: Program Verification	3 or 4	
CS 477: Formal Software Development Methods	3 or 4	
CS 481: Advanced Topics in Stochastic Processes & Applications	3 or 4	
CS 483: Applied Parallel Programming	4	
CS 484: Parallel Programming	3 or 4	
CS 498: Special Topics (As Approved)	1 to 4	
CSE 401: Numerical Analysis	3 or 4	
CSE 402: Parallel Progrmg: Sci & Engrg	3 or 4	
CSE 412: Numerical Thermo-Fluid Mechs	2 to 4	
CSE 441: Introduction to Optimization	3 or 4	
CSE 450: Computational Mechanics	3 or 4	
CSE 451: Finite Element Analysis	3 or 4	
CSE 461: 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 425: Intro to VLSI System Design	3	
ECE 428: Distributed Systems	3 or 4		ECE 428: Distributed Systems	3 or 4	
ECE 431: Electric Machinery	4		ECE 431: Electric Machinery	4	
ECE 432: Advanced Electric Machinery	3		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	3		ECE 437: Sensors and Instrumentation	3	
ECE 438: Communication Networks	3 or 4		ECE 438: Communication Networks	3 or 4	
ECE 439: Wireless Networks	3 or 4		ECE 439: Wireless Networks	3 or 4	
ECE 441: Physcs & Modeling Semicond Dev	3		ECE 441: Physcs & Modeling Semicond Dev	3	
ECE 444: IC Device Theory & Fabrication	4		ECE 444: IC Device Theory & Fabrication	4	
ECE 447: Active Microwave Ckt Design	3		ECE 447: Active Microwave Ckt Design	3	
ECE 448: Artificial Intelligence	3 or 4		ECE 448: Artificial Intelligence	3 or 4	
ECE 451: Adv Microwave Measurements	3		ECE 451: Adv Microwave Measurements	3	
ECE 452: Electromagnetic Fields	3		ECE 452: Electromagnetic Fields	3	
ECE 453: Wireless Communication Systems	4		ECE 453: Wireless Communication Systems	4	
ECE 454: Antennas	3		ECE 454: Antennas	3	
ECE 455: Optical Electronics	3 or 4		ECE 455: Optical Electronics	3 or 4	
ECE 456: Global Nav Satellite Systems	4		ECE 456: Global Nav Satellite Systems	4	
ECE 457: Microwave Devices & Circuits	3		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	3		ECE 459: Communications Systems	3	
ECE 460: Optical Imaging	4		ECE 460: Optical Imaging	4	
ECE 462: Logic Synthesis	3		ECE 462: Logic Synthesis	3	
ECE 463: Digital Communications Lab	2		ECE 463: Digital Communications Lab	2	
ECE 464: Power Electronics	3		ECE 464: Power Electronics	3	
ECE 465: Optical Communications Systems	3		ECE 465: Optical Communications Systems	3	
ECE 466: Optical Communications Lab	1		ECE 466: Optical Communications Lab	1	
ECE 467: Biophotonics	3		ECE 467: Biophotonics	3	
ECE 468: Optical Remote Sensing	3		ECE 468: Optical Remote Sensing	3	
ECE 469: Power Electronics Laboratory	2		ECE 469: Power Electronics Laboratory	2	
ECE 470: Introduction to Robotics	4		ECE 470: Introduction to Robotics	4	
ECE 472: Biomedical Ultrasound Imaging	3		ECE 472: Biomedical Ultrasound Imaging	3	
ECE 473: Fund of Engrg Acoustics	3 or 4		ECE 473: Fund of Engrg Acoustics	3 or 4	
ECE 476: Power System Analysis	3		ECE 476: Power System Analysis	3	
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 481: Nanotechnology	4		ECE 481: Nanotechnology	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 485: MEMS Devices & Systems	3		ECE 485: MEMS Devices & Systems	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	
ECE 488: Compound Semicond & Devices	3		ECE 488: Compound Semicond & Devices	3	
ECE 489: Robot Dynamics and Control	4		ECE 489: Robot Dynamics and Control	4	
ECE 490: Introduction to Optimization	3 or 4		ECE 490: Introduction to Optimization	3 or 4	
