

Date Submitted: 11/13/20 1:57 pm

Viewing: **NANO-M : Nanotechnology Minor**

Last approved: 06/12/20 1:36 pm

Last edit: 12/14/20 5:11 pm

Changes proposed by: rickwise

Catalog Pages Using
this Program[Nanotechnology.\(NANO\)](#)Submitter: User ID: **rickwise kucza** Phone:
2875 7456

Program Status Active

Academic Level Undergraduate

Type of proposal Minor

Select a reason for this modification

Making Minor Changes to an Existing Degree (e.g. changing 15 or fewer hours,
changing admission/graduation requirements, adding/changing Focused Study or
Track)

Effective Catalog Year Fall 2021

College/School Code

**Graduate School and International Education (GRAD) Provost's Office
(PROV)**

Department Code

Materials Science and Engineering (MSEN) PROV

Program Code NANO-M

Degree Minor

CIP Code

In Workflow

1. PROV Dean Initial
2. Director of Program Assessment and Review
3. Registrar Initial
4. Institutional Research
5. PROV Chair
6. ENGR Dean
7. ARSC Dean
8. PROV Dean
9. Global Campus
10. Provost Review
11. University Course and Program Committee
12. Faculty Senate
13. Provost Final
14. Provost's Office-- Notification of Approval
15. Registrar Final
16. Catalog Editor Final

Approval Path

1. 12/03/20 8:52 am
Terry Martin
(tmartin): Approved for PROV Dean Initial
2. 12/09/20 1:49 pm
Alice Griffin
(agriffin): Approved for Director of Program

- Assessment and Review
3. 12/14/20 6:01 pm
Lisa Kulczak
(lkulcza): Approved for Registrar Initial
 4. 12/15/20 10:52 am
Gary Gunderman
(ggunderm): Approved for Institutional Research
 5. 12/15/20 11:48 am
Terry Martin
(tmartin): Approved for PROV Chair
 6. 12/17/20 1:38 pm
Norman Dennis
(ndennis): Approved for ENGR Dean
 7. 12/17/20 7:14 pm
Jeannie Hulen
(jhulen): Approved for ARSC Dean
 8. 01/04/21 10:29 am
Terry Martin
(tmartin): Approved for PROV Dean
 9. 01/04/21 11:30 am
Suzanne Kenner
(skenner): Approved for Global Campus
 10. 01/04/21 1:27 pm
Terry Martin
(tmartin): Approved for Provost Review
 11. 01/25/21 10:35 am
Alice Griffin
(agriffin): Approved for University

History

1. Jun 10, 2015 by
Charlie Alison
(calison)
2. Aug 18, 2015 by Lisa
Kulczak (lkulcza)
3. May 25, 2017 by
Lisa Kulczak (lkulcza)
4. May 26, 2020 by
Lisa Kulczak (lkulcza)
5. Jun 12, 2020 by Lisa
Kulczak (lkulcza)

14.1801 - Materials Engineering.

Program Title

Nanotechnology Minor

Program Delivery

Method

On Campus

Is this program interdisciplinary?

Yes ~~No~~

College(s)/School(s)

College/School Name
College of Engineering (ENGR)
Fulbright College of Arts and Sciences (ARSC)

Does this proposal impact any courses from another College/School?

No

What are the total
hours needed to
complete the
program? 15

Program Requirements and Description

Requirements

Requirements for the Nanotechnology Minor

Students wishing to participate in the Nanotechnology minor must declare participation formally. The students are required to meet with the faculty coordinator of an individual department who will help the student to develop a list of courses suitable for the minor and a schedule for taking those courses. Examples of model programs for each participating department are given below.

Students need to take a total of 15 credit hours, which includes 6 credit hours of required courses and 9 credit hours of elective courses and must earn a grade of "C" or better for all courses used to fulfill the requirements of the Nanotechnology minor.

Required Research Courses

Nanotechnology Laboratory

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<u>BENG 4753L</u>	Nanotechnology Laboratory
<u>BMEG 4103L</u>	Nanotechnology Laboratory
or <u>BMEG 4103M</u>	Honors Nanotechnology Laboratory
<u>CHEM 4153L</u>	Nanotechnology Laboratory
<u>MEEG 4323L</u>	Nanotechnology Laboratory
or <u>MEEG 4323M</u>	Honors Nanotechnology Laboratory
<u>PHYS 4793L</u>	Nanotechnology Laboratory
or <u>PHYS 4793M</u>	Honors Nanotechnology Laboratory

Nanotechnology Research (Independent Study or Honors Thesis in nanotechnology)

6

Students can choose from the following courses:

