RECEIVED BY SENATE
02/06/2023

EP.23.034
February 6, 2023

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN SENATE
COMMITTEE ON EDUCATIONAL POLICY
(Final; Information)

EP.23.034 Report of Administrative Approvals through January 30, 2023

Senate committees are authorized to act for and in the name of the Senate on minor matters. Below is a listing of the administrative approvals the Senate Committee on Educational Policy approved at its meeting on January 30. For each program listing, there is no change to the total hours required. Additional information for each approval is attached.

A. <u>Undergraduate Programs</u>

1) **Revise the Undergraduate Minor in Natural Resource Conservation in the College of Agricultural, Consumer and Environmental Sciences** – adds 2 courses to the General Elective options list.
2) **Revise the Undergraduate Minor in Wildlife and Fisheries Conservation in the College of Agricultural, Consumer and Environmental Sciences** – adds 1 course to a cluster of courses in a choose from list and removes 1 duplicate course from a choose from list.
3) **Revise the Bachelor of Science in Neural Engineering in the Grainger College of Engineering** – removes Liberal Education Electives, updates number of free elective hours, adds an alternative course for 2 courses, and moves footnotes into the program of study table to improve accessibility.

Program Change Request

Date Submitted: 11/01/22 11:00 am

Viewing: **10KP6131BS : Neural Engineering, BS**

Last approved: 07/21/22 3:37 pm

Last edit: 01/27/23 12:37 pm

Changes proposed by: Maddie Darling

Catalog Pages Using this Program	Neural Engineering, BS

Proposal Type:

In Workflow

1. **U Program Review**
2. **1343 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. 11/01/22 2:54 pm Emily Stuby (eastuby): Approved for U Program Review
2. 11/01/22 3:04 pm Mark Anastasio (maa): Approved for 1343 Head
3. 01/17/23 1:15 pm Michael Hirschi (mch): Approved for KP Committee Chair
4. 01/17/23 3:37 pm Cindy Pruitt (cpruitt): Rollback to KP Committee Chair for KP Dean
5. 01/24/23 12:49 pm Keri Pipkins (kcp): Approved for KP Committee Chair

6. 01/24/23 1:29 pm
   Cindy Pruitt (cpruitt): Approved for KP Dean
7. 01/25/23 2:47 pm
   Chris Prom (prom): Approved for University Librarian
8. 01/27/23 10:24 am
   Brooke Newell (bsnewell): Approved for Provost

History

1. Jul 21, 2022 by Maddie Darling (darling4)

Major (ex. Special Education)

This proposal is for a:
Revision

Administration Details

Official Program Name	Neural Engineering, BS	
Diploma Title		
Sponsor College	Grainger College of Engineering	
Sponsor Department	Bioengineering	
Sponsor Name	Mark A. Anastasio, Donald Biggar Willett Professor in Engineering, Head of Department of Bioengineering	
Sponsor Email	maa@illinois.edu	
College Contact	Jonathan Makela, Associate Dean for Undergraduate Programs, Grainger College of Engineering	College Contact Email jmakela@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.

Maddie Darling, darling4@illinois.edu (BIOE); Keri Carter Pipkins, kcp@illinois.edu (GCOE).

Does this program have inter-departmental administration?

No

Proposal Title

Effective Catalog Term: Fall 2023

Proposal Title (either Establish/Revise/Eliminate the Degree Name in Program Name in the College of XXXX, i.e., Establish the Bachelor of Science in Entomology in the College of Liberals Art and Sciences, include the Graduate College for Grad Programs)

Revise the Bachelor of Science in Neural Engineering in the Grainger College of Engineering

Does this proposal have any related proposals that will also be revised during the next 6 weeks? Consider Majors, Minors, Concentrations & Joint Programs in your department. Please know that this information is used administratively to move related proposals through workflow efficiently. Example: If you are revising the BS proposal and one related concentration within the next 6 weeks, "This BS proposal (key 567) is related to the Concentration A proposal (key 145)."

Program Justification

Provide a brief description of what changes are being made to the program.

Removed Liberal Education Electives, updated number of free elective hours, added ENG 300 as an option instead of ENG 100 for off-campus transfer students, and moved foot notes into the Program of Study Table (to improve accessibility). Clarified existing language regarding technical/track elective hours and the option to complete CS 101 or CS 124 in the program of study.

The 40 hours of upper-division classes for IBHE requirement are met by:
• 35 hours of 300 & 400 level classes individually specified, including 9 of 12 hrs of technical elective courses (PSYC 210 is an option which is not advanced)
• 8 hours 200 level coursework with 2 or more prerequisites
o MATH 241 (4 credit hours) - prerequisites of MATH 231 and MATH 220 or 221
o PHYS 211 (4 credit hours) - prerequisites of MATH 231 and MATH 220 or 221

Did the program content change 25% or more in relation to the total credit hours, since the 2020-2021 catalog. (http://catalog.illinois.edu/archivedacademiccatalogs/2020-2021/)

No

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.

Both CS101 and CS124 provide an introduction to computing topics and problem-solving techniques. CS101 is targeted toward other engineering and science majors and therefore uses MATLAB and Python as the programming languages. CS124 is targeted toward computer science majors and uses more advanced programming languages (Java and Kotlin). Since the underlying objectives in CS 101 and CS 124 are similar and students taking CS 124 have learned a more advanced programming language, students who have passed CS124 should be able to apply the concepts from that course in MATLAB and pick up the MATLAB syntax quickly, which allows either course to appropriately satisfy the programming needs in the neural engineering

degree program.

ENG 300 is currently offered as an alternative to ENG 100 for off-campus transfer students. Neural Engineering will allow off-campus transfer students, which requires the addition of ENG 300 as an or option to ENG 100 in our program.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

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

No

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

Yes

Courses outside of the sponsoring department/interdisciplinary departments

PSYC 100 - Intro Psych
MCB 150 - Molec & Cellular Basis of Life
MCB 250 - Molecular Genetics
MCB 252 - Cells, Tissues & Development
CHEM 102 - General Chemistry I
CHEM 103 - General Chemistry Lab I
CHEM 104 - General Chemistry II
CHEM 105 - General Chemistry Lab II
CHEM 232 - Elementary Organic Chemistry I
MATH 221 - Calculus I
MATH 231 - Calculus II
MATH 241 - Calculus III
MATH 285 - Intro Differential Equations
PHYS 211 - University Physics: Mechanics
PHYS 212 - University Physics: Elec & Mag
CS 101 - Intro Computing: Engrg & Sci
RHET 105 - Writing and Research
ECE 410 - Neural Circuits and Systems
ECE 421 - Neural Interface Engineering
CS 124 - Intro to Computer Science I

Please attach any letters of support/acknowledgement for any

BS-Neural Eng CIMP signed 10132022.pdf

Instructional Resources consider faculty, students, and/or other impacted units as appropriate.

Program Regulation and Assessment

Plan to Assess and Improve Student Learning

Illinois Administrative Code: 1050.30(b)(1)(D) Provision is made for guidance and counseling of students, evaluations of student performance, continuous monitoring of progress of students toward their degree objectives and appropriate academic record keeping.

List the program's student learning outcomes. Each outcome should identify what students are expected to know and/or be able to do upon completing this program.

The Neural Engineering (NE) Program Committee will be responsible for making NE curricular decisions. The NE Program Committee will consist of tenured and tenure-track faculty members in the Department of Bioengineering and will be tasked with mapping the NE program-level educational objectives (PEOs) to student outcomes through individual course session learning objectives (LOs) and linking them to specific course performance indicators for success. The program specific performance indicators comprise a combination of both direct (exam results) and indirect (survey data) measures.

Most performance indicators will measure two levels of student achievement: attainment of skills and mastery of skills, representing distinct levels in the curriculum. Student work will be analyzed against a rubric to determine the fraction of students achieving each level of performance, with the target goal of 70% of junior/senior students achieving a high performance level. We will use lower-level course attainment scores as formative feedback on how students are progressing in the desired skill. Data analysis and action items resulting from the review of outcomes will be presented in a self-study report. A detailed breakdown for each outcome will be made available for faculty review.

