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Changes proposed by: Laura Nagel

Catalog Pages Using this Program	Materials Science & Engineering, BS

Proposal Type:

In Workflow

1. **U Program Review**
2. **1919 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 3:15 pm
   Nancy Sottos (n-sottos): Approved for 1919 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 14, 2018 by Deb Forgacs (dforgacs)
2. Dec 14, 2018 by Deb Forgacs (dforgacs)
3. Apr 23, 2019 by Deb Forgacs (dforgacs)
4. May 14, 2019 by Deb Forgacs (dforgacs)
5. Aug 12, 2019 by Deb Forgacs (dforgacs)
6. Feb 26, 2020 by Brooke Newell (bsnewell)
7. Mar 31, 2020 by Deb Forgacs (dforgacs)
8. Apr 14, 2020 by Deb Forgacs (dforgacs)
9. Oct 8, 2021 by Brooke Newell (bsnewell)

Major (ex. Special Education)

This proposal is for a:
Revision

Administration Details

Official Program	Materials Science & Engineering, BS

Name	
Sponsor College	Grainger College of Engineering
Sponsor Department	Materials Science & Engineering
Sponsor Name	Dallas Trinkle
Sponsor Email	dtrinkle@illinois.edu
College Contact	Jonathan Makela ~~Brooke Newell~~
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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; Dallas Trinkle, dtrinkle@illinois.edu and Laura Nagel, ljnagel@illinois.edu, MatSE

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).

Clarified the role of MSE 183, removing the one hour from the table, and noting in the comments that the course is optional, but highly recommended and that the 1 hour for the course applies to free electives.

Replaced MATH 225 with MATH 257.

Updated topical lecture and technical elective course lists.

Reorganized courses and edited some text in the Technical Core and Technical Electives sections in the Program of Study table to improve 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 throughout a student's program of study.

Emphasize to students that MSE 183 is an optional free elective course that the department encourages students to take if it feasible to take freshman year.

The required course MATH 225 has been replaced with MATH 257, a new course that has been developed in a collaboration between Mathematics and Engineering to better serve the needs of Engineering students by integrating programming skills into the course.

Remove deactivated courses and add relevant courses to the topical lecture list. CHEM 483, CHBE 458 and CHBE 472 are all senior level courses covering materials-related topics that will enhance the choices that MatSE students can make when selecting courses from the Topical Lecture list.

Replace the current technical elective list with simple guidelines for technical electives that will be easier for students to understand and for staff to manage. The department has included the rubrics that had multiple courses on the technical elective list. The TE rubric has been included to reflect the increased course offerings that are relevant to our students. The total number of technical elective courses is not being changed significantly by the reformulation of the list.

The required course in statistics (IE 300 or STAT 400) is being moved from the technical core to the area-specific courses to better reflect the practice in the department to ensure that all students meet the ABET accreditation requirement for 45 hours of engineering coursework.

MSE 470 is being moved from the Biomaterials Area technical electives to the Biomaterials Area core course list because it is required for all students in the Biomaterials Area (ie it is not an elective).

The summation of hours for the program is edited for clarity. The technical electives sections have been reorganized and edited 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

CHEM 483 - Solid State Structural Anlys
MATH 257 - Linear Algebra w Computat Appl
CHBE 458 - Synthetic Nanomaterials
CHBE 472 - Techniques in Biomolecular Eng

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.

MATH 257 will replace MATH 225 in the degree requirements. The Mathematics department has planned to allocate resources as needed to support this change.

Adding CHEM 483 to the topical lecture list: this should have minimal impact on enrollment for this course.

Adding CHBE 458 to the topical lecture list: this should have minimal impact on enrollment for this course.

Adding CHBE 472 to the topical lecture list: this should have minimal impact on enrollment for this course.

The department's proposed technical elective revision will increase the number of courses from the TE rubric on the technical elective list. While this will likely increase the number of MatSE students who take TE courses, the number will be manageable. TE supports this change.

Attach letters of support or acknowledgement from other departments.	Re_ MatSE Curriculum Revision - CHEM 483.pdf MatSE_letter_225_Math_257.pdf FW_ MatSE Curriculum Revision - CHBE 472 and 458.pdf Re_ Math Letter of Support - MatSE Technical Electives.pdf Re_ TE Letter of Support - MatSE Technical Electives.pdf LOS MatSE MCB.pdf Letters of Acknowledgement - Liberal Education Electives.pdf

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).

The Materials Science and Engineering BS is ABET accredited.

The program educational objectives of the MatSE Department and its faculty at the undergraduate level are:

1. Our graduates will attain the foundational knowledge to be successful in their chosen career.
2. Our graduates will be skilled at teamwork, communication and individual professionalism, including ethics and environmental awareness.
3. Our graduates will provide valuable service to their chosen profession and to society.
4. Our graduates will have the ability to achieve their personal goals and advance in their chosen profession through life-long learning.

The curriculum is designed to guarantee a certain breadth of knowledge in materials science and engineering through a set of core courses, as well as to ensure depth and focus in specialties with materials science. In accordance with the ABET educational criteria, the program has been developed so that graduates will have:

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.

Students are assessed on these seven educational criteria in the required classes. Data is collected in alternating years on student achievement, and reviewed by the curriculum committee, with feedback to the faculty in the required courses. The faculty document changes made to their courses in response to the review of assessment data. ~~NA~~

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 Materials Science & Engineering, BS Side by Side.xlsx

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

Catalog Page Text - Overview Tab

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

Statement for Programs of Study Catalog

Graduation Requirements

Minimum 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. MSE 307 and MSE 308 will satisfy technical core requirements 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
~~MSE 183~~	~~Freshman Materials Laboratory 2~~	~~1~~
Recommended, optional 1 credit course, MSE 183 Freshman Materials Laboratory. Credit hour counts toward free electives.		
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
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
~~MATH 225~~	~~Introductory Matrix Theory~~	~~2~~
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
PHYS 214	Univ Physics: Quantum Physics	2
Total Hours		35

Materials Science and Engineering Technical Core

For All Students

Course List

Code	Title	Hours
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
~~IE 300~~	~~Analysis of Data 4~~	~~3~~
~~or STAT 400~~	~~Statistics and Probability I~~	
MSE 182	Introduction to MatSE	2
MSE 201	Phases and Phase Relations	3
MSE 206	Mechanics for MatSE	4
MSE 307	Materials Laboratory I	3
MSE 308	Materials Laboratory II	3
MSE 395	Materials Design	3
MSE 401	Thermodynamics of Materials	3
MSE 402	Kinetic Processes in Materials	3
MSE 406	Thermal-Mech Behavior of Matls	3
Subtotal Hours of Technical Core for All Students		33

