APPROVED BY SENATE
02/10/2020

Date Submitted: 01/10/20 8:14 am

Viewing: 10KP0121BS : Engineering Physics, BS

Last approved: 08/12/19 8:34 am

Last edit: 01/22/20 3:04 pm

Changes proposed by: Brooke Newell

Catalog Pages Using this Program	Engineering Physics, BS

In Workflow

1. **U Program Review**
2. **1244 Head**
3. **KP Committee Chair**
4. **KP Dean**
5. **University Librarian**
6. **COTE Programs**
7. **Provost**
8. **Senate EPC**
9. Senate
10. U Senate Conf
11. Board of Trustees
12. IBHE
13. DMI

Approval Path

1. 01/10/20 9:12 am Deb Forgacs (dforgacs): Approved for U Program Review
2. 01/10/20 9:50 am Matthias Perdekamp (mgp): Approved for 1244 Head
3. 01/10/20 10:10 am Michael Hirschi (mch): Approved for KP Committee Chair
4. 01/10/20 10:23 am Candy Deaville (candyd): Approved for KP Dean

5. 01/10/20 11:49 am
   John Wilkin (jpwilkin): Approved for University Librarian
6. 01/10/20 1:54 pm
   Brenda Clevenger (bmclvngr): Approved for COTE Programs
7. 01/13/20 11:31 am
   Kathy Martensen (kmartens): Rollback to KP Committee Chair for Provost
8. 01/13/20 11:56 am
   Michael Hirschi (mch): Approved for KP Committee Chair
9. 01/13/20 12:36 pm
   Candy Deaville (candyd): Approved for KP Dean
10. 01/13/20 12:39 pm
    John Wilkin (jpwilkin): Rollback to KP Dean for University Librarian
11. 01/13/20 1:25 pm
    Candy Deaville (candyd): Approved for KP Dean
12. 01/13/20 3:07 pm
    John Wilkin

(jpwilkin): Approved for University Librarian
13. 01/13/20 3:49 pm Brenda Clevenger (bmclvngr): Approved for COTE Programs
14. 01/22/20 11:17 am Kathy Martensen (kmartens): Approved for Provost

History

1. Jan 17, 2019 by Deb Forgacs (dforgacs)
2. Apr 4, 2019 by Deb Forgacs (dforgacs)
3. Apr 6, 2019 by Deb Forgacs (dforgacs)
4. Apr 11, 2019 by Deb Forgacs (dforgacs)
5. Apr 23, 2019 by Deb Forgacs (dforgacs)
6. Aug 12, 2019 by Deb Forgacs (dforgacs)

Proposal Type

Proposal Type:
Major (ex. Special Education)

This proposal is for a:
Revision

Proposal Title:

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

Revising text and tables ~~degree audit UG Course Lists~~

EP Control Number	**EP.20.100_original**
Official Program Name	Engineering Physics, BS
Effective Catalog Term	Fall 2020
Sponsor College	Grainger College of Engineering
Sponsor Department	Physics
Sponsor Name	
Sponsor Email	
College Contact	College Contact Email

Program Description and Justification

Justification for proposal change:

Updates for Academic Catalog 2020-21

Corresponding Degree	**BS Bachelor of Science**

Is this program interdisciplinary?

No

Academic Level	Undergraduate
Will you admit to the concentration directly?	
Is a concentration required for graduation?	
CIP Code	141201 - Engineering Physics/Applied Physics.

Is This a Teacher Certification Program?

Yes

Will specialized accreditation be sought for this program?

No

Admission Requirements

Desired
Admissions Term

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

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

Enrollment

Describe how this revision will impact enrollment and degrees awarded.

None.

Estimated Annual Number of Degrees Awarded

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

What is the matriculation term for this program?
Fall

Delivery Method

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

This program is available:
On Campus

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)

Resource Implications

Facilities

Will the program require new or additional facilities or significant improvements to already existing facilities?
No

Technology

Will the program need additional technology beyond what is currently available for the unit?
No

Non-Technical Resources

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

No

Resources

Faculty Resources

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

None.