ECE 491: Numerical Analysis	3 or 4		ECE 491: Numerical Analysis	3 or 4	
ECE 492: Parallel Progrmg: Sci & Engrg	3 or 4		ECE 492: Parallel Progrmg: Sci & Engrg	3 or 4	
ECE 493: Advanced Engineering Math	3 or 4		ECE 493: Advanced Engineering Math	3 or 4	
ECE 495: Photonic Device Laboratory	3		ECE 495: Photonic Device Laboratory	3	
ECE 498: Special Topics in ECE [13]	0 to 4		ECE 498: Special Topics in ECE (As Approved)	0 to 4	
ECON 302: Inter Microeconomic Theory [11]	3		ECON 302: Inter Microeconomic Theory (As Approved)	3	
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 330: Industrial Quality Control	3		IE 330: Industrial Quality Control	3	
IE 340: Human Factors	4		IE 340: Human Factors	4	
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	3 or 4		IE 411: Optimization of Large Systems	3 or 4	
IE 412: OR Models for Mfg Systems	3 or 4		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	3 or 4		IE 420: Financial Engineering	3 or 4	
IE 430: Economic Found of Quality Syst	3 or 4		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 [11]	3 or 4		IE 445: Human Performance and Cognition in Context (As Approved)	3 or 4	
IE 497: Independent Study [12]	1 to 4		IE 497: Independent Study (As Approved)	1 to 4	
IE 498: Special Topics [13]	1 to 4		IE 498: Special Topics (As Approved)	1 to 4	
MATH 347: Fundamental Mathematics	3		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	3 or 4		MATH 412: Graph Theory	3 or 4	
MATH 413: Intro to Combinatorics	3 or 4		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 Abstract Algebra II	3 or 4		MATH 418: Intro to Abstract Algebra II	3 or 4	
MATH 423: Differential Geometry	3 or 4		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 427: Honors Abstract Algebra	3		MATH 427: Honors Abstract Algebra	3	
MATH 428: Honors Topics in Mathematics [13]	3		MATH 428: Honors Topics in Mathematics (As Approved)	3	
MATH 432: Set Theory 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	3 or 4		MATH 444: Elementary Real Analysis	3 or 4	
MATH 446: Applied Complex Variables	3 or 4		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	3 or 4		MATH 450: Numerical Analysis	3 or 4	
MATH 453: Elementary Theory of Numbers	3 or 4		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		MATH 473: Algorithms	4	
MATH 475: Formal Models of Computation	3 or 4		MATH 475: Formal Models of Computation	3 or 4	
MATH 481: Vector and Tensor Analysis	3 or 4		MATH 481: Vector and Tensor Analysis	3 or 4	
MATH 482: Linear Programming	3 or 4		MATH 482: Linear Programming	3 or 4	
MATH 484: Nonlinear Programming	3 or 4		MATH 484: Nonlinear Programming	3 or 4	
MATH 487: Advanced Engineering Math	3 or 4		MATH 487: Advanced Engineering Math	3 or 4	
MATH 489: Dynamics & Differential Eqns	3 or 4		MATH 489: Dynamics & Differential Eqns	3 or 4	
MATH 490: Advanced Topics in Mathematics [13]	1 to 4		MATH 490: Advanced Topics in Mathematics (As Approved)	1 to 4	
MATH 492: Undergraduate Research in Math [12]	1 to 3		MATH 492: Undergraduate Research in Math (As Approved)	1 to 3	
MCB 401: Cell & Membrane Physiology	3		MCB 401: Cell & Membrane Physiology	3	
MCB 402: Sys & Integrative Physiology	3		MCB 402: Sys & Integrative Physiology	3	
MCB 403: Cell & Membrane Physiology Lab	1 or 2		MCB 403: Cell & Membrane Physiology Lab	1 or 2	
MCB 404: Sys & Integrative Physiol Lab	1 to 2		MCB 404: Sys & Integrative Physiol Lab	1 to 2	