For the Biomaterials Area

Course List

Code	Title	Hours
CHEM 232	Elementary Organic Chemistry I	3 or 4
IE 300	Analysis of Data (Students in the Biomaterials Area may substitute STAT 400 for IE 300 with permission from the department.)	3
MCB 150	Molec & Cellular Basis of Life	4
MCB 450	Introductory Biochemistry	3
MCB 252	Cells, Tissues & Development	3
~~Subtotal~~		~~13~~

Code	Title	Hours
~~Total for the Biomaterials Area~~		~~49~~
MSE 470	Design and Use of Biomaterials	3
Total Hours for the Biomaterials Area		52

For All Other Areas

Course List

Code	Title	Hours
IE 300	Analysis of Data (The extra hour of credit for STAT 400 may be used to help meet free elective requirements.)	3
or STAT 400	Statistics and Probability I	
MSE 304	Electronic Properties of Matls	3
MSE 405	Microstructure Determination	3
~~Subtotal~~		~~6~~
Total Hours for All Other Areas		42

Technical Electives

For the Biomaterials Area

Course List

Code	Title	Hours
MSE 404	Laboratory Studies in Materials Science and Engineering (Each section of MSE 404 is 1.5 hours. Students take 2 unique sections of MSE 404 for 3 hours.)	3
~~MSE 470~~	~~Design and Use of Biomaterials~~	~~3~~
Topical lecture courses in the Biomaterials Area. See Topical Lecture list below.		5
Topical lecture courses outside of the Biomaterials Area. See Topical Lecture list below.		6
Total Hours		14

For All Other Areas

Course List

Code	Title	Hours
MSE 404	Laboratory Studies in Materials Science and Engineering (Each section of MSE 404 is 1.5 hours. Students take 4 unique sections of MSE 404 for 6 hours.)	6
Technical electives selected from the following rubrics: ABE, AE, BIOC, BIOE, BIOP, CHBE, CHEM, CEE, CS, CSE, ECE, IE, MATH, MCB, ME, MSE, NPRE, PHYS, SE, TAM, TE. Technical electives must be 200 level or higher courses---excluding independent study, research, or special topics---that do not currently satisfy another requirement. Other courses may be approved by the department.		6
Topical lecture courses. See Topical Lecture list below. No more than 6 hours may be from introductory topical lectures.		12
Total Hours		24

Topical Lectures

Course List

Code	Title	Hours
Introductory - No more than 2 introductory courses can count for Topical Lecture		
MSE 420	Ceramic Materials & Properties	3
MSE 441	Metals Processing	3
MSE 450	Polymer Science & Engineering	3 or 4
MSE 470	Design and Use of Biomaterials	3
ECE 340	Semiconductor Electronics	3
Biomaterials		
MSE 473	Biomolecular Materials Science	3

Code	Title	Hours
MSE 474	Biomaterials and Nanomedicine	3
ABE 446	Biological Nanoengineering	3 or 4
BIOE 416	Biosensors	3
BIOE 461	Cellular Biomechanics	4
BIOE 476	Tissue Engineering	3
BIOE 487	Stem Cell Bioengineering	3 or 4
CHBE 472	Techniques in Biomolecular Eng	3 or 4
CHBE 473	Biomolecular Engineering	3 or 4
ECE 380	Biomedical Imaging	3
ECE 414	Biomedical Instrumentation	3
ECE 415	Biomedical Instrumentation Lab	2
ECE 472	Biomedical Ultrasound Imaging	3
ME 482	Musculoskel Tissue Mechanics	3 or 4
ME 483	Mechanobiology	4
Biomaterials Science - Can only count one science course for Topical Lecture Biomaterials		
BIOC 446	Physical Biochemistry	3
BIOC 455	Technqs Biochem & Biotech	4
BIOP 401	Introduction to Biophysics	3
All Other Areas		
MSE 403	Synthesis of Materials	3
MSE 421	Ceramic Processing	3 or 4
MSE 422	Electrical Ceramics	3
MSE 440	Mechanical Behavior of Metals	3
MSE 443	Design of Engineering Alloys	3
MSE 445	Corrosion of Metals	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 464	Course MSE 464 Not Found (Magnetic Materials and their Applications)	3 or 4
MSE 466	Materials in Electrochem Syst	3
MSE 480	Surfaces and Colloids	3
MSE 481	Electron Microscopy	3
MSE 484	Composite Materials	3
MSE 485	Atomic Scale Simulations	3
MSE 487	Materials for Nanotechnology	3
MSE 488	Optical Materials	3 or 4
MSE 489	Matl Select for Sustainability	3
ABE 482	Package Engineering	3
CEE 401	Concrete Materials	4
CEE 460	Steel Structures I	3
CHBE 457	Microelectronics Processing	3
CHBE 458	Synthetic Nanomaterials	3
ECE 441	Physcs & Modeling Semicond Dev	3

Code	Title	Hours
ECE 443	LEDs and Solar Cells	4
ECE 444	IC Device Theory & Fabrication	4
ECE 481	Nanotechnology	4
ECE 485	MEMS Devices & Systems	3
ECE 487	Intro Quantum Electr for EEs	3
ECE 488	Compound Semicond & Devices	3
ECE 495	Photonic Device Laboratory	3
IE 431	Design for Six Sigma	3
ME 431	Mechanical Component Failure	3 or 4
~~ME 450~~	~~Course ME 450 Not Found~~	
ME 472	Introduction to Tribology	3 or 4
ME 487	MEMS-NEMS Theory & Fabrication	4
NPRE 470	Fuel Cells & Hydrogen Sources	3
SE 412	Nondestructive Evaluation	3 or 4
~~TAM 427~~	~~Course TAM 427 Not Found~~	
TAM 451	Intermediate Solid Mechanics	4
TAM 456	Experimental Stress Analysis	3
Science - Can only count one science course for Topical Lecture		
CHEM 436	Fundamental Organic Chem II	3
CHEM 483	Solid State Structural Anlys	4
PHYS 485	Atomic Phys & Quantum Theory	3
PHYS 486	Quantum Physics I	4
PHYS 487	Quantum Physics II	4