The NE Program Committee will be responsible for creating, continuous oversight, and evaluation of the NE degree curriculum. Annually, learning outcomes and LOs will be reviewed and revised to ensure that they are clearly written, student-centered, measurable, concise, meaningful, achievable, and outcome-based. Resources from the Center for Innovation in Teaching and Learning (CITL) will be used for guidance. Teaching and Learning will be assessed through both informal and formal methods administered throughout and at the end of each term. Informal early feedback during each semester will be gathered, analyzed, and utilized to act on student feedback while the class is in progress. Instructor and Course Evaluation System (ICES) will be used as the end-of-course evaluation tool of instructor and course effectiveness for both faculty and teaching assistants. Overall course performance will be used to guide subsequent instruction. Monitoring of changes and action items will be reviewed annually by the NE Program Committee.

Assessment instruments and performance indicators used to evaluate each course will be critiqued. Course directors will draft an assessment blueprint in which the content of the course will be divided into categories corresponding to (1) mastery of the fundamental principles of neuroscience, (2) integrated skill development in electrical and imaging systems, molecular and cellular engineering, biological interfacing, and computational data sciences, and (3) the application of design principles to solve modern problems in basic and translational neuroscience. Percentage weights will be assigned to each category (e.g. 10%, 40%). The blueprint will then be referenced when creating exams.

The NE Program Committee will review courses taught for the first time and annually review all course descriptions. After offering all courses at least once, the NE Program Committee will reexamine all the embedded indicators and ensure that they map to the student outcomes and fully demonstrate the designated outcome. Areas in need of improvement will be identified and recommendations for improvement will be specified that can be implemented in future years. The systematic assessment of student

outcomes will be used to track progress and improvement goals.

To continuously improve the NE program and student learning, data will be collected and evaluated every 3 years, allowing for the NE program to make and assess changes in program curriculum, advising processes, and the assessment process itself.

The Program Director will serve as the chair of the NE Program Committee and will be responsible for allocating advising duties, providing oversight of advising activities, and developing best practices for advising

Describe how, when, and where these learning outcomes will be assessed.

Describe here:

Identify faculty expectations for students' achievement of each of the stated student learning outcomes. What score, rating, or level of expertise will signify that students have met each outcome? Provide rating rubrics as necessary.

Explain the process that will be implemented to ensure that assessment results are used to improve student learning.

Program Description and Requirements
Attach Documents

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/PublicAdminRules2017.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.

Revised programs
NE side-by-side for CIM_11012022.xlsx
Neural Engineering BS Sample Sequence.pdf

Attach a revised Sample Sequence (for undergraduate program) or college-level forms.

Catalog Page Text - Overview Tab

Description of program for 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.

Bachelor of Science, Neural Engineering

The Bachelor of Science in Neural Engineering provides training at the intersection of neuroscience and engineering fundamentals. The program focuses on skill development in electrical and imaging systems, molecular and cellular engineering, biological interfacing, and computational data sciences. The first two years of the program provide foundational knowledge in applied formal sciences, physical sciences, and life sciences. Years three and four provide focused training in neural engineering fundamentals and applications through core courses, neuroscience courses, and neural engineering electives. Students will be prepared for employment as engineers in growing healthcare industry sectors related to neurological devices, brain-computer interfaces, neurological disease treatments, and brain imaging technologies. Graduates will also be positioned to pursue professional degrees in medicine and graduate studies in clinical, life, and behavioral sciences.

Minimum Hours for Graduation: 128

Graduation

To graduate, students must satisfy all University requirements as to residency, scholarship, and fees and must complete the University's general education requirements.

Highest honors/departmental distinction: Students completing a Bachelor's thesis with a minimum GPA of 3.8 will be eligible for highest honors. ~~Curriculum:First Semester CS 101 Introduction to Programming for Engineers and Scientists (3) ENG 100 Engineering Orientation (0) MATH 221 Calculus I (4) MCB 150 Molecular and Cellular Basis of Life (4) NE 100 Introduction to Neural Engineering (2) PSYC 100 Introductory Psychology (4) Credit hours:3 + 0 + 4 + 4 + 2 + 4 = 17 CR Second Semester CHEM 102 General Chemistry I (3) CHEM 103 General Chemistry Lab I (1) MATH 231 Calculus II (3) PHYS 211 University Physics:Mechanics (4) RHET 105 Writing and Research (4) Social Sciences or Humanities elective (3) Credit hours:3 + 1 + 3 + 4 + 4 + 3 = 18 CR Third Semester BIOE 210 Linear Algebra in Biomedical Data Science (3) CHEM 104 General Chemistry II (3) CHEM 105 General Chemistry Lab II (1) MATH 241 Calculus III (4) MCB 250 Molecular Genetics (3) PHYS 212 University Physics:Electricity and Magnetism (4) Credit hours:3 + 3 + 1 + 4 + 3 + 4 = 18 CR Fourth Semester BIOE 205 Signals and Systems in Bioengineering (3) BIOE 310 Computational Tools for Biological Data (3) CHEM 232 Elementary Organic Chemistry I (4) MATH 285 Introduction to Differential Equations (3) MCB 252 Cells, Tissues, and Development (3) Credit hours:3 + 3 + 4 + 3 + 3 = 16 CR Fifth Semester NE 330 Neuroscience for Engineers (3) NE 410 / ECE 410 Neural Circuits and Systems (3) Neural Engineering elective (3) Social Sciences or Humanities elective (3) Credit hours:3 + 3 + 3 + 3 = 12 CR Sixth Semester NE 420 / ECE 421 Neural Interface Engineering (3) NE 422 Introduction to Neuroimaging (3) Neural Engineering elective Free elective (3) Social Sciences or Humanities elective (3) Credit hours:3 + 3 + 3 + 3 + 3 = 15 CR Seventh Semester NE 412 Neural Data Analysis (3) NE 430 Neural Cell and Tissue Engineering (3) NE 431~~

~~Neural Cell & Tissue Engineering Lab (4) Neural Engineering elective (3) Social Sciences or Humanities elective (3) Credit hours:3 + 3 + 4 + 3 + 3 = 16 CR Eighth Semester NE 402 Neural Engineering Senior Design (4) Free elective (3) Neural Engineering elective (3) Social Sciences or Humanities elective (3) Social Sciences or Humanities elective (3) Credit hours:4 + 3 + 3 + 3 + 3 = 16 CR Total program credit hours:17 + 18 + 18 + 16 + 12 + 15 + 16 + 16 = 128 CR~~

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Overall GPA: 2.0

Minimum ~~Minimum~~ hours required for graduation: 128 hours

General education: Students must complete the Campus General Education requirements including the campus general education language requirement.