MCB 450: Introductory Biochemistry	3		MCB 450: Introductory Biochemistry	3	
MCB 493: Special Topics Mol Cell Biol [13]	1 to 4		MCB 493: Special Topics Mol Cell Biol (As Approved)	1 to 4	
ME All 400 level ME courses, except 470 and potentially 497, 498 [12,13]					
MSE 304: Electronic Properties of Matls	3		MSE 304: Electronic Properties of Matls	3	
MSE 307: Materials Laboratory I	3		MSE 307: Materials Laboratory I	3	
MSE 308: Materials Laboratory II	3		MSE 308: Materials Laboratory II	3	
MSE 401: Thermodynamics of Materials	3		MSE 401: Thermodynamics of Materials	3	
MSE 402: Kinetic Processes in Materials	3		MSE 402: Kinetic Processes in Materials	3	
MSE 403: Synthesis of Materials	3		MSE 403: Synthesis of Materials	3	
MSE 405: Microstructure Determination	3		MSE 405: Microstructure Determination	3	
MSE 406: Thermal-Mech Behavior of Matls	3		MSE 406: Thermal-Mech Behavior of Matls	3	
MSE 420: Ceramic Materials & Properties	3		MSE 420: Ceramic Materials & Properties	3	
MSE 421: Ceramic Processing	3 or 4		MSE 421: Ceramic Processing	3 or 4	
MSE 422: Electrical Ceramics	3		MSE 422: Electrical Ceramics	3	
MSE 440: Mechanical Behavior of Metals	3		MSE 440: Mechanical Behavior of Metals	3	
MSE 441: Metals Processing	3		MSE 441: Metals Processing	3	
MSE 443: Design of Engineering Alloys	3		MSE 443: Design of Engineering Alloys	3	
MSE 445: Corrosion of Metals	3 or 4		MSE 445: Corrosion of Metals	3 or 4	
MSE 450: Polymer Science & Engineering	3 or 4		MSE 450: Polymer Science & Engineering	3 or 4	
MSE 453: Plastics Engineering	3		MSE 453: Plastics Engineering	3	
MSE 455: Macromolecular Solids	3		MSE 455: Macromolecular Solids	3	
MSE 456: Mechanics of Composites	3		MSE 456: Mechanics of Composites	3	
MSE 457: Polymer Chemistry	3 or 4		MSE 457: Polymer Chemistry	3 or 4	
MSE 458: Polymer Physics	3 or 4		MSE 458: Polymer Physics	3 or 4	
MSE 460: Electronic Materials I	3		MSE 460: Electronic Materials I	3	
MSE 461: Electronic Materials II	3		MSE 461: Electronic Materials II	3	
MSE 466: Materials in Electrochem Syst	3		MSE 466: Materials in Electrochem Syst	3	
MSE 470: Design and Use of Biomaterials	3		MSE 470: Design and Use of Biomaterials	3	
MSE 473: Biomolecular Materials Science	3		MSE 473: Biomolecular Materials Science	3	
MSE 474: Biomaterials and Nanomedicine	3		MSE 474: Biomaterials and Nanomedicine	3	
MSE 480: Surfaces and Colloids	3 or 4		MSE 480: Surfaces and Colloids	3 or 4	
MSE 481: Electron Microscopy	3 or 4		MSE 481: Electron Microscopy	3 or 4	
MSE 484: Composite Materials	3 or 4		MSE 484: Composite Materials	3 or 4	
MSE 485: Atomic Scale Simulations	3 or 4		MSE 485: Atomic Scale Simulations	3 or 4	
MSE 487: Materials for Nanotechnology	3 or 4		MSE 487: Materials for Nanotechnology	3 or 4	
MSE 488: Optical Materials	3 or 4		MSE 488: Optical Materials	3 or 4	
MSE 489: Matl Select for Sustainability	3 or 4		MSE 489: Matl Select for Sustainability	3 or 4	
MSE 497: Independent Study [12]	1 to 4		MSE 497: Independent Study (As Approved)	1 to 4	
MSE 498: Special Topics [13]	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 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 423: Plasma Laboratory	2		NPRE 423: Plasma Laboratory	2	
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 442: Radioactive Waste Management	3		NPRE 442: Radioactive Waste Management	3	
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	3		NPRE 451: NPRE Laboratory	3	
NPRE 455: Neutron Diffusion & Transport	4		NPRE 455: Neutron Diffusion & Transport	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 475: Wind Power Systems	3 or 4	
NPRE 498: Special Topics [13]	1 to 4		NPRE 498: Special Topics (As Approved)	1 to 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 404: Electronic Circuits	4 or 5		PHYS 404: Electronic Circuits	4 or 5	
PHYS 406: Acoustical Physics of Music	4		PHYS 406: Acoustical Physics of Music	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	3		PHYS 436: Electromagnetic Fields II	3	
PHYS 460: Condensed Matter Physics	4		PHYS 460: Condensed Matter Physics	4	
PHYS 466: Atomic Scale Simulations	3 or 4		PHYS 466: Atomic Scale Simulations	3 or 4	
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 486: Quantum Physics I	4		PHYS 486: Quantum Physics I	4	
PHYS 487: Quantum Physics II	4		PHYS 487: Quantum Physics II	4	
PHYS 496: Intro to Physics Research [11]	3		PHYS 496: Intro to Physics Research (As Approved)	3	
PHYS 497: Individual Study [12]	1 to 4		PHYS 497: Individual Study (As Approved)	1 to 4	
PHYS 498: Special Topics in Physics [13]	1 to 4		PHYS 498: Special Topics in Physics (As Approved)	1 to 4	
SE 400: Engineering Law[11]	3 or 4		SE 400: Engineering Law (As Approved)	3 or 4	
SE 402: Comp-Aided Product Realization	3 or 4		SE 402: Comp-Aided Product Realization	3 or 4	
SE 411: Reliability Engineering	3 or 4		SE 411: Reliability Engineering	3 or 4	
SE 412: Nondestructive Evaluation	3 or 4		SE 412: Nondestructive Evaluation	3 or 4	
SE 413: Engineering Design Optimization	3 or 4		SE 413: Engineering Design Optimization	3 or 4	
SE 420: Digital Control Systems	4		SE 420: Digital Control Systems	4	
SE 422: Robot Dynamics and Control	4		SE 422: Robot Dynamics and Control	4	
SE 423: Mechatronics	3		SE 423: Mechatronics	3	
SE 424: State Space Design for Control	3		SE 424: State Space Design for Control	3	
SE 450: Decision Analysis I [11]	3 or 4		SE 450: Decision Analysis I (As Approved)	3 or 4	
SE 497: Independent Study [12]	0 to 4		SE 497: Independent Study (As Approved)	0 to 4	
SE 498: Special Topics [13]	1 to 4		SE 498: Special Topics (As Approved)	1 to 4	
STAT 409: Actuarial Statistics II	4		STAT 409: Actuarial Statistics II	4	
STAT 410: Statistics and Probability II	3 or 4		STAT 410: Statistics and Probability II	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	3 or 4		STAT 426: Sampling and Categorical Data	3 or 4	
STAT 428: Statistical Computing	3 or 4		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 [13]	3 or 4		STAT 430: Topics in Applied Statistics (As Approved)	3 or 4	