Library Resources

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

None.

Instructional Resources

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

No

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

No

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

No

Financial Resources

How does the unit intend to financially support this proposal?

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

No

Attach letters of support

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

Yes

Program Regulation and Assessment

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

Is the career/profession for graduates of this program regulated by the State of Illinois?

No

Program of Study

"Baccalaureate degree requires at least 120 semester credit hours or 180 quarter credit hours and at least 40 semester credit hours (60 quarter credit hours) in upper division courses" (source: https://www.ibhe.org/assets/files/PrivateAdminRules2017.pdf). For proposals for new bachelor's degrees, if this minimum is not explicitly met by specifically-required 300- and/or 400-level courses, please provide information on how the upper-division hours requirement will be satisfied.

All proposals must attach the new or revised version of the Academic Catalog program of study entry. Contact your college office if you have questions.

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

Catalog Page Text

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

Statement for Programs of Study Catalog

Graduation Requirements

Minimum Technical GPA: 2.0

TGPA is required for Math and Physics courses. See Technical GPA to clarify requirements.

Minimum Overall GPA: 2.0

Minimum hours required for graduation: 128 hours

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

~~**Overview of Curricular Requirements The curriculum requires 128 hours for graduation and is organized as shownbelow. Orientation and Professional Development These courses introduce the opportunities and resources your college, department, and curriculum can offer you as you work to achieve your careergoals.They also provide the skills to work effectively and successfully in the**~~

~~engineeringprofession.Foundational Mathematics and Science These courses stress the basic mathematical and scientific principles upon which the engineering discipline isbased.Engineering Physics Technical Core These courses stress fundamental concepts and basic laboratory techniques that comprise the common intellectual understanding of engineeringphysics.~~**Orientation and Professional Development**

Course List

Code	Title	Hours
ENG 100	Engineering Orientation 1	0
PHYS 110	Physics Careers 1	0
Total Hours		0

Foundational Mathematics and Science

Course List

Code	Title	Hours
MATH 221	Calculus I 2	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 285	Intro Differential Equations 3	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 213	Univ Physics: Thermal Physics	2
PHYS 214	Univ Physics: Quantum Physics	2
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CS 101	Intro Computing: Engrg & Sci	3
Total Hours		33

Engineering Physics Technical ~~Flexible Physics~~ Core

Course List

Code	Title	Hours
PHYS 225	Relativity & Math Applications	2
PHYS 325	Classical Mechanics I	3
PHYS 435	Electromagnetic Fields I	3
PHYS 486	Quantum Physics I 4	4
or PHYS 485	Atomic Phys & Quantum Theory	
Total Hours		12

Flexible Physics Core Electives

Course List

Code	Title	Hours
Flexible physics core electives. Choose three courses from a departmentally approved list below, with at least one being a lab course (PHYS 401, PHYS 402, PHYS 403, PHYS 404, or PHYS 406). The number of hours varies depending upon the courses chosen.		9-15

Code	Title	Hours
PHYS 326	Classical Mechanics II	3
PHYS 401	Classical Physics Lab	3
PHYS 402	Light	3 or 4
PHYS 403	Modern Experimental Physics	4 or 5
PHYS 404	Electronic Circuits	4 or 5
PHYS 406	Acoustical Physics of Music	4
PHYS 427	Thermal & Statistical Physics	4
PHYS 436	Electromagnetic Fields II	3
PHYS 460	Condensed Matter Physics	4
PHYS 470	Subatomic Physics	4
PHYS 475	Introduction to Biophysics	3 or 4
PHYS 487	Quantum Physics II	4