Orientation and Professional Development

Course List

Code	Title	Hours
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
Total Hours		1

Foundational Mathematics and Science

~~Orientation and Professional DevelopmentFoundational 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
CHEM 232	Elementary Organic Chemistry I (May be taken for 3 or 4 credit hours; the extra hour may be used to help meet free elective requirements.)	4
MATH 221	Calculus I (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 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
Total Hours		34

Neural Engineering Technical Core

~~Technical Electives (List of Pre-Approved Neural Engineering Electives)Electives~~

~~**1**~~

~~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.*~~

~~**2**~~

~~*May be taken for 3 or 4 credit hours; the extra hour may be used to help meet free elective requirements.*~~

~~**3**~~

~~*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.*~~

~~**4***The Grainger College of Engineering restrictions to free electives can be found here.*~~

Course List

Code	Title	Hours
BIOE 205	Signals & Systems in Bioengrg	3
BIOE 210	Linear Algebra for Biomedical Data Science	3
BIOE 310	Computational Tools for Biological Data	3
NE 100	Introduction to Neural Engineering	2
NE 330	Neuroscience for Engineers	3
NE 402	Neural Engineering Senior Design	4
NE 412	Neural Data Analysis	3
NE 422	Introduction to Neuroimaging	3
NE 430	Neural Cell and Tissue Engineering	3
NE 431	Neural Cell & Tissue Engineering Lab	4
ECE/NE 410	Neural Circuits and Systems	3
ECE 421/NE 420	Neural Interface Engineering	3
CS 101	Intro Computing: Engrg & Sci (CS 124 may be taken instead of CS 101.)	3
MCB 150	Molec & Cellular Basis of Life	4
MCB 250	Molecular Genetics	3
MCB 252	Cells, Tissues & Development	3
PSYC 100	Intro Psych (For this major only: does not apply toward social and behavioral sciences general education requirements.)	4
Total Hours		54

Technical Electives

(List of Pre-Approved Neural Engineering Electives)

Course List

Code	Title	Hours
Must choose 12 hours from the following:		12
Bioengineering:		
BIOE 420	Intro Bio Control Systems	
BIOE 460	Gene Editing Lab	
BIOE 476	Tissue Engineering	
BIOE 483	Biomedical Computed Imaging Systems	
BIOE 484	Statistical Analysis of Biomedical Images	
BIOE 485	Computational Mathematics for Machine Learning and Imaging	
BIOE 486	Applied Deep Learning for Biomedical Imaging	
BIOE 487	Stem Cell Bioengineering	
BIOE 488	Applied High-Performance Computing for Imaging Science	
BIOE 489	Regulations, Ethics and Logistics in Biomedical Applications of Machine Learning	
BIOE 498	Special Topics (Quantitative Pharmacology)	
BIOE 498	Special Topics (Introduction to Synthetic Biology)	
BIOE 498	Special Topics (Soft Robotics)	
BIOE 498	Special Topics (Immunoengineering)	
Electrical and Computer Engineering		
ECE 416	Biosensors	
ECE 442	Silicon Photonics	
ECE 459	Communications Systems	
ECE 460	Optical Imaging	
ECE 461	Digital Communications	

Code	Title	Hours
ECE 467	Biophotonics	
ECE 470	Introduction to Robotics	
ECE 480	Magnetic Resonance Imaging	
Mechanical Engineering		
ME 483	Mechanobiology	
Psychology		
PSYC 210	Behavioral Neuroscience	
PSYC 404	Cognitive Neuroscience	
Physics		
PHYS 475	Introduction to Biophysics	
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. 3~~		~~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. 4~~		~~6~~
Additional coursework, 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

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	140501 - Bioengineering and Biomedical Engineering.

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

Yes

Describe the plans for seeking specialized accreditation:

ABET accreditation will ultimately be sought for this program following the graduation of the first cohort of students. When mapped to the bioengineering/biomedical engineering B.S. ABET criteria, the proposed curriculum satisfies criteria including engineering course hours.

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 2023

Is this revision a change to the admission status of the program?

No

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.

Application processing at the freshman level will be administered by the Office of Undergraduate Admissions, with requirements commensurate with standards of Grainger Engineering.

Admission Requirements for Freshmen:
• The general admission requirements of the University apply
• Application fee
• Self-reported academic record (SRAR)
• Official test scores - Standardized test scores are required for admission review: either ACT (code 1154) or SAT I (code 1836) scores are accepted
• English proficiency
o International students must score at least 100 on the iBT version of the English as a Foreign Language test (TOEFL); or 7 on each section of the IELTS.

For more detailed information regarding application requirements and the application process, please visit the University of Illinois Admissions website at: www.admissions.illinois.edu.

Admission Requirements for Inter-College/Department Transfer Students and Pre-Engineering Students (ICT/IDT/PREP)

• Students originating outside of the Grainger College of Engineering who entered the University of Illinois Urbana-Champaign as first time freshmen will be required to participate in the Pre-Engineering Program to be reviewed for transfer into Neural Engineering
• Pre-Engineering and current University students should demonstrate interest in the major by:
• Earning grades of "B" or better in introductory courses such as CHEM 102, 103; MATH 221, 231; PHYS 211; and MCB 150.
• Maintain a cumulative minimum GPA of 3.00 or higher
• Successfully complete the ICT or IDT transfer application

Enrollment

Describe how this revision or phase down/elimination will impact enrollment and degrees awarded. If this is an elimination/phase down proposal include the plans for the students left in the program.

No impact

Estimated Annual Number of Degrees Awarded

Year One Estimate	0	5th Year Estimate (or when fully implemented)	35

What is the matriculation term for this	Fall

program?

Budget

Are there budgetary implications for this revision? No

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

Please explain/describe:

While many existing BIOE faculty members will contribute to delivering the new degree, there will be a need for additional faculty. Four additional tenure track faculty or two teaching track faculty, or some combination of the two, will be hired to ensure that the Department of Bioengineering maintains sufficient personnel to meet the needs of the new program and the anticipated growth of the exisiting degree programs within the department. Neural Engineering has previously been identified as a strategic area for research growth in the department. The hires to support the new NE degree will therefore be consistent with the planned expansion of the department. These hires will be forthcoming due to a commitment to Dr. Anastasio by Grainger Engineering as part of his recruitment as department head.

In addition to the new faculty hires, existing faculty in the Department of Bioengineering will contribute to the teaching needs of the program. Research track faculty Dr. Catherine Best and Dr. Yogatheesan Varatharajah will teach one course. Both have contributed to the development of this program and have teaching experience. The Department of Bioengineering will also be hiring in several other areas over the coming years. As new faculty join the department, this will permit the realignment of some of the teaching assignments of the existing neural engineering faculty to support the proposed degree program. As such, due to these available resources and the department of Bioengineering’s commitment to invest in neural engineering, the proposed degree program will receive the staffing needed for its success. In fact, the department has already begun faculty recruiting in areas that are directly relevant to the proposed program.

For the first two years, while the program is ramping up, we will leverage our existing staff to support the administrative needs of the program. In Year 3, using program revenue, we will hire a new staff position.This person will oversee student advising, recruitment, course scheduling, and other day-to-day business of running the program.

Additional Budget Information

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

As described in the budget section, the unit will support the new degree through strategic hiring of faculty as supported by existing commitments from Grainger Engineering and initially leveraging existing administrative resources, including BIOE program staff serving other degree programs in the department. Only one new introductory course needs to be offered during the first two years of the program. With the third cohort of students, we will hire a staff position to support operational procedures of the program.

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

Faculty Resources

Please address the impact on faculty resources including any changes in numbers of faculty, class size, teaching loads, student-faculty ratios, etc.

We intend to fill new tenure-track and/or teaching track faculty positions that can contribute to the teaching needs of the proposed program before the third year of the program. Additional details are described in the budget description. There will be no impact on teaching loads for any bioengineering faculty. As neural engineering is already a significant focus in the department of Bioengineering, the new courses developed for the program will be made available to students outside of the new program. The new courses will satisfy the teaching load requirements of the faculty in the manner as those contributing to the existing B.S., M.S., M.Eng. and Ph.D. courses within the department. Three current courses that are core components of the BIOE B.S. program will experience an increased enrollment (BIOE 205, 210, 310) as they are also core courses in the NE B.S. program. These courses have already been scaled from enrollment of approximately 30 up to 100 in recent years, and will only be moderately impacted by the increase to 135–145. If needed, multiple sections of these courses will be offered. Other elective courses currently offered by the department are expected to experience a modest and reasonable increase in enrollment (from ~25 to ~35) as they serve as NE elective courses. With the increase in total undergraduate enrollment from ~400 BIOE students in fall of 2021 to include 145 NE students by 2027, we expect to increase faculty by 4 (see Budget section), so that our student:faculty ratio will rise from 17 to 20, which is still near the Grainger Engineering average of 17.

The appointed Program Director will be responsible for allocating advising duties and for developing best practices for advising. A new staff position will be created to serve as the permanent student advisor by the end of the second year of the program offering. Engineering Career Services is expected to be the primary facilitator of job placement for Grainger Engineering students. It is anticipated that the first several cohorts will yield high matriculation to graduate programs, as was the case with the first 5 years of BIOE B.S. recipients. Advisement for graduate and professional school placement will be through Bioengineering faculty, with personalized faculty advising for which individual student career interests will be paired to those faculty most capable of offering depth of knowledge and opportunities.