Free ~~Technical Elective courses~~ Electives

Course List

~~Code~~	~~Title~~	~~Hours~~
~~Technical electives selected from the list below of approved courses established by the department:~~		~~6~~
~~AE 202~~	~~Aerospace Flight Mechanics~~	~~3~~
~~AE 302~~	~~Aerospace Flight Mechanics II~~	~~3~~
~~AE 311~~	~~Incompressible Flow~~	~~3~~
~~AE 312~~	~~Compressible Flow~~	~~3~~
~~AE 321~~	~~Mechs of Aerospace Structures~~	~~3~~
~~AE 323~~	~~Applied Aerospace Structures~~	~~3~~
~~AE 352~~	~~Aerospace Dynamical Systems~~	~~3~~
~~AE 353~~	~~Aerospace Control Systems~~	~~3~~
~~AE 370~~	~~Aerospace Numerical Methods~~	~~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~~

Code	Title	Hours
AE 420	Finite Element Analysis	3 or 4
AE 427	Course AE 427 Not Found	
AE 428	Mechanics of Composites	3
AE 433	Aerospace Propulsion	3 or 4
AE 434	Rocket Propulsion	3 or 4
AE 435	Electric 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 460	Aerodynamics & Propulsion Lab	2
AE 461	Structures & Control Lab	2
AE 468	Optical Remote Sensing	3
AE 482	Introduction to Robotics	4
AE 483	Autonomous Systems Lab	2
ABE 223	ABE Principles: Machine Syst	2
ABE 224	ABE Principles: Soil & Water	2
ABE 225	ABE Principles: Bioenvironment	2
ABE 226	ABE Principles: Bioprocessing	2
ABE 341	Transport Processes in ABE	3
ABE 361	Off-Road Machine Design	3
ABE 425	Engrg Measurement Systems	4
ABE 430	Project Management	2
ABE 436	Renewable Energy Systems	3 or 4
ABE 446	Biological Nanoengineering	3 or 4
ABE 454	Environmental Soil Physics	3
ABE 455	Erosion and Sediment Control	2
ABE 456	Land & Water Resources Engrg	3 or 4
ABE 457	NPS Pollution Processes	2
ABE 458	NPS Pollution Modeling	2
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

Code	Title	Hours
ABE 482	Package Engineering	3
ABE 483	Engineering Properties of Food Materials	3
ABE 488	Bioprocessing Biomass for Fuel	4
BIOC 446	Physical Biochemistry	3
BIOC 455	Technqs Biochem & Biotech	4
BIOE 201	Conservation Principles Bioeng	3
BIOE 202	Cell & Tissue Engineering Lab	2
BIOE 205	Signals & Systems in Bioengrg	3
BIOE 301	Course BIOE 301 Not Found	
BIOE 302	Modeling Human Physiology	3
BIOE 303	Quantitative Physiology Lab	2
BIOE 306	Biofabrication Lab	3
BIOE 360	Transport & Flow in Bioengrg	3
BIOE 380	Biomedical Imaging	3
BIOE 414	Biomedical Instrumentation	3
BIOE 415	Biomedical Instrumentation Lab	2
BIOE 416	Biosensors	3
BIOE 420	Intro Bio Control Systems	3
BIOE 430	Intro Synthetic Biology	3 or 4
BIOE 461	Cellular Biomechanics	4
BIOE 467	Biophotonics	3
BIOE 476	Tissue Engineering	3
BIOE 479	Cancer Nanotechnology	3
BIOE 480	Magnetic Resonance Imaging	3 or 4
BIOE 481	Whole-Body Musculoskel Biomech	3 or 4
BIOE 482	Musculoskel Tissue Mechanics	3 or 4
BIOE 487	Stem Cell Bioengineering	3 or 4
BIOP 401	Introduction to Biophysics	3
BIOP 419	Brain, Behavior & Info Process	3
BIOP 432	Photosynthesis	3
BTW 261	Principles Tech Comm	3
CHBE 221	Principles of CHE	3
CHBE 421	Momentum and Heat Transfer	4
CHBE 422	Mass Transfer Operations	4
CHBE 424	Chemical Reaction Engineering	3
CHBE 430	Unit Operations Laboratory	4
CHBE 431	Process Design	4
CHBE 440	Process Control and Dynamics	3
CHBE 451	Transport Phenomena	3
CHBE 452	Chemical Kinetics & Catalysis	3
CHBE 456	Polymer Science & Engineering	3
CHBE 457	Microelectronics Processing	3

Code	Title	Hours
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
CHBE 478	Bioenergy Technology	3
CHEM 222	Quantitative Analysis Lecture	2
CHEM 223	Quantitative Analysis Lab	2
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 360	Chemistry of the Environment	3
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 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 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
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3

Code	Title	Hours
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3
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 430	Ecological Quality Engineering	2
CEE 432	Stream Ecology	3 or 4
CEE 434	Environmental Systems I	3
CEE 437	Water Quality Engineering	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	
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 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

Code	Title	Hours
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	Course CEE 480 Not Found	
CEE 483	Soil Mechanics and Behavior	4
CEE 484	Applied Soil Mechanics	3 or 4
CEE 491	Decision and Risk Analysis	3 or 4
CSE 401	Numerical Analysis	3 or 4
CSE 402	Parallel Progrmg: Sci & Engrg	3 or 4
CSE 414	Algorithms	4
CSE 422	Computer System Organization	3 or 4
CSE 423	Operating Systems Design	3 or 4
CSE 426	Software Engineering I	3 or 4
CSE 427	Interactive Computer Graphics	3 or 4
CSE 429	Software Engineering II	3 or 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
CSE 485	Atomic Scale Simulations	3 or 4
CS 173	Discrete Structures	3
CS 210	Ethical & Professional Issues	2
CS 225	Data Structures	4
CS 233	Computer Architecture	4
CS 241	Course CS 241 Not Found	
CS 242	Programming Studio	3
CS 357	Numerical Methods I	3

Code	Title	Hours
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

Code	Title	Hours
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 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 482	Simulation	3 or 4
CS 483	Applied Parallel Programming	4
CS 484	Parallel Programming	3 or 4
ECE 206	Electrical and Electronic Circuits Lab	1
ECE 210	Analog Signal Processing	4
ECE 211	Analog Circuits & Systems	2
ECE 304	Photonic Devices	3
ECE 307	Techniques for Engrg Decisions	3
ECE 310	Digital Signal Processing	3
ECE 311	Digital Signal Processing Lab	1
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 350	Fields and Waves II	3
ECE 380	Biomedical Imaging	3
ECE 385	Digital Systems Laboratory	3