Mathematics Elective

Course List

Code	Title	Hours
Mathematics elective, chosen from a departmentally approved list below:		3
CS 357	Numerical Methods I	3
CS 450	Numerical Analysis	3 or 4
MATH 415	Applied Linear Algebra	3 or 4
MATH 417	Intro to Abstract Algebra	3 or 4
MATH 453	Elementary Theory of Numbers	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 482	Linear Programming	3 or 4
MATH 347	Fundamental Mathematics	3
MATH 348	Fundamental Mathematics-ACP	4
MATH 424	Honors Real Analysis	3
MATH 441	Differential Equations	3 or 4
MATH 442	Intro Partial Diff Equations	3 or 4
MATH 444	Elementary Real Analysis	3 or 4
MATH 446	Applied Complex Variables	3 or 4
MATH 447	Real Variables	3 or 4
MATH 484	Nonlinear Programming	3 or 4
MATH 489	Dynamics & Differential Eqns	3 or 4
MATH 402	Non Euclidean Geometry	3 or 4
MATH 403	Euclidean Geometry	3 or 4
MATH 423	Differential Geometry	3 or 4
MATH 432	Set Theory and Topology	3 or 4
MATH 481	Vector and Tensor Analysis	3 or 4
MATH 461	Probability Theory	3 or 4

Code	Title	Hours
MATH 463	Statistics and Probability I	4
MATH 450	Numerical Analysis	3 or 4

Technical/Professional Option Electives

Course List

Code	Title	Hours
Technical/professional option electives for the option selected, chosen from a departmentally approved list of Technical/Professional Option Electives (or a list designed for a departmentally approved custom option) below. The number of hours varies depending upon the option chosen.		12-22

~~Acoustical Physics~~

Acoustical Physics

ECE 210	Analog Signal Processing	4
ECE 473	Fund of Engrg Acoustics	3 or 4
Choose 2 classes from the following:		
ECE 310	Digital Signal Processing	3
ECE 417	Multimedia Signal Processing	4
ECE 473	Fund of Engrg Acoustics	3
ECE 402	Electronic Music Synthesis	3
PHYS 402	Light	3 or 4

~~Astrophysics~~

Astrophysics

ASTR 210	Introduction to Astrophysics	3
ASTR 350	The Big Bang, Black Holes, and the End of the Universe (OR ASTR 406: Galaxies and the Universe)	3
ASTR 404	Stellar Astrophysics	3
ASTR 405	Planetary Systems	3
ASTR 414	Astronomical Techniques	4

~~Atmospheric Science~~

Atmospheric Science

ATMS 201	General Physical Meteorology	3
Choose 4 classes from the following:		
ATMS 301	Atmospheric Thermodynamics	3
ATMS 302	Atmospheric Dynamics I	3
ATMS 304	Radiative Transfer-Remote Sens	3
ATMS 305	Computing and Data Analysis	3
ATMS 306	Cloud Physics	3
ATMS 314	Mesoscale Dynamics	3
ATMS 405	Boundary Layer Processes	4

~~BioPhysics~~

BioPhysics

CHEM 104	General Chemistry II (OR CHEM 204)	3
CHEM 105	General Chemistry Lab II (OR CHEM 205)	1

Code	Title	Hours
CHEM 232	Elementary Organic Chemistry I (OR CHEM 236)	3 or 4
CHEM 233	Elementary Organic Chem Lab I	2
Choose 2 classes from the following:		
BIOP 401	Introduction to Biophysics	3
MCB 450	Introductory Biochemistry (OR MCB 354: Biochemistry and Physical Basis of Life)	3
PHYS 498	Special Topics in Physics (Quantiative Biology)	4

~~Business~~

Business

ENG 471	Seminar Energy & Sustain Engrg	1
IE 420	Financial Engineering	3 or 4

~~Computational Physics~~

SE 400	Engineering Law	3 or 4
TE 100	Introduction to Innovation, Leadership and Engineering Entrepreneurship	1
TE 360	Lectures in Engineering Entrepreneurship	1
TE 333	Creativity, Innovation, Vision	4
TE 461	Technology Entrepreneurship	3
TE 450	Startups: Inc, Fund, Contracts, IP	3
TE 466	High-Tech Venture Marketing	2