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.

Current library resources, including collections and services, are sufficient to address the needs of this program revision.

EP Documentation

EP Control Number	EP.23.034

Attach

Rollback/Approval Notices	
This proposal requires HLC inquiry	No

DMI Documentation

Attach Final Approval Notices	
Banner/Codebook Name	BS:Neural Engineering - UIUC
Program Code:	10KP6131BS

Minor Code	Conc Code	Degree Code	BS	Major Code
6131				

Senate Approval Date	
Senate Conference Approval Date	
BOT Approval Date	
IBHE Approval Date	
HLC Approval Date	
DOE Approval Date	
Effective Date:	
Attached Document Justification for this request	

Program Reviewer Comments	**Brooke Newell (bsnewell) (09/06/22 4:06 pm):** Rollback: Please fix CHEM 232 and MATH 221 comments. Please revise the POS accordingly for CS 124 and ENG 300. Please complete the Instructional Resources section and attach LOS from CS regarding CS 124 addition. **Michael Hirschi (mch) (10/31/22 4:46 pm):** Rollback: Maddie - I count 15 hrs of Free elective. I will send you my ABET Table 5-1 for NeuralE to clarify. It'll help with Sample Sequence when you get there... **Cindy Pruitt (cpruitt) (01/17/23 3:37 pm):** Rollback: By request

Brooke Newell (bsnewell) (01/27/23 10:34 am): In conversation with the sponsor (Maddie Darling), the sponsors don’t want Psyc 100 to count as a Gen Ed since it is a major requirement and they want students to take an additional 6 hours of Gen Ed coursework in that category. The sponsors did have some conversations with Kathy around when it came to campus for review when the major was originally proposed, in which the recommendation of being clear in the Program of Study (and thus the degree audit) would be necessary if not allowed to count towards the Gen Ed SBS category.

Key: 1044

ILLINOIS

DEPARTMENT OF COMPUTER SCIENCE
Thomas M. Siebel Center for Computer Science
201 N. Goodwin Ave.
Urbana, IL 61801-2302 USA

NANCY M. AMATO
Abel Bliss Professor and Head
2248 Siebel Center
namato@illinois.edu

October 14, 2022

Dear Professor Mark A. Anastasio,

The Department of Computer Science (CS) understands CS 101, as previously approved, is a required course in the Neural Engineering-BS degree program. Students may take CS 124 in place of CS 101, on a limited basis. The Department of Computer Science supports the enrollment of up to 35 Neural Engineering students in the following course and will provide access to the following, as needed:

- CS 124: Introduction to Computer Science I

Sincerely,

Nancy M. Amato
Abel Bliss Professor and Head
Department of Computer Science

First Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
ENG 100 (External transfer students take ENG 300.)	1	MATH 231: Calculus II	3
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	PHYS 211: University Physics: Mechanics	4
CS 101: Intro Computing: Engrg & Sci (CS 124 may be taken instead of CS 101.)	3	CHEM 102 General Chemistry I	3
MCB 150: Molecular & Cellular Basis of Life	4	CHEM 103 General Chemistry Lab I	1
NE 100 Introduction to Neural Engineering	2	General Education Elective	3
RHET 105 (if UIN is even) or PSYC 100 (if UIN is odd; For this major only: does not apply toward social and behavioral sciences general education requirements.)	4	PSYC 100 (if UIN is even; For this major only: does not apply toward social and behavioral sciences general education requirements.) or RHET 105 (if UIN is odd)	4
	18		**18**

Second Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
MATH 241: Calculus III	4	MATH 285: Intro Differential Equations	3
PHYS 212: University Physics: Elec & Mag	4	CHEM 232 Elementary Organic Chemistry I	4
CHEM 104 General Chemistry II	3	MCB 252 Cells, Tissues, and Development	3
CHEM 105 General Chemistry Lab II	1	BIOE 310 Computational Tools for Biological Data	3
MCB 250 Molecular Genetics	3	BIOE 205: Signals & Systems in Bioengrg	3
BIOE 210: Linear Algebra for Biomedical Data Science	3		
	18		**16**

Third Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
NE 330 Neuroscience for Engineers	3	NE 420 / ECE 421 Neural Interface Engineering	3
NE 410 / ECE 410 Neural Circuits and Systems	3	NE 422 Introduction to Neuroimaging	3
Neural Engineering Technical Elective	3	Neural Engineering Technical Elective	3
General Education Elective	3	Free elective	3
		General Education Elective	3
	12		**15**

Fourth Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
NE 412 Neural Data Analysis	3	NE 402 Neural Engineering Senior Design	4
NE 430 Neural Cell and Tissue Engineering	3	Free elective	6
NE 431 Neural Cell & Tissue Engineering Lab	4	Neural Engineering Technical Elective	3
Neural Engineering Technical Elective	3	General Education Elective	3
Free elective	2		
	15		**16**

Total Hours 128

for the degree of Bachelor of Science in Neural Engineering

Sample Sequence
This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements.

Minimum hours for graduation is 128, to include a minimum of 40 hours of upper-division coursework. These hours can be drawn from all elements of the degree. Upper division courses are those whose content and teaching are appropriate for junior- and senior-year students in a baccalaureate program or other students with experience in the subject.

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.

First Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
ENG 100	1	MATH 231	3
MATH 221 (MATH 220 may be substituted)	4	PHYS 211	4
NE 100	2	CHEM 102	3
PSYC 100	4	CHEM 103	1
General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3	CS 101	3
Composition I course or MCB 150	4	MCB 150 or Composition I course	4
	18		**18**

Second Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
MATH 241	4	MATH 285	3
PHYS 212	4	CHEM 232	4

First Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
CHEM 104	3	MCB 252	3
CHEM 105	1	BIOE 310	3
MCB 250	3	BIOE 205	3
BIOE 210	3		
	18		**16**

Third Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
NE 330	3	NE 420 or ECE 421	3
NE 410 or ECE 410	3	NE 422	3
Neural Engineering Technical elective course	3	Neural Engineering Technical elective course	3
General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3	Language Other Than English (3rd level) course	4
		General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
	12		**16**

Fourth Year

FIRST SEMESTER	HOURS	SECOND SEMESTER	HOURS
NE 412	3	NE 402	4
NE 430	3	General Education course (choose a Humanities or Social/Behavioral Science course that is also Advanced Composition)	3
NE 431	4	Neural Engineering Technical elective course	3
Neural Engineering Technical elective course	3	Free elective course	4
Free elective course	3		
	16		**14**

Total Hours 128

for the degree of Bachelor of Science in Neural Engineering

Program Change Request

Date Submitted: 01/06/23 5:06 pm

Viewing: **5294 : Natural Resource Conservation Minor, UG**

Last approved: 10/15/20 3:49 pm

Last edit: 01/27/23 12:37 pm

Changes proposed by: Susan Helmink

Catalog Pages Using this Program	Natural Resource Conservation Minor

Proposal Type:

In Workflow

1. **U Program Review**
2. **1875 Committee Chair**
3. **1875 Head**
4. **KL Committee Chair**
5. **KL Dean**
6. **University Librarian**
7. **Provost**
8. **Senate EPC**
9. Senate
10. U Senate Conf
11. Board of Trustees
12. IBHE
13. HLC
14. DMI

Approval Path

1. 01/09/23 2:21 pm Deb Forgacs (dforgacs): Approved for U Program Review
2. 01/10/23 2:14 pm James Miller (jrmillr): Approved for 1875 Committee Chair
3. 01/16/23 8:42 am Robert Schooley (schooley): Approved for 1875 Head
4. 01/17/23 9:17 am Brianna Gregg (bjgray2): Approved for KL Committee Chair
5. 01/17/23 9:47 am Anna Ball (aball):