Code	Title	Hours
ECE 391	Computer Systems Engineering	4
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 443	LEDs and Solar Cells	4
ECE 444	IC Device Theory & Fabrication	4
ECE 445	Senior Design Project Lab	4
ECE 446	Principles of Experimental Research in Electrical Engineering	4
ECE 447	Active Microwave Ckt Design	3
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

Code	Title	Hours
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 461	Digital Communications	3
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
ABE 482	Package Engineering	3
IE 330	Industrial Quality Control	3
IE 340	Human Factors	4
IE 360	Facilities Planning and Design	3
IE 361	Production Planning & Control	3
IE 400	Design & Anlys of Experiments	3 or 4

Code	Title	Hours
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
IE 411	Optimization of Large Systems	3 or 4
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	3 or 4
MATH 213	Basic Discrete Mathematics	3
MATH 347	Fundamental Mathematics	3
MATH 348	Fundamental Mathematics ACP	4
MATH 357	Numerical Methods I	3
MATH 402	Non Euclidean Geometry	3 or 4
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 416	Abstract Linear Algebra	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 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

Code	Title	Hours
MATH 448	Complex Variables	3 or 4
MATH 450	Numerical Analysis	3 or 4
MATH 453	Number Theory	3 or 4
MATH 461	Probability 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
ME 170	Computer-Aided Design	3
ME 270	Design for Manufacturability	3
ME 310	Fundamentals of Fluid Dynamics	4
ME 320	Heat Transfer	4
ME 340	Dynamics of Mechanical Systems	3.5
ME 351	Course ME 351 Not Found	
ME 360	Signal Processing	3.5
ME 370	Mechanical Design I	3
ME 371	Mechanical Design II	3
ME 400	Energy Conversion Systems	3 or 4
ME 401	Refrigeration and Cryogenics	3 or 4
ME 402	Design of Thermal Systems	3 or 4
ME 403	Internal Combustion Engines	3 or 4
ME 410	Intermediate Gas Dynamics	3 or 4
ME 411	Viscous Flow & Heat Transfer	4
ME 412	Numerical Thermo-Fluid Mechs	2 to 4
ME 420	Intermediate Heat Transfer	4

Code	Title	Hours
ME 431	Mechanical Component Failure	3 or 4
ME 440	Kinem & Dynamics of Mech Syst	3 or 4
ME 445	Introduction to Robotics	4
ME 446	Robot Dynamics and Control	4
ME 450	Course ME 450 Not Found	
ME 451	Computer-Aided Mfg Systems	3 or 4
ME 452	Num Control of Mfg Processes	3 or 4
ME 455	Micromanufacturing Process & Automation	3 or 4
ME 460	Industrial Control Systems	4
ME 461	Computer Cntrl of Mech Systems	3 or 4
ME 471	Finite Element Analysis	3 or 4
ME 472	Introduction to Tribology	3 or 4
ME 481	Whole-Body Musculoskel Biomech	3 or 4
ME 482	Musculoskel Tissue Mechanics	3 or 4
ME 483	Mechanobiology	4
ME 485	MEMS Devices & Systems	3
ME 487	MEMS-NEMS Theory & Fabrication	4
MCB 150	Molec & Cellular Basis of Life	4
MCB 151	Molec & Cellular Laboratory	1
MCB 215	Foundation in Mol & Cell Bio	3
MCB 244	Human Anatomy & Physiology I	3
MCB 245	Human Anat & Physiol Lab I	2
MCB 246	Human Anatomy & Physiology II	3
MCB 247	Human Anat & Physiol Lab II	2
MCB 250	Molecular Genetics	3
MCB 251	Exp Techniqs in Molecular Biol	2
MCB 252	Cells, Tissues & Development	3
MCB 253	Exp Techniqs in Cellular Biol	2
MCB 270	Medical Genetics	3
MCB 300	Microbiology	3
MCB 301	Experimental Microbiology	3
MCB 314	Introduction to Neurobiology	3
MCB 316	Genetics and Disease	4
MCB 317	Genetics and Genomics	4
MCB 320	Mechanisms of Human Disease	3
MCB 354	Biochem & Phys Basis of Life	3
MCB 400	Cancer Cell Biology	3

Code	Title	Hours
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 406	Gene Expression & Regulation	3
MCB 408	Immunology	3
MCB 410	Developmental Biology, Stem Cells and Regenerative Medicine	3
MCB 413	Endocrinology	3
MCB 419	Brain, Behavior & Info Process	3
MCB 421	Microbial Genetics	3
MCB 424	Microbial Biochemistry	3
MCB 426	Bacterial Pathogenesis	3
MCB 428	Microbial Pathogens Laboratory	2
MCB 429	Cellular Microbiology &Disease	3
MCB 430	Molecular Microbiology	3
MCB 431	Microbial Physiology	3
MCB 432	Computing in Molecular Biology	3
MCB 433	Virology & Viral Pathogenesis	3
MCB 435	Evolution of Infectious Disease	3
MCB 442	Comparative Immunobiology	4
MCB 446	Physical Biochemistry	3
MCB 450	Introductory Biochemistry	3
MCB 458	Basic Human Pathology	3
MCB 461	Cell & Molecular Neuroscience	3
MCB 462	Integrative Neuroscience	3
MCB 465	Human Metabolic Disease	3
MCB 471	Cell Structure and Dynamics	3
MCB 480	Eukaryotic Cell Signaling	3
MSE 396	Introduction to Research (Maximum of 3 hours of technical elective credit for research (MSE 396 and MSE 499). All additional research credit counts for free elective.)	1 to 3
MSE 403	Synthesis of Materials	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 454	Course MSE 454 Not Found	3
MSE 455	Macromolecular Solids	3