STAT 440: Statistical Data Management	3 or 4	
STAT 443: Professional Statistics [11]	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 [12,13]		
TE 461: Technology Entrepreneurship [11]	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 Education lists for Social and Behavioral Sciences or Humanities and the Arts [14]	6	
Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree. [15]	6	
Total Hours of Curriculum to Graduate	**128**	
Footnotes		
[1] *External transfer students take ENG 300 instead* [2] *CHEM 103 requirement waived for students who received test-based credit (AP, IB, or proficiency) for CHEM 102, similarly CHEM 105 requirement wavied for students who received test-based credit for CHEM 104. Students are still required to have 128 hours minimum to graduate.* [3] *MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.* [4] *MATH 415 may be substituted for students entering prior to fall 2022.* [5] *MATH 284 may be substituted.* [6] *CS 124 or CS 125 or ECE 220 may be substituted.* [7] *ECE 110 and ECE 210 (or ECE 211) combined may be substituted.* [8] *Advanced Composition satisfied by completing ME 470.* [9] *Transfers and Physics minor/dual degree students may substitute PHYS 325.* [10] *Transfers and ECE minor/dual degree students may substitute ECE 313.* [11] *Professional Elective course. No more than 3 hours of professional elective credit may be used to satisfy the Technical Electives requirements.* [12] *A maximum of 3 hours of independent/individual study courses may be used to satisfy the MechSE Elective or Technical Elective requirements.* [13] *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 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.*		