Approved for KL Dean

6. 01/19/23 2:16 pm
   Chris Prom (prom): Rollback to KL Dean for University Librarian
7. 01/20/23 3:58 pm
   Anna Ball (aball): Approved for KL Dean
8. 01/23/23 10:20 am
   Chris Prom (prom): Rollback to KL Committee Chair for University Librarian
9. 01/23/23 10:25 am
   Brianna Gregg (bjgray2): Approved for KL Committee Chair
10. 01/23/23 10:52 am
    Anna Ball (aball): Approved for KL Dean
11. 01/23/23 10:56 am
    Chris Prom (prom): Approved for University Librarian
12. 01/27/23 10:24 am
    Brooke Newell (bsnewell): Approved for Provost

History

1. Oct 15, 2020 by Susan Helmink

(shelmink)

Minor (ex. European Union Studies)

This proposal is for a:
Revision

Administration Details

Official Program Name	Natural Resource Conservation Minor, UG	
Diploma Title		
Sponsor College	Agr, Consumer, & Env Sciences	
Sponsor Department	Natural Res & Env Science	
Sponsor Name	Jim Miller, Professor and Chair of the NRES Courses and Curriculum Committee	
Sponsor Email	jrmillr@illinois.edu	
College Contact	Anna Dilger, ~~Tony Yannarell,~~ Associate Professor and Chair of the ACES Courses and Curriculum Committee	College Contact Email adilger2@illinois.edu ~~acyann@illinois.edu~~
College Budget Officer		
College Budget Officer Email		

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

Does this program have inter-departmental administration?
No

Proposal Title

Effective Catalog Term	Fall 2023

Proposal Title (either Establish/Revise/Eliminate the Degree Name in Program Name in the College of XXXX, i.e., Establish the Bachelor of Science in Entomology in the College of Liberals Art and Sciences, include the Graduate College for Grad Programs)

Revise the Undergraduate Minor in Natural Resource Conservation in the College of Agricultural, Consumer and Environmental Sciences

Does this proposal have any related proposals that will also be revised during the next 6 weeks? Consider Majors, Minors, Concentrations & Joint Programs in your department. Please know that this information is used administratively to move related proposals through workflow efficiently. Example: If you are revising the BS proposal and one related concentration within the next 6 weeks, "This BS proposal (key 567) is related to the Concentration A proposal (key 145)."

Program Justification

Provide a brief description of what changes are being made to the program.

We propose that two new courses be added to the General Elective options: NRES 480 - Human-Wildlife Interactions and NRES 482 - Aquatic Biogeochemistry.

Did the program content change 25% or more in relation to the total credit hours, since the 2020-2021 catalog. (http://catalog.illinois.edu/archivedacademiccatalogs/2020-2021/)

No

Why are these changes necessary?

New faculty developed new courses that recently received permanent course numbers. The Natural Resource Conservation Minor addresses the diverse biological, physical, social, economic, and political aspects of natural resources and stewardship.

NRES 480 - Human-Wildlife Interactions addresses the biological, social, economic, and political aspects as students learn about human-wildlife interactions along a spectrum from conflict to coexistence, discuss the pros and cons of various measures taken to reduce conflicts, and think critically about they ways that attitudes, economics, geography, policies, and culture affect our relationships with wildlife globally.

NRES 482 - Aquatic Biogeochemistry focuses on the physical aspects through examination of the transport, transformation, and retention of carbon and nutrients in aquatic ecosystems across the continuum from streams to coastal waters and how disturbance and global change drivers alter nutrient and carbon cycling in the context of watersheds. Emphasis is placed on improving water quality and aquatic ecosystem protection.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

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

No

Does the program include other courses/subjects outside of the sponsoring

department impacted by the creation/revision of this program?

No

Program Regulation and Assessment

Plan to Assess and Improve Student Learning

Illinois Administrative Code: 1050.30(b)(1)(D) Provision is made for guidance and counseling of students, evaluations of student performance, continuous monitoring of progress of students toward their degree objectives and appropriate academic record keeping.

List the program's student learning outcomes. Each outcome should identify what students are expected to know and/or be able to do upon completing this program.

All subject areas/courses in the minor have been selected because they specifically address the learning objectives of the minor. We therefore intend to use student performance in these courses as benchmarks to ensure that students have achieved these educational goals. All courses in Natural Resources and Environmental Sciences (NRES) regularly undergo peer-review assessments, and we will continue this practice for all courses in the minor.

The Natural Resource Conservation Minor provides a fundamental and strong background in the management and conservation of natural resources. Courses in the minor are also part of the NRES major and each course addresses one or more of the following NRES major learning outcomes:

1. Understand the scientific method/ways of knowing and critically evaluate information.
2. Integrate principles of biological, chemical, physical, and social sciences and apply them to resource and environmental issues using a systems approach.
3. Understand ecological principles underpinning management of resources, populations, communities, and ecosystems.
4. Use data collection and analysis tools (such as field methods, GIS, modeling, and statistics) to develop plans for managing resource/environmental challenges and adapt plans in response to rapid change.
5. Understand the policies governing resources and the environment and identify social dimensions (stakeholders, interests, trade-offs, synergies, ethical principles) to consider in the development of management plans.
6. Communicate effectively with colleagues, stakeholders, and the public about environmental and resource management issues.
7. Recognize how diverse groups understand the environment, experience positive and negative environmental impacts, and perceive just and equitable solutions.

Describe how, when, and where these learning outcomes will be assessed.

Describe here:

Identify faculty expectations for students' achievement of each of the stated student learning outcomes. What score, rating, or level of expertise will signify that students have met each outcome? Provide rating rubrics as necessary.

Explain the process that will be implemented to ensure that assessment results are used to improve student learning.

Program Description and Requirements
Attach Documents

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/PublicAdminRules2017.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.

An undergraduate minor should consist of at least 16 - and no more than 21 hours - of course work, with at least 6 hours of 300- or 400- level courses. Except for clearly remedial offerings, prerequisite courses within the sponsoring unit count towards the total; prerequisite courses outside the sponsoring unit do not count toward this total. The unit sponsoring the minor and that unit's college may set educationally necessary prerequisites for eligibility for the minor within these constraints. Does this proposal meet these criteria?

Yes

Revised programs NRES_NRC_Minor_curriculum_revision_proposal_2023.docx
Attach a revised Sample Sequence (for undergraduate program)
or college-level forms.

Catalog Page Text - Overview Tab

Description of program for 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.

No changes

Statement for Programs of Study Catalog

Course List

Code	Title	Hours
Required Courses for a Minor in Natural Resource Conservation		
NRES 102	Introduction to NRES	3
or NRES 100	Fundamentals of Env Sci	
NRES 287	Environment and Society	3
or NRES 219	Applied Ecology	
General Electives		
Minimum of 12 credit hours, at least 6 of which much be 400-level, selected from:		12
NRES 108	Env Sc & Nat Resource Careers	
NRES 201	Introductory Soils	
ACE/NRES 210	Environmental Economics	
NRES 219	Applied Ecology	
or NRES 287	Environment and Society	

Code	Title	Hours
ACE/NRES 310	Natural Resource Economics	
NRES 302	Dendrology	
NRES 325	Natural Resource Policy Mgmt	
NRES 340	Environ Social Sci Res Meth	
NRES 348	Fish and Wildlife Ecology	
NRES 351	Introduction to Environmental Chemistry	
NRES 362	Ecology of Invasive Species	
NRES 402	Ecohydrology and Water Management	
NRES 407	Wildlife Population Ecology	
NRES 409	Fishery Ecol and Conservation	
NRES 415	Native Plant ID and Floristics	
NRES 418	Wetland Ecology & Management	
NRES 419	Env and Plant Ecosystems	
NRES 420	Restoration Ecology	
NRES 421	Quantitative Methods in NRES	
NRES 423	Politics of International Conservation and Development	
NRES 424	US Environ, Justic & Policy	
NRES 427	Modeling Natural Resources	
NRES 428	Valuing Nature	
NRES 429	Aquatic Ecosystem Conservation	
NRES 438	Soil Nutrient Cycling	
NRES 439	Env and Sustainable Dev	
NRES 454	GIS in Natural Resource Mgmt	
NRES 455	Adv GIS for Nat Res Planning	
NRES 465	Landscape Ecology	
NRES 471	Pedology	
NRES 472	Environmental Psychology	
NRES 474	Soil and Water Conservation	
NRES 475	Environmental Microbiology	
NRES 480	Human-Wildlife Interactions	
NRES 482	Aquatic Biogeochemistry	
NRES 485	Stream Ecosystem Management	
NRES 487	Soil Chemistry	
NRES 488	Soil Fertility and Fertilizers	
Total Hours		18

Program Features

Academic Level Undergraduate

Is this minor?