Code	Title	Hours
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
MSE 481	Electron Microscopy	3
MSE 484	Composite Materials	3
MSE 485	Atomic Scale Simulations	3
MSE 487	Materials for Nanotechnology	3
MSE 488	Optical Materials	3
MSE 489	Matl Select for Sustainability	3
MSE 499	Senior Thesis	3
NPRE 201	Energy Systems	2 or 3
NPRE 241	Intro to Radiation Protection	2
NPRE 247	Modeling Nuclear Energy System	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 432	Nuclear Engrg Materials Lab	2
NPRE 435	Radiological Imaging	3
NPRE 441	Radiation Protection	4
NPRE 442	Radioactive Waste Management	3
NPRE 446	Radiation Interact w/Matter I	3
NPRE 447	Radiation Interact w/Matter II	3
NPRE 448	Nuclear Syst Engrg & Design	4
NPRE 451	NPRE Laboratory	3
NPRE 455	Neutron Diffusion & Transport	4
NPRE 461	Probabilistic Risk Assessment	3 or 4
NPRE 470	Fuel Cells & Hydrogen Sources	3
NPRE 475	Wind Power Systems	3 or 4
PHYS 213	Univ Physics: Thermal Physics	2
PHYS 225	Relativity & Math Applications	2

Code	Title	Hours
PHYS 325	Classical Mechanics I	3
PHYS 326	Classical Mechanics II	3
PHYS 329	Atmospheric Dynamics I	3
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 406	Acoustical Physics of Music	4
PHYS 419	Space, Time, and Matter-ACP	3 or 4
PHYS 420	Space, Time, and Matter	2
PHYS 435	Electromagnetic Fields I	3
PHYS 436	Electromagnetic Fields II	3
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
SE 101	Engineering Graphics & Design	3
SE 261	Business Side of Engineering	2
SE 310	Design of Structures and Mechanisms	3
SE 311	Engineering Design Analysis	3
SE 312	Instrumentation and Test Lab	1
SE 320	Control Systems	4
SE 361	Emotional Intelligence Skills	3
SE 400	Engineering Law	3 or 4
SE 402	Comp-Aided Product Realization	3 or 4
SE 410	Component Design	3
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	3 or 4

Code	Title	Hours
TSM 233	Course TSM 233 Not Found	
TE 461	Technology Entrepreneurship	3
TAM 212	Introductory Dynamics	3
TAM 252	Solid Mechanics Design	1
TAM 302	Engineering Design Principles	3
TAM 335	Introductory Fluid Mechanics	4
TAM 412	Intermediate Dynamics	4
TAM 413	Fund of Engrg Acoustics	3 or 4
TAM 424	Mechanics of Structural Metals	3 or 4
TAM 427	Course TAM 427 Not Found	
TAM 428	Mechanics of Composites	3
TAM 435	Intermediate Fluid Mechanics	4
TAM 445	Continuum Mechanics	4
TAM 451	Intermediate Solid Mechanics	4
TAM 456	Experimental Stress Analysis	3
TAM 461	Cellular Biomechanics	4
TAM 470	Computational Mechanics	3 or 4

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 6		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. 7		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.		10
Total Hours of Curriculum to Graduate		128

123

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

The replacement of IE 300%7C *with* STAT 400%7C *is not allowed for students in the Biomaterials Area unless one of their biomaterials area topical lectures and one of their topical lectures outside the biomaterials area are deemed by the Accreditation Board for Engineering and Technology (ABET) to be an engineering course. The extra hour of credit for STAT 400 may be used to help meet free elective requirements.*

5*Advanced Composition satisfied by completing* MSE 307%7C *and* MSE 308%7C.**6**

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.

7*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	141801 - Materials 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 2022

Provide a brief narrative description of the admission requirements for this program. Where relevant, include information about licensure requirements, student background checks, GRE and TOEFL scores, and admission requirements for transfer students.

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

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

These changes will not impact enrollment.

Estimated Annual Number of Degrees Awarded

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

What is the matriculation term for this program?
Fall

Budget

Are there budgetary implications for this revision?
No

Will the program or revision require staffing (faculty, advisors, etc.) beyond what is currently available?
No

Additional Budget Information
No changes.

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?
NA

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 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 University Library's resources, collections and services.

EP Documentation

EP Control Number	EP.22.092
Attach Rollback/Approval Notices	ep22092_response from sponsor_20220214.pdf
This proposal requires HLC inquiry	No

DMI Documentation

Attach Final Approval Notices	
Banner/Codebook Name	BS:Materials Sci & Engr -UIUC
Program Code:	10KP0130BS

Minor Code	Conc Code	Degree Code	BS	Major Code
0130				

Senate Approval Date

Senate Conference Approval Date

BOT Approval Date

IBHE Approval Date

HLC Approval Date

Effective Date:

Attached Document

Justification for this request

Program Reviewer Comments

Addition
Removal
Revision

Current Program of Study

Graduation 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. Specific Advanced Composition courses required for this degree are listed below.

Orientation and Professional Development

Course List

Code	Title	Hours
ENG 100	Engineering Orientation [1]	0
MSE 183	Freshman Materials Laboratory [2]	1
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
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I [3]	4
MATH 225	Introductory Matrix Theory	2
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 214	Univ Physics: Quantum Physics	2
Total Hours		34

Materials Science and Engineering Technical Core

For All Students

Course List

Code	Title	Hours
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
IE 300	Analysis of Data [4]	3
or STAT 400	Statistics and Probability I	
MSE 182	Introduction to MatSE	2
MSE 201	Phases and Phase Relations	3
MSE 206	Mechanics for MatSE	4
MSE 307	Materials Laboratory I [5]	3
MSE 308	Materials Laboratory II [5]	3
MSE 395	Materials Design	3
MSE 401	Thermodynamics of Materials	3
MSE 402	Kinetic Processes in Materials	3
MSE 406	Thermal-Mech Behavior of Matls	3
Total Hours		36

For the Biomaterials Area

Course List

Code	Title	Hours
CHEM 232	Elementary Organic Chemistry I	3 or 4
MCB 150	Molec & Cellular Basis of Life	4
MCB 450	Introductory Biochemistry	3
MCB 252	Cells, Tissues & Development	3
Subtotal		13
Total for the Biomaterials Area		49

For All Other Areas

Course List

Code	Title	Hours
MSE 304	Electronic Properties of Matls	3
MSE 405	Microstructure Determination	3
Subtotal		6
Total for All Other Areas		42

Technical Electives

For the Biomaterials Area

New Program of Study

Graduation 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. MSE 307 and MSE 308 will satisfy technical core requirements and the Campus General Education Advanced Composition requirement.