Computational Physics

CS 173	Discrete Structures (OR MATH 213: Basic Discrete Structures)	3
CS 225	Data Structures	4
Choose 3 classes from the following:		
CS 357	Numerical Methods I	3
CS 420	Parallel Progrmg: Sci & Engrg	3 or 4
CS 418	Interactive Computer Graphics	3 or 4
CS 450	Numerical Analysis	3 or 4
PHYS 298	Freshmen/Sophomore Special Topics in Physics (Computational Physics)	2
PHYS 498	Special Topics in Physics (Computation in Physics)	3

~~Electrical and Computer Engineering~~

Electrical and Computer Engineering

ECE 110	Introduction to Electronics (OR ECE 205: Electrical and Electronic Circuits)	1 to 3
ECE 120	Introduction to Computing	4
ECE 210	Analog Signal Processing	4
Take 1 class from the following:		
ECE 310	Digital Signal Processing	3
ECE 330	Power Ckts & Electromechanics	3
ECE 385	Digital Systems Laboratory	3

~~Energy/Sustainability~~

Code	Title	Hours
PHYS 404	Electronic Circuits (or ECE 342: Electronic Circuits)	4 or 5
Energy/Sustainability		
ATMS 201	General Physical Meteorology	3
ATMS 302	Atmospheric Dynamics I	3
ECE 205	Electrical and Electronic Circuits	3
ENG 471	Seminar Energy & Sustain Engrg	1
NRES 210	Environmental Economics	3
Choose 1 class from the following:		
ECE 333	Green Electric Energy	3
~~Materials Science~~		
NPRE 402	Nuclear Power Engineering	3 or 4
NPRE 412	Nuclear Power Econ & Fuel Mgmt	3 or 4
NPRE 470	Fuel Cells & Hydrogen Sources	3
NPRE 475	Wind Power Systems	3 or 4
Materials Science		
MSE 206	Mechanics for MatSE	4
MSE 280	Engineering Materials	3
MSE 401	Thermodynamics of Materials (OR PHYS 427: Thermal & Statistical Physics)	3
Choose 1 class from the following:		
MSE 304	Electronic Properties of Matls	3
MSE 402	Kinetic Processes in Materials	3
MSE 403	Synthesis of Materials	3
MSE 405	Microstructure Determination	3
MSE 406	Thermal-Mech Behavior of Matls	3
~~Nuclear Physics~~		
Nuclear Physics		
NPRE 402	Nuclear Power Engineering	3 or 4
PHYS 470	Subatomic Physics	4
Choose 2 classes from the following:		
NPRE 435	Radiological Imaging	3
NPRE 441	Radiation Protection	4
~~Optical Physics~~		
NPRE 446	Radiation Interact w/Matter I	3
Optical Physics		
ECE 455	Optical Electronics	3 or 4
ECE 460	Optical Imaging	4
ECE 465	Optical Communications Systems	3
Choose 1 class from the following:		

Code	Title	Hours
PHYS 402	Light	3 or 4
PHYS 404	Electronic Circuits	4 or 5
PHYS 436	Electromagnetic Fields II	3

~~Law~~

Law

CMN 211	Business Communication	3
JOUR 200	Introduction to Journalism	3
LAW 301	Introduction to Law	2 or 3

Choose 2 classes from the following:

ESE 320	Water Planet, Water Crisis	3

~~Professional Option~~

NPRE 480	Energy and Security	3
PS 225	Environmental Politics & Policy	3
PS 273	Environment and Society	3
SE 400	Engineering Law	3 or 4