A Comprehensive study in a single discipline

Is This a Teacher Certification Program?

No

Will specialized accreditation be sought for this program?

No

Other than certification via the students' degree audits, is there any additional planned mechanism to award/honor successful completion of the minor?

No

Delivery Method

This program is available:

On Campus - Students are required to be on campus, they may take some online courses.

Enrollment

Will the department limit enrollment to the minor?

No

Describe how the department will monitor the admission to/enrollment in the minor.

Students complete the Statement of Intent to Pursue a Campus-Approved Minor form as well as an NRES Department form declaring their intent to pursue the minor. Once the forms are complete, students meet with the NRES Academic Advising Coordinator for review/discussion and to obtain signatures on the forms.

Are there any prerequisites for the proposed minor?

No

Describe how this revision or phase down/elimination will impact enrollment and degrees awarded. If this is an elimination/phase down proposal include the plans for the students left in the program.

We do not anticipate this revision will impact enrollment and degrees awarded.

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?

These changes only impact courses currently offered, so we do not anticipate any financial costs to this revision.

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

No

Attach letters of support

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.

Library collections, resources and services are sufficient to support the undergraduate Natural Resource Conservation Minor.

EP Documentation

EP Control Number: EP.23.034

Attach Rollback/Approval Notices

This proposal requires HLC inquiry: No

DMI Documentation

Attach Final Approval Notices

Banner/Codebook Name: Natural Resource Conservation

Program Code: 5294

Minor Code	Conc Code	Degree Code	Major Code
5294			

Senate Approval Date

Senate Conference Approval Date

BOT Approval

Date	
IBHE Approval Date	
HLC Approval Date	
DOE Approval Date	
Effective Date:	
Attached Document Justification for this request	
Program Reviewer Comments	**Brooke Newell (bsnewell) (01/04/23 3:37 pm):** Rollback: Email sent to Susan, James Miller, and Brianna Gregg. **Chris Prom (prom) (01/19/23 2:16 pm):** Rollback: The Library resources states that there will be no anticipated impact on Library collections, services or resources. While this is a minor change, I would prefer an affirmation that current Library collections, resources, and services will meet the needs of the new courses, or if additions are needed assurance that the appropriate library disciplinary expert, Mike Dickinson, has been consulted. **Chris Prom (prom) (01/23/23 10:20 am):** Rollback: The Library resources states that there will be no anticipated impact on Library collections, services or resources. While this is a minor change, I would prefer an affirmation that current Library collections, resources, and services will meet the needs of the new courses, or if additions are needed assurance that the appropriate library disciplinary expert, Mike Dickinson, has been consulted.

Proposed Curriculum Revision

The following table shows the proposed revisions to the curriculum course tables for the Natural Resources and Environmental Sciences **Natural Resource Conservation Minor**. Where appropriate, changes are highlighted with color to indicate courses that will be added (blue) to the curriculum.

Current Requirements			***Revised Requirements***	
	hours			hours
NATURAL RESOURCE CONSERVATION MINOR	**18**		**NATURAL RESOURCE CONSERVATION MINOR**	**18**
Required Courses			***Required Courses***	
NRES 102 Introduction to NRES or NRES 100 Fundamentals of Env Sci	3		NRES 102 Introduction to NRES or NRES 100 Fundamentals of Env Sci	3
NRES 287 Environment and Society or NRES 219 Applied Ecology	3		NRES 287 Environment and Society or NRES 219 Applied Ecology	3
General Electives			***General Electives***	
Minimum of 12 credit hours, at least 6 of which must be 400-level, selected from:	12		Minimum of 12 credit hours, at least 6 of which must be 400-level, selected from:	12
NRES 108 Env Sc & Nat Resource Careers	1		NRES 108 Env Sc & Nat Resource Careers	1
NRES 201 Introductory Soils	4		NRES 201 Introductory Soils	4
ACE/NRES 210 Environmental Economics	3		ACE/NRES 210 Environmental Economics	3
NRES 219 Applied Ecology or NRES 287 Environment and Society	3		NRES 219 Applied Ecology or NRES 287 Environment and Society	3
ACE/NRES 310 Natural Resource Economics	3		ACE/NRES 310 Natural Resource Economics	3
NRES 302 Dendrology	4		NRES 302 Dendrology	4
NRES 325 Natural Resource Policy Mgmt	3		NRES 325 Natural Resource Policy Mgmt	3
NRES 340 Communication in Env. & Soc. Movements	3		NRES 340 Communication in Env. & Soc. Movements	3
NRES 348 Fish and Wildlife Ecology	3		NRES 348 Fish and Wildlife Ecology	3
NRES 351 Introduction to Environmental Chemistry	3		NRES 351 Introduction to Environmental Chemistry	3
NRES 362 Ecology of Invasive Species	3		NRES 362 Ecology of Invasive Species	3
NRES 402 Ecohydrology and Water Management	3		NRES 402 Ecohydrology and Water Management	3

	NRES 407 Wildlife Population Ecology	4			NRES 407 Wildlife Population Ecology	4
	NRES 409 Fishery Ecol and Conservation	4			NRES 409 Fishery Ecol and Conservation	4
	NRES 415 Native Plant ID and Floristics	4			NRES 415 Native Plant ID and Floristics	4
	NRES 418 Wetland Ecology & Management	3			NRES 418 Wetland Ecology & Management	3
	NRES 419 Env and Plant Ecosystems	3			NRES 419 Env and Plant Ecosystems	3
	NRES 420 Restoration Ecology	4			NRES 420 Restoration Ecology	4
	NRES 421 Quantitative Methods in NRES	3			NRES 421 Quantitative Methods in NRES	3
	NRES 423 Politics of Conservation and Development	3			NRES 423 Politics of Conservation and Development	3
	NRES 424 US Environ Justice & Policy	4			NRES 424 US Environ Justice & Policy	4
	NRES 427 Modeling Natural Resources	4			NRES 427 Modeling Natural Resources	4
	NRES 428 Valuing Nature	3			NRES 428 Valuing Nature	3
	NRES 429 Aquatic Ecosystem Conservation	3			NRES 429 Aquatic Ecosystem Conservation	3
	NRES 438 Soil Nutrient Cycling	3			NRES 438 Soil Nutrient Cycling	3
	NRES 439 Env and Sustainable Dev	3			NRES 439 Env and Sustainable Dev	3
	NRES 454 GIS in Natural Resource Mgmt	4			NRES 454 GIS in Natural Resource Mgmt	4
	NRES 455 Adv GIS for Nat Res Planning	3			NRES 455 Adv GIS for Nat Res Planning	3
	NRES 465 Landscape Ecology	3			NRES 465 Landscape Ecology	3
	NRES 471 Pedology	3			NRES 471 Pedology	3
	NRES 472 Environmental Psychology	4			NRES 472 Environmental Psychology	4
	NRES 474 Soil and Water Conservation	3			NRES 474 Soil and Water Conservation	3
	NRES 475 Environmental Microbiology	3			NRES 475 Environmental Microbiology	3
					NRES 480 Human-Wildlife Interactions	3
					NRES 482 Aquatic Biogeochemistry	3