Orientation and Professional Development

Course List

Code	Title	Hours
ENG 100	Engineering Orientation (External tr	1
Recommended, optional 1 credit course, MSE 183 Freshman Materials Laboratory. Credit hour counts toward free electives.		
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
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substit	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational A	3
MATH 285	Intro Differential Equations	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 214	Univ Physics: Quantum Physics	2
Total Hours		35

Materials Science and Engineering Technical Core

For All Students

Course List

Code	Title	Hours
CS 101	Intro Computing: Engrg & Sci	3
ECE 205	Electrical and Electronic Circuits	3
MSE 182	Introduction to MatSE	2
MSE 201	Phases and Phase Relations	3
MSE 206	Mechanics for MatSE	4
MSE 307	Materials Laboratory I	3
MSE 308	Materials Laboratory II	3
MSE 395	Materials Design	3
MSE 401	Thermodynamics of Materials	3
MSE 402	Kinetic Processes in Materials	3
MSE 406	Thermal-Mech Behavior of Matls	3
Subtotal Hours of Technical Core for All Students		33

For the Biomaterials Area

Course List

Code	Title	Hours
CHEM 232	Elementary Organic Chemistry I	3 or 4
IE 300	Analysis of Data (Students in the Bio	3
MCB 150	Molec & Cellular Basis of Life	4
MCB 450	Introductory Biochemistry	3
MCB 252	Cells, Tissues & Development	3
MSE 470	Design and Use of Biomaterials	3
Total Hours for the Biomaterials Area		52

For All Other Areas

Course List

Code	Title	Hours
IE 300	Analysis of Data (The extra hour of c	3
or STAT 400	Statistics and Probability	
MSE 304	Electronic Properties of Matls	3
MSE 405	Microstructure Determination	3
Total Hours for All Other Areas		42

Technical Electives

For the Biomaterials Area

ILLINOIS

COLLEGE OF LIBERAL ARTS & SCIENCES
School of Molecular & Cellular Biology
MCB Instructional Program
127 Burrill Hall, MC-119
407 S. Goodwin Ave.
Urbana, IL 61801

January 28, 2022

Laura Nagel, Senior Lecturer and Chief Advisor
Department of Materials Science and Engineering

Dear Laura,

The School of Molecular and Cellular Biology (MCB) is supportive of your proposal to modify the manner in which you describe technical elective courses for your major. MCB is happy to allow Materials Science and Engineering majors to enroll in MCB courses (including MCB, BIOC, and BIOP subjects) **when seats are available.** We are in the process of refining our seat management strategy in order to be sure that we can accommodate students in an array of MCB majors, and this change may ultimately make our courses less available to those outside of MCB.

Because it remains a goal of ours to serve students from majors outside of MCB when we can, we hope to retain our long-standing posture where we manage enrollment through the official enrollment period, and once all of our students have had an opportunity to enroll, we remove some restrictions so that empty seats can be filled by others. If your students are able to take advantage of those available seats, we are happy to have them.

We wish you luck with your proposed changes, and we thank you for your patience as sorted through this request.

Sincerely,

Melissa Michael
Associate Director for Curriculum & Instruction
mmichae@illinois.edu

cc: Milan Bagchi, Director
School of Molecular and Cellular Biology

From: Jahnke, Keilin
To: Trinkle, Dallas
Cc: Nagel, Laura; Singer, Andy; Taylor, Jed L
Subject: Re: TE Letter of Support - MatSE Technical Electives
Date: Friday, December 17, 2021 9:42:17 AM

Hi Dallas,

Thank you for your response and TE supports this curriculum change. We look forward to working with you in the future so we can best support your students!

Best,
Keilin

On 12/16/21, 4:37 PM, "Trinkle, Dallas" <dtrinkle@illinois.edu> wrote:

Thanks Keilin. For TE 401, I think we would count that as a tech elective. And yes, part of the purpose of our change is to allow newly approved courses to qualify as a tech elective for students without having to continually be making minor curriculum modifications. Thanks; --d

> On 2021Dec16 , at 3:59 PM, Jahnke, Keilin <deahl1@illinois.edu> wrote:
>
> Hi Laura,
>
> Thank you for your original and follow-up email.
>
> We have two quick questions. First, TE 401: Developing Breakthrough Projects offers variable credit and requires instructor approval, and so we would like to confirm that it would still qualify as a technical elective for students and would not be considered an independent study. Second, if a permanent course proposal has been submitted for a special topics (x98) course, could that course be considered for technical elective approval by your department?
>
> Please let me know if I can expand on this and I would be happy to do so.
>
> Best regards,
> Keilin
>
> KEILIN JAHNKE
> Teaching Assistant Professor
>
> The Grainger College of Engineering | Technology Entrepreneur Center
> 366 Coordinated Science Lab | 1308 W. Main St. | MC228
> Urbana, IL 61801 | deahl1@illinois.edu
>
> <image001.png>
>
> Under the Illinois Freedom of Information Act any written communication to or from university employees regarding university business is a public record and may be subject to public disclosure.
>
> From: "Nagel, Laura" <ljnagel@illinois.edu>
> Date: Thursday, December 16, 2021 at 3:08 PM
> To: "Singer, Andy" <acsinger@illinois.edu>, "Jahnke, Keilin" <deahl1@illinois.edu>, "Taylor, Jed L" <jedt@illinois.edu>
> Cc: "Trinkle, Dallas" <dtrinkle@illinois.edu>

> Subject: RE: TE Letter of Support - MatSE Technical Electives
>
> Hi all,
>
> I'm following up on my email from last week. Please let us know if TE will support this curriculum change.
>
> Best,
> Laura
>
> From: Nagel, Laura
> Sent: Wednesday, December 8, 2021 1:27 PM
> To: Singer, Andy <acsinger@illinois.edu>; Jahnke, Keilin <deahl1@illinois.edu>; Taylor, Jed L <jedt@illinois.edu>
> Cc: Trinkle, Dallas <dtrinkle@illinois.edu>
> Subject: TE Letter of Support - MatSE Technical Electives
>
> Dear TEC folks,
>
> MatSE is changing the structure of our technical electives list. The current list names specific courses, which makes it more complicated to keep up to date as course offerings change. https://matse.illinois.edu/academics/undergraduate-programs/undergraduate-curriculum/technical-electives We are proposing moving to language that says "Technical electives are 200 level or higher courses---excluding independent study, research, or special topics---that do not currently satisfy another requirement, which are selected from the following rubrics: AE, ABE, BIOC, BIOE, BIOP, CHBE, CHEM, CEE, CSE, CS, ECE, IE, MSE, MATH, ME, MCB, NPRE, PHYS, SE, TE, TAM. Other courses may be approved by the department." This will increase the number of TE courses which will count for MatSE technical elective requirements. The College of Engineering has asked us to include letters of support from departments that may be impacted by this change. Does TE support this change? Please let me know if you have any questions or concerns.
>
> Best,
> Laura
>
> LAURA NAGEL, PHD
> Senior Lecturer and Chief Advisor
>
> Materials Science and Engineering
> The Grainger College of Engineering
> 201A Materials Science and Engineering Building
> 1304 W. Green, Urbana, IL 61801
> 217.300.0133 | ljnagel@illinois.edu
>
> <image002.png>
>
> Under the Illinois Freedom of Information Act any written communication to or from university employees regarding university business is a public record and may be subject to public disclosure.
>