Professional Option

MATH 415	Applied Linear Algebra	3 or 4
PHYS 326	Classical Mechanics II	3
PHYS 436	Electromagnetic Fields II	3
PHYS 427	Thermal & Statistical Physics	4
PHYS 487	Quantum Physics II	4

Choose 1 lab from the following (cannot count toward Flexible Physics Core):

PHYS 401	Classical Physics Lab	3
PHYS 402	Light	3 or 4
PHYS 403	Modern Experimental Physics	4 or 5
PHYS 404	Electronic Circuits	4 or 5

~~Solid State Electronics~~

Solid State Electronics

ECE 110	Introduction to Electronics	1 to 3
ECE 444	IC Device Theory & Fabrication	4
PHYS 404	Electronic Circuits	4 or 5
PHYS 460	Condensed Matter Physics	4

Electives

~~These courses complement the Engineering Physics Technical Core, extending the intellectual understanding of engineering physics.~~

Course List

Code	Title	Hours
Free Electives		
The Grainger College of Engineering Liberal Education course list, or additional courses from the campus General Education lists for Social and Behavrioal Sciences or Humanities and the Arts 5		**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. The number of hours varies depending upon the total hours earned in both the Flexible Physics Core and the Technical/Professional Option and whether or not MATH 415 and PHYS 486 are taken in place of PHYS 485. 6		13-37
Total Hours of Curriculum to Graduate		128

1

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

3*MATH 285 may be replaced by MATH 441 followed by MATH 442.*

4 *If PHYS 486 is chosen, take prerequisite MATH 415, which may be used to meet free elective requirements.If PHYS 485 is taken, an additional free elective hour or a surplus flexible physics core course hour offsets the one-hour credit differential.*

5 *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.*

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

~~Mathematics Elective Technical/Professional Option Electives Students may select from a list of pre-approved options or design a custom option, subject to departmental approval.The current pre-approved options, requiring 12-22 credit hours of course work, are:Acoustical Physics Astrophysics Atmospheric Science Biophysics Business Computational Physics Computer Engineering Energy/Sustainability Materials Science Nuclear Physics Optical Physics Law Professional Physics Solid State Electronics Pre-Med Pre-Law The course work is selected in consultation with the student's advisor to address an intellectually coherent body of knowledge.General Education Requirements~~

~~Course List~~

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

~~Course List~~

~~Code~~	~~Title~~	~~Hours~~
~~Completion of the third semester or equivalent of a non-primary language is required. Completion of three years of a single language in high school satisfies this requirement.~~		~~0-9~~
~~University Composition These courses teach fundamentals of expository writing.~~		

~~Course List~~

~~Code Title Hours~~
~~Choose one:~~
~~RHET 105 Writing and Research~~
~~CMN 111 Oral & Written Comm I~~
~~& CMN 112 and Oral & Written Comm II~~
~~ESL 111 Intro to Academic Writing I~~
~~& ESL 112 and Intro to Academic Writing II~~
~~ESL 115 Principles of Academic Writing~~
~~Advanced Composition (satisfied by completing a course with the Advanced Composition designation in either the social sciences and humanities or the free elective categories).~~
~~Free Electives~~

EP Documentation

Attach
Rollback/Approval
Notices

DMI Documentation

Attach Final
Approval Notices

Banner/Codebook Name
BS:Engineering Physics -UIUC

Program Code: 10KP0121BS

Minor Code	Conc Code	Degree Code	BS Major Code
0121			

Senate Approval Date

Senate Conference Approval Date

BOT Approval Date

IBHE Approval Date

Effective Date:

Attached Document

Justification for this request

Program Reviewer Comments

Deb Forgacs (dforgacs) (01/09/20 1:42 pm): Rollback: .
Kathy Martensen (kmartens) (01/13/20 11:31 am): Rollback: Email exchange.
John Wilkin (jpwilkin) (01/13/20 12:39 pm): Rollback: Please provide a statement regarding needs for library resources.

Key: 117

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