	NRES 485 Stream Ecosystem Management	4			NRES 485 Stream Ecosystem Management	4
	NRES 487 Soil Chemistry	3			NRES 487 Soil Chemistry	3
	NRES 488 Soil Fertility and Fertilizers	3			NRES 488 Soil Fertility and Fertilizers	3

Date Submitted: 01/10/23 10:19 am

Viewing: 6008 : Wildlife and Fisheries Conservation Minor, UG

Last approved: 06/18/21 2:04 pm

Last edit: 01/27/23 12:38 pm

Changes proposed by: Susan Helmink

Catalog Pages Using this Program	Wildlife & Fisheries Conservation Minor

Proposal Type:

In Workflow

1. **U Program Review**
2. **1875 Committee Chair**
3. **1875 Head**
4. **KL Committee Chair**
5. **KL Dean**
6. **University Librarian**
7. **Provost**
8. **Senate EPC**
9. Senate
10. U Senate Conf
11. Board of Trustees
12. IBHE
13. HLC
14. DMI

Approval Path

1. 01/11/23 2:18 pm Deb Forgacs (dforgacs): Approved for U Program Review
2. 01/12/23 6:16 am James Miller (jrmillr): Approved for 1875 Committee Chair
3. 01/16/23 8:42 am Robert Schooley (schooley): Approved for 1875 Head
4. 01/17/23 9:17 am Brianna Gregg (bjgray2): Approved for KL Committee Chair
5. 01/17/23 9:47 am Anna Ball (aball):

Approved for KL Dean

6. 01/19/23 2:18 pm Chris Prom (prom): Rollback to KL Dean for University Librarian
7. 01/20/23 3:58 pm Anna Ball (aball): Approved for KL Dean
8. 01/20/23 5:00 pm Chris Prom (prom): Approved for University Librarian
9. 01/23/23 9:16 am Brooke Newell (bsnewell): Rollback to University Librarian for Provost
10. 01/23/23 10:20 am Chris Prom (prom): Rollback to KL Committee Chair for University Librarian
11. 01/23/23 10:25 am Brianna Gregg (bjgray2): Approved for KL Committee Chair
12. 01/23/23 10:52 am Anna Ball (aball): Approved for KL Dean
13. 01/23/23 10:56 am Chris Prom (prom): Approved for University

Librarian
14. 01/27/23 10:24 am
Brooke Newell (bsnewell): Approved for Provost

History

1. Jun 18, 2021 by James Miller (jrmillr)

Minor (ex. European Union Studies)

This proposal is for a:
Revision

Administration Details

Official Program Name	Wildlife and Fisheries Conservation Minor, UG
Diploma Title	
Sponsor College	Agr, Consumer, & Env Sciences
Sponsor Department	Natural Res & Env Science
Sponsor Name	James Miller
Sponsor Email	jrmillr@illinois.edu
College Contact	Anna Dilger ~~Anthony Yannarell~~
College Contact Email	adilger2@illinois.edu ~~acyann@illinois.edu~~
College Budget Officer	
College Budget Officer Email	

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

Does this program have inter-departmental administration?
No

Proposal Title

Effective Catalog Term: Fall 2023

Proposal Title (either Establish/Revise/Eliminate the Degree Name in Program Name in the College of XXXX, i.e., Establish the Bachelor of Science in Entomology in the College of Liberals Art and Sciences, include the Graduate College for Grad Programs)

Revise the Undergraduate Minor in Wildlife and Fisheries Conservation in the College of Agricultural, Consumer and Environmental Sciences

Does this proposal have any related proposals that will also be revised during the next 6 weeks? Consider Majors, Minors, Concentrations & Joint Programs in your department. Please know that this information is used administratively to move related proposals through workflow efficiently. Example: If you are revising the BS proposal and one related concentration within the next 6 weeks, "This BS proposal (key 567) is related to the Concentration A proposal (key 145)."

Program Justification

Provide a brief description of what changes are being made to the program.

We propose to 1) add one new course, NRES 480 - Human-Wildlife Interactions, to a cluster of courses from which students may choose and 2) to remove a duplicate course, IB 464 - Herpetology.

Did the program content change 25% or more in relation to the total credit hours, since the 2020-2021 catalog. (http://catalog.illinois.edu/archivedacademiccatalogs/2020-2021/)

No

Why are these changes necessary?

The Wildlife & Fisheries Conservation Minor focuses on the management and conservation of undomesticated animals. A new faculty member created a new course that was recently assigned a permanent course number. NRES 480 - Human-Wildlife Interactions aims to enhance students' capacity as educators, resource managers, and conservationists to overcome negative perceptions of wildlife and to improve outcomes during human-wildlife interactions. Students discuss the pros and cons of various measures taken to reduce conflicts and think critically about the ways that attitudes, economics, geography, policies, and culture affect our relationships with wildlife globally.

Herpetology was mistakenly included twice as IB 464 and IB 464/NRES 461.

Instructional Resources

Will there be any reduction in other course offerings, programs or concentrations by your department as a result of this new program/proposed change?

No

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

No

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

No

Program Regulation and Assessment

Plan to Assess and Improve Student Learning

Illinois Administrative Code: 1050.30(b)(1)(D) Provision is made for guidance and counseling of students, evaluations of student performance, continuous monitoring of progress of students toward their degree objectives and appropriate academic record keeping.

List the program's student learning outcomes. Each outcome should identify what students are expected to know and/or be able to do upon completing this program.

All courses in the minor have been selected because they specifically address the learning objectives of the proposed minor. We therefore intend to use student performance in these courses as benchmarks to ensure that students have achieved these educational goals. All courses in NRES regularly undergo peer-review assessments, and we will continue this practice for all courses in the minor.

The Wildlife & Fisheries Conservation Minor provides students in biology-centered fields instruction related to the management and conservation of undomesticated animals. Courses in the minor are also part of the NRES major and each course addresses one or more of the following NRES major learning outcomes.

1. Understand the scientific method/ways of knowing and critically evaluate information.
2. Integrate principles of biological, chemical, physical, and social sciences and apply them to resource and environmental issues using a systems approach.
3. Understand ecological principles underpinning management of resources, populations, communities, and ecosystems.
4. Use data collection and analysis tools (such as field methods, GIS, modeling, and statistics) to develop plans for managing resource/environmental challenges and adapt plans in response to rapid change.
5. Understand the policies governing resources and the environment and identify social dimensions (stakeholders, interests, trade-offs, synergies, ethical principles) to consider in the development of management plans.
6. Communicate effectively with colleagues, stakeholders, and the public about environmental and resource management issues.
7. Recognize how diverse groups understand the environment, experience positive and negative environmental impacts, and perceive just and equitable solutions.

Describe how, when, and where these learning outcomes will be assessed.

Describe here:

Identify faculty expectations for students' achievement of each of the stated student learning outcomes. What score, rating, or level of expertise will signify that students have met each outcome? Provide rating rubrics as necessary.

Explain the process that will be implemented to ensure that assessment results are used to improve student learning.

Program Description and Requirements
Attach Documents

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/PublicAdminRules2017.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.

An undergraduate minor should consist of at least 16 - and no more than 21 hours - of course work, with at least 6 hours of 300- or 400- level courses. Except for clearly remedial offerings, prerequisite courses within the sponsoring unit count towards the total; prerequisite courses outside the sponsoring unit do not count toward this total. The unit sponsoring the minor and that unit's college may set educationally necessary prerequisites for eligibility for the minor within these constraints. Does this proposal meet these criteria?

Yes

Revised programs NRES_WFC_Minor_curriculum_revision_proposal_2023.docx
Attach a revised Sample Sequence (for undergraduate program) or college-level forms.

Catalog Page Text - Overview Tab

Description of program for 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 Wildlife and Fisheries Conservation minor is ideal for students in biology-centered fields who seek additional instruction related to the management and conservation of undomesticated fish and animals. This minor is not available to NRES majors, but it is open to students in all other majors. The minor requires the completion of an additional 17-19 hours of coursework selected from the following list.