--
DALLAS TRINKLE
Ivan Racheff Professor of Materials Science and Engineering
Associate Head, Materials Science and Engineering
The Grainger College of Engineering
308 Materials Science
1304 W. Green
Urbana, IL 61801
217.244.6519 | dtrinkle@illinois.edu
dtrinkle.matse.illinois.edu

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

From: McCarthy, Randy III
To: Nagel, Laura
Subject: Re: Math Letter of Support - MatSE Technical Electives
Date: Thursday, December 9, 2021 4:41:09 PM

Hi Laura,

Yes, Math does support this change and agrees that the potential change in enrollments by MatSE students in Math is likely to change very little while the proposed changes will not only be administratively easier to manage but likely make it easier for students as well.

Randy

PS If you would like a more formal letter of support I would be happy to write one for you.

> On Dec 8, 2021, at 11:39 AM, Nagel, Laura <ljnagel@illinois.edu> wrote:
>
> Hi Randy,
>
> Thanks for your help with the letter of support for MATH 257. MatSE is changing the structure of our technical electives list. The current list names specific courses, which makes it more complicated to keep up to date as course offerings change. https://matse.illinois.edu/academics/undergraduate-programs/undergraduate-curriculum/technical-electives We are proposing moving to language that says "Technical electives are 200 level or higher courses---excluding independent study, research, or special topics---that do not currently satisfy another requirement, which are selected from the following rubrics: AE, ABE, BIOC, BIOE, BIOP, CHBE, CHEM, CEE, CSE, CS, ECE, IE, MSE, MATH, ME, MCB, NPRE, PHYS, SE, TE, TAM. Other courses may be approved by the department." This has the potential to increase the number of MATH courses which will count for MatSE technical elective requirements. In practice, I do not expect this to have a significant impact on the number of MatSE students taking upper level math courses. The College of Engineering has asked us to include letters of support from departments that may be impacted by this change. Does Math support this change? Please let me know if you have any questions or concerns.
>
> Best,
> Laura
>
> **LAURA NAGEL, PHD**
> *Senior Lecturer and Chief Advisor*
>
> Materials Science and Engineering
> The Grainger College of Engineering
> 201A Materials Science and Engineering Building
> 1304 W. Green, Urbana, IL 61801
> 217.300.0133 | ljnagel@illinois.edu

From:	Nagel, Laura
To:	Nagel, Laura
Subject:	FW: MatSE Curriculum Revision - CHBE 472 and 458
Date:	Wednesday, December 8, 2021 10:36:12 AM
Attachments:	image001.png

From: "Peters, Baron G" <baronp@illinois.edu>
Date: December 1, 2021 at 5:29:29 PM CST
To: "Trinkle, Dallas" <dtrinkle@illinois.edu>
Subject: RE: MatSE Curriculum Revision - CHBE 472 and 458

Dear Dallas,
Yes, ChBE would be delighted to have materials students in these classes. I apologize for forgetting to answer this earlier.
Cheers,
Baron

From: Trinkle, Dallas <dtrinkle@illinois.edu>
Sent: Wednesday, December 1, 2021 1:59 PM
To: Peters, Baron G <baronp@illinois.edu>
Subject: Re: MatSE Curriculum Revision - CHBE 472 and 458

Hi Baron; sorry to bother you about this, but we do need to hear from ChBE very soon to say that it is not a problem for us to include these two courses as possible electives that our students might take to satisfy curriculum requirements. It's a bit ridiculous, but the campus is requiring departments to obtain documentation that adding such a course into the curriculum will not adversely impact the other department. An email from you, or the head, that you do not have any objection to us adding these courses as electives in our curriculum will suffice. Thanks; —d

--
DALLAS TRINKLE
Ivan Racheff Professor of Materials Science and Engineering
Associate Head, Materials Science and Engineering
The Grainger College of Engineering
308 Materials Science
1304 W. Green
Urbana, IL 61801
217.244.6519 | dtrinkle@illinois.edu
dtrinkle.matse.illinois.edu

On Nov 10, 2021, at 9:50 AM, Nagel, Laura <ljnagel@illinois.edu> wrote:

Hi Baron,

MatSE is making some minor curriculum revisions, including updating our topical lecture course list. These are elective courses typically taken senior year. CHBE 472 Techniques in Biomolecular Engineering and CHBE 458 Synthetic Nanomaterials cover topics that are relevant to MatSE. Is it okay for MatSE to include these courses on the topical lecture list?

Best,
Laura

LAURA NAGEL, PHD
Senior Lecturer and Chief Advisor

Materials Science and Engineering
The Grainger College of Engineering
201A Materials Science and Engineering Building
1304 W. Green, Urbana, IL 61801
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ILLINOIS

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Department of Mathematics

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

Re: Use of Math 257 in MatSE

The Mathematics Department, working with the Grainger College of Engineering, has recently created the course MATH 257, *Linear Algebra with Computational Applications*. Quoting from the justification of the approved proposal, "In the future, MATH 257 will replace the MATH 415 requirement in many science and engineering curricula." With this in mind, the department would be pleased to have MatSE replace their current requirement of Math 225 with MATH 257 in their programs. As the Mathematics department is reallocating instructional resources from both Math 225 and Math 415 to Math 257 as the need shifts, as it was expected that some programs would shift from 225 to 257, this will not cause any undue difficulties for Mathematics resources.

Sincerely

Randy McCarthy

Randy McCarthy
Professor of Mathematics
Dir of Undergraduate Studies in Math
rmccrthy@illinois.edu

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

From: Axelson, Jordan Cole
To: Nagel, Laura
Subject: Re: MatSE Curriculum Revision - CHEM 483
Date: Wednesday, November 17, 2021 11:39:17 AM
Attachments: image001.png

Hi Laura,

I've heard back from a couple members of our curriculum committee as well as Prof. Greg Girolami, who has most recently taught CHEM 483.