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	
TE 461: Technology Entrepreneurship (As Approved)	3	
TMGT 460: Business Process Modeling	3	
TMGT 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 credit hours earned toward the degree. (https://go.grainger.illinois.edu/FreeElectives)	11	
Total Hours of Curriculum to Graduate	**128**	

ILLINOIS

COLLEGE OF AGRICULTURAL, CONSUMER
& ENVIRONMENTAL SCIENCES

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

January 13, 2022

Dear Dean Bashir,

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

Sincerely,

Germán Bollero, Interim Dean

ILLINOIS

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,

Cheryl Hanley-Maxwell

Dean

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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

Dear Dean Bashir,

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

Sincerely,

Assistant Dean for Academic Affairs
College of Education | University of Illinois at Urbana-Champaign

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

College of Fine & Applied Arts

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

21 December 2021

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

Dear Dean Bashir,

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

Sincerely,

Kevin Hamilton
Dean and Professor

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

College of Liberal Arts & Sciences
2090 Lincoln Hall, MC-448
702 S. Wright St.
Urbana, IL 61801

December 20, 2021

Dear Dean Bashir,

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

Sincerely,

Venetria K. Patton
Harry E. Preble Dean

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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

January 13, 2022

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

Dear Dean Bashir,

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

Sincerely,

Tracy Sulkin
Dean, College of Media

Gies College of Business
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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

December 13th, 2021

Dean Bashir,

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

Sincerely,

Jeffrey R. Brown
Dean, Gies College of Business

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

School of Information Sciences

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

February 3, 2022

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

Dear Rashid,

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

Sincerely,

Eunice Santos

Eunice Santos
Professor and Dean

From: Hanley-Maxwell, Cheryl D <cherylhm@illinois.edu>
Sent: Monday, February 14, 2022 3:57 PM
To: Miller, Nolan H <nmiller@illinois.edu>
Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

That's fine. Thanks for asking

CHERYL D HANLEY-MAXWELL
Dean

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

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

From: Miller, Nolan H <nmiller@illinois.edu>
Sent: Monday, February 14, 2022 1:49 PM
To: Hanley-Maxwell, Cheryl D <cherylhm@illinois.edu>
Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

Dear Cheryl,

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

Thanks,

Nolan

_____

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

From: Hanley-Maxwell, Cheryl D <cherylhm@illinois.edu>
Sent: Thursday, February 10, 2022 1:49 PM
To: Miller, Nolan H <nmiller@illinois.edu>
Subject: RE: Senate Ed Pol - Re: change to Grainger Liberal Education requirement

Hi Nolan –

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

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

Hope this works!

Cheryl

CHERYL D HANLEY-MAXWELL, PHD
Dean

University of Illinois at Urbana-Champaign
College of Applied Health Sciences
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