Statement for Programs of Study Catalog

Course List

Code	Title	Hours
Required Courses for a Minor in Wildlife & Fisheries		
NRES 219	Applied Ecology	3
or IB 203	Ecology	

Code	Title	Hours
NRES 348	Fish and Wildlife Ecology	3
Pick one:		
NRES 407	Wildlife Population Ecology	
NRES 409	Fishery Ecol and Conservation	
Pick one:		
NRES 465	Landscape Ecology	
NRES 420	Restoration Ecology	
NRES 429	Aquatic Ecosystem Conservation	
NRES 480	Human-Wildlife Interactions	
NRES 485	Stream Ecosystem Management	
Pick one:		
NRES 302	Dendrology	
NRES 415	Native Plant ID and Floristics	
IB 335	Plant Systematics	
IB 462/NRES 442	Mammalogy	
IB 464/NRES 461	Herpetology	
~~IB 464~~	~~Herpetology~~	
IB/NRES 463	Ichthyology	
Total Hours		17

Program Features

Academic Level Undergraduate

Is this minor?
A Comprehensive study in a single discipline

Is This a Teacher Certification Program?
No

Will specialized accreditation be sought for this program?

No

Other than certification via the students' degree audits, is there any additional planned mechanism to award/honor successful completion of the minor?
No

Delivery Method

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

Enrollment

Will the department limit enrollment to the minor?

No

Describe how the department will monitor the admission to/enrollment in the minor.

Students will be able to declare this minor as outlined by the University of Illinois Office of the Provost (https://provost.illinois.edu/education/advising-resources/pursuing-undergraduate-minor/how-to-declare-a-minor/). Students will need to complete both a "Statement of Intent to Pursue a Campus-Approved Minor" form and an "NRES minor application form," both of which are available online (they can be accessed through the NRES website: https://nres.illinois.edu/undergraduate/minors). The NRES Student Services staff will monitor enrollment in the minor.

Are there any prerequisites for the proposed minor?

No

Describe how this revision or phase down/elimination will impact enrollment and degrees awarded. If this is an elimination/phase down proposal include the plans for the students left in the program.

We do not anticipate this revision will impact enrollment and degrees awarded.

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

All courses in the minor are already regularly offered on campus. Anticipated enrollment of 15 students will not necessitate additional staffing for advising or instruction.

Advising: given that NRES majors are not eligible for this minor, all of the students taking the proposed minor will come from other campus units, and they will have access to the advising resources of their home units. The requirements to complete the proposed minor are relatively straightforward, and we do not expect the program to impose additional strain on advisors in other units. However, the NRES Visiting Academic Advising Coordinator and the six NRES faculty members with expertise in Applied Animal Ecology and Conservation can assist with advising students in the minor as necessary.

All NRES courses in the proposed minor have capacity to support any increased enrollment due to the minor. There are some non-NRES courses in the proposed minor (IB 203, IB 461, IB 462, IB 463, IB 464), and several of the courses in the proposed minor have pre-requisite courses that are taught in the School of Integrative Biology and the Department of Molecular and Cellular Biology. These specific courses are: MCB 150 (for students electing to take IB 203); IB 150 (for students electing to take IB

203); IB 202 (prerequisite for IB 462); IB 302 (prerequisite for IB 463/4640; IB 204 (prerequisite for IB 302). However, given that we expect that at least half of the students enrolled in the proposed minor will be IB majors who already need these classes to fulfill their major requirements, we do not anticipate that the new minor will result in a large increase in enrollment for these classes. We expect that enrollment for these classes will increase by approximately 4-8 students as a result of the proposed minor. These numbers assume that 1) only non-SIB students would contribute to an increase in class size and 2) only some of the students in the minor will take any given course at any given time, as they have several elective options to choose from. We do not anticipate that 4-8 additional students will place an undue burden on instructors teaching these courses.

Attach File(s)

Financial Resources

How does the unit intend to financially support this proposal?

The proposed minor should not necessitate the hiring of additional staff or the acquisition of additional technologies, classroom space, or other resources. It utilizes existing courses that are regularly taught on campus and that have sufficient capacity to accommodate enough students to meet our anticipated enrollment goals (15 students). Thus, the proposed minor should not require any additional financial support beyond "business as usual."

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

No

Attach letters of support

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.

Library collections, resources and services are sufficient to support the undergraduate Wildlife and Fisheries Conservation minor.

EP Documentation

EP Control Number	EP.23.034
Attach Rollback/Approval Notices	
This proposal requires HLC inquiry	No

DMI Documentation

Attach Final Approval Notices	
Banner/Codebook Name	Wildlife and Fisheries Conservation
Program Code:	6008

Minor Code	Conc Code	Degree Code	Major Code
6008			

Senate Approval Date	
Senate Conference Approval Date	
BOT Approval Date	
IBHE Approval Date	
HLC Approval Date	
DOE Approval Date	
Effective Date:	
Attached Document Justification for this request	

Program Reviewer Comments

Brooke Newell (bsnewell) (01/04/23 3:39 pm): Rollback: Email sent to Susan H, James Miller, and Brianna Gregg

Chris Prom (prom) (01/19/23 2:18 pm): Rollback: Library resources states that there will be no anticipated impact on Library collections, services or resources. While this is a minor change, I would prefer an affirmation that current Library collections, resources, and services will meet the needs of the new courses, or if additions are needed, assurance that the appropriate library disciplinary expert, Mike Dickinson, has been consulted.

Brooke Newell (bsnewell) (01/23/23 9:16 am): Rollback: Per request

Chris Prom (prom) (01/23/23 10:20 am): Rollback: The Library resources states that there will be no anticipated impact on Library collections, services or resources. While this is a minor change, I would prefer an affirmation that current Library collections, resources, and services will meet the needs of the new courses, or if additions are needed assurance that the appropriate library disciplinary expert, Mike

Dickinson, has been consulted.

Key: 930

Proposed Curriculum Revision

The following table shows the proposed revisions to the curriculum course tables for the Natural Resources and Environmental Sciences **Wildlife and Fisheries Conservation Minor**. Where appropriate, changes are highlighted with color to indicate courses that will be added (blue) to and removed (orange) from the curriculum.

Current Requirements			***Revised Requirements***	
	hours			hours
WILDLIFE AND FISHERIES CONSERVATION MINOR	**17**		**WILDLIFE AND FISHERIES CONSERVATION MINOR**	**17**
Pick one:			***Pick one:***	
NRES 219 Applied Ecology	3		NRES 219 Applied Ecology	3
IB 203 Ecology	4		IB 203 Ecology	4
Required			***Required***	
NRES 348 Fish and Wildlife Ecology	3		NRES 348 Fish and Wildlife Ecology	3
Pick one:			***Pick one:***	
NRES 407 Wildlife Population Ecology	4		NRES 407 Wildlife Population Ecology	4
NRES 409 Fishery Ecol and Conservation	4		NRES 409 Fishery Ecol and Conservation	4
Pick one:			***Pick one:***	
NRES 465 Landscape Ecology	3		NRES 465 Landscape Ecology	3
NRES 420 Restoration Ecology	4		NRES 420 Restoration Ecology	4
NRES 429 Aquatic Ecosystem Conservation	3		NRES 429 Aquatic Ecosystem Conservation	3
			NRES 480 Human-Wildlife Interactions	3
NRES 485 Stream Ecosystem Management	4		NRES 485 Stream Ecosystem Management	4
Pick one:			***Pick one:***	
NRES 302 Dendrology	4		NRES 302 Dendrology	4
NRES 415 Native Plant ID and Floristics	4		NRES 415 Native Plant ID and Floristics	4
IB 335 Plant Systematics	4		IB 335 Plant Systematics	4
IB 462/NRES 442 Mammalogy	4		IB 462/NRES 442 Mammalogy	4
IB 464/NRES 461 Herpetology	4		IB 464/NRES 461 Herpetology	4
IB 464 Herpetology	4			
IB/NRES 463 Ichthyology	4		IB/NRES 463 Ichthyology	4