In general, they feel that this is a reasonable addition to the advanced electives for MatSE students. In my email to the committee, I did enquire about the CHEM 442 prerequisite for CHEM 483, since that class is not currently a requirement for MatSE majors. Greg did not see this as a major issue, assuming that the math and physics prerequisites associated with CHEM 442 are completed beforehand.

I've copied my correspondence with Greg below, as I thought his opinions on the necessary prerequisites would be informational for the engineering advisors and the students who would be interested in CHEM 483.

Best,
Jordan

On Mon, Nov 15, 2021 at 5:05 PM Girolami, Gregory S <ggirolam@illinois.edu> wrote:

> Dear Jordan:
>
> Sorry for the slow reply.
>
> I have no objection to having Chem 483 listed as an advanced elective for MatSE; as always, the prerequisites are there to make sure that the students come into the course with certain needed tools. The Chem 442 requirement is mostly so students know something about quantum mechanics and the advanced math that is required to do Q.M.; Chem 483 does NOT make use of concepts in thermodynamics or kinetics.
>
> Math 241 (which includes vector analysis and multiple integrals), Math 285 (which includes Fourier series), Physics 212 (electromagnetism), and Physics 214 (wave mechanics) are all essential. If students have taken all of these, then Chem 442 need not be taken.
>
> Greg
>
> Gregory S. Girolami
> Lycan Professor of Chemistry
> Beckman Institute Affiliate
> University Scholar
>
> Department of Chemistry
> University of Illinois at Urbana-Champaign

600 South Mathews Ave
Urbana, IL 61801

tel (research office): 217-333-2729
fax (research office): 217-244-3186

From: Axelson, Jordan Cole <axelson2@illinois.edu>
Sent: Wednesday, November 10, 2021 6:41 PM
To: Huang, Tina H <thhuang@illinois.edu>; Koerner, Michael <doctork@illinois.edu>; Moore, Jeff <jsmoore@illinois.edu>; Han, Hee Sun <hshan@illinois.edu>
Cc: Girolami, Gregory S <ggirolam@illinois.edu>
Subject: Fw: MatSE Curriculum Revision - CHEM 483

Greetings Curriculum Committee,

I received an email from MatSE today stating that they are revising their curriculum and would like to include CHEM 483 Solid State Structure Analysis as an advanced elective class for their senior students since the topics covered by CHEM 483 are relevant to MatSE. They wanted to know if we would approve of this update.

I've CC'ed Greg as well since I saw that he has taught CHEM 483 most recently.

CHEM 442 is the only prereq for CHEM 483. I took a quick look and it appears that the base MatSE curriculum should take care of Math 225; Phys 211, 212, and 214 requirements. However, their curriculum only requires CHEM 102/103 and 104/105. I'm not sure if their thermo and kinetics MatSE courses in junior year would cover the necessary components from CHEM 442. The recommended class schedule for MatSE can be found here for reference: https://matse.illinois.edu/academics/undergraduate-programs/undergraduate-sequence

Would these classes provide enough of a foundation for CHEM 483? I've copied the description of CHEM 483 and its prereq CHEM 442 for reference as well.

CHEM 483 Solid State Structural Anlys credit: 4 Hours.
Lectures and laboratory on various aspects of X-ray diffraction studies of solids; topics include the properties of crystals, symmetry, diffraction techniques, data collection methods, and the determination and refinement of crystal structures. 4 undergraduate hours. 4 graduate hours. Prerequisite: CHEM 442 or consent of instructor.

CHEM 442 Physical Chemistry I credit: 4 Hours.
Lectures and problems focusing on microscopic properties. CHEM 442 and CHEM 444 constitute a year-long study of chemical principles. CHEM 442 focuses on quantum chemistry, atomic and molecular structure, spectroscopy and dynamics. 4 undergraduate hours. 4 graduate hours. Credit is not given for both CHEM 442 and PHYS 485.
Prerequisite: CHEM 204 or CHEM 222; MATH 225, 257, or 415, and a minimal knowledge of differential equations, or equivalent; and PHYS 211, PHYS 212, and PHYS 214 or equivalent.

Best,
Jordan

Jordan C. Axelson, PhD
(she, her, hers)
Director of Undergraduate Studies
Department of Chemistry
University of Illinois at Urbana-Champaign
axelson2@illinois.edu

From: Nagel, Laura <ljnagel@illinois.edu>
Sent: Thursday, November 11, 2021 1:16 PM
To: Axelson, Jordan Cole <axelson2@illinois.edu>
Subject: RE: MatSE Curriculum Revision - CHEM 483

Thanks, Jordan! I look forward to hearing from you.

Laura

From: Axelson, Jordan Cole <axelson2@illinois.edu>
Sent: Wednesday, November 10, 2021 6:43 PM
To: Nagel, Laura <ljnagel@illinois.edu>
Subject: Re: MatSE Curriculum Revision - CHEM 483

Hi Laura,

I've forwarded your request to our curriculum committee and the professor that has been teaching CHEM 483 most recently. Either I or they will get back to you on this inquiry.

Best,
Jordan

Jordan C. Axelson, PhD
(she, her, hers)
Director of Undergraduate Studies
Department of Chemistry
University of Illinois at Urbana-Champaign
axelson2@illinois.edu

From: Nagel, Laura <ljnagel@illinois.edu>
Sent: Wednesday, November 10, 2021 9:57 AM
To: Axelson, Jordan Cole <axelson2@illinois.edu>
Cc: Trinkle, Dallas <dtrinkle@illinois.edu>
Subject: MatSE Curriculum Revision - CHEM 483

Hi Jordan,

MatSE is making some minor curriculum revisions, including updating our topical lecture course list. These are elective courses typically taken senior year. CHEM 483 Solid State Structural Analysis covers topics relevant to MatSE. Is it okay for MatSE to include this course on the topical lecture list? Please let me know if I should direct this request to someone else!

Best,
Laura

LAURA NAGEL, PHD
Senior Lecturer and Chief Advisor

Materials Science and Engineering
The Grainger College of Engineering
201A Materials Science and Engineering Building
1304 W. Green, Urbana, IL 61801
217.300.0133 | ljnagel@illinois.edu

ILLINOIS

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

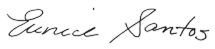
February 3, 2022

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
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
108 Huff Hall
1206 S Fourth | M/C 586
Champaign, IL 61820
217.333.2131 | cherylhm@illinois.edu
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(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