<u>BENG 450V</u>	Special Problems
<u>BENG 451VH</u>	Honors Thesis
<u>BMEG 450VH</u>	Honors Thesis
<u>BMEG 460V</u>	Individual Study
<u>BMEG 460VH</u>	Honors Individual Study
<u>CHEG 488V</u>	Special Problems
<u>CHEM 400V</u>	Chemistry Research
<u>CHEM 400VH</u>	Honors Chemistry Research
<u>ELEG 488V</u>	Special Problems
<u>ELEG 488VH</u>	Honors Special Problems
<u>MEEG 4903H</u>	Honors Mechanical Engineering Research
<u>MEEG 492V</u>	Individual Study in Mechanical Engineering
<u>MEEG 492VH</u>	Honors Individual Study in Mechanical Engineering
<u>PHYS 306V</u>	Projects
<u>PHYS 399VH</u>	Honors
<u>PHYS 498V</u>	Senior Thesis

Elective Courses

A minimum of 9 hours of elective courses selected from the following:

<u>BENG 3113</u>	Measurement and Control for Biological Systems
or <u>BENG 3113H</u>	Honors Measurement and Control for Biological Systems
<u>BENG 3733</u>	Transport Phenomena in Biological Systems
<u>BENG 4743</u>	Food and Bio-Product Systems Engineering
<u>BENG 4123</u>	Biosensors & Bioinstrumentation
<u>BENG 4743</u>	Food and Bio-Product Systems Engineering
<u>BMEG 3634</u>	Biomaterials
<u>BMEG 3824</u>	Biomolecular Engineering
<u>BMEG 4243</u>	Advanced Biomaterials and Biocompatibility
<u>BMEG 4873</u>	Bionanotechnology
<u>CHEG 3713</u>	Chemical Engineering Materials Technology
<u>CHEG 5043</u>	Colloid and Interface Science
<u>CHEM 4123</u>	Advanced Inorganic Chemistry I
<u>CHEM 4213</u>	Instrumental Analysis
<u>CHEM 4283</u>	Energy Conversion and Storage
<u>CHEM 4443</u>	Physical Chemistry of Materials
<u>CHEM 5443</u>	Physical Chemistry of Materials
<u>ELEG 4203</u>	Semiconductor Devices
<u>ELEG 4303</u>	Introduction to Nanomaterials and Devices
<u>MEEG 491V</u>	Special Topics in Mechanical Engineering
<u>MEEG 4303</u>	Materials Laboratory
<u>MEEG 4313</u>	Introduction to Tribology
<u>MEEG 5263</u>	Introduction to Micro Electro Mechanical Systems
<u>MEEG 5343</u>	Computational Material Science
<u>PHYS 3213</u>	Electronics in Experimental Physics
<u>PHYS 3613</u>	Modern Physics
<u>PHYS 4073</u>	Introduction to Quantum Mechanics
<u>PHYS 4213</u>	Physics of Devices
<u>PHYS 4713</u>	Solid State Physics
<u>PHYS 4773</u>	Introduction to Optical Properties of Materials

or from other appropriate courses not on this list if approved first by the Nanotechnology Minor Curriculum Committee and by the course instructor.

Total Hours

15

Below are model programs for students from different participating departments. Students also have the flexibility to design their own programs according to the stated requirements above.

Model program for a student majoring in Biological Engineering

Required Courses (6 hours)

6

<u>BENG 4753L</u>	Nanotechnology Laboratory
<u>BENG 450V</u>	Special Problems

<u>BENG 451VH</u>	Honors Thesis	
Elective Courses (9 hours)		9
<u>BENG 3113</u>	Measurement and Control for Biological Systems	
or <u>BENG 3113H</u>	Honors Measurement and Control for Biological Systems	
<u>BENG 4743</u>	Food and Bio-Product Systems Engineering	
<u>BENG 4123</u>	Biosensors & Bioinstrumentation	
Total Hours		15
Model program for a student majoring in Biomedical Engineering		
Required Courses (6 hours)		6
BMEG 4103L	Nanotechnology Laboratory	
or BMEG 4103M	Honors Nanotechnology Laboratory	
<u>BMEG 450VH</u>	Honors Thesis	
<u>BMEG 460V</u>	Individual Study	
or <u>BMEG 460VH</u>	Honors Individual Study	
Elective Courses (9 hours)		9
<u>BMEG 3634</u>	Biomaterials	
<u>BMEG 3824</u>	Biomolecular Engineering	
<u>BMEG 4243</u>	Advanced Biomaterials and Biocompatibility	
Total Hours		15
Model program for a student majoring in Chemical Engineering		
Required Courses (6 hours)		6
PHYS 4793L	Nanotechnology Laboratory	
or PHYS 4793M	Honors Nanotechnology Laboratory	
<u>CHEG 488V</u>	Special Problems	
Elective Courses (9 hours)		9
<u>CHEG 3713</u>	Chemical Engineering Materials Technology	
CHEG 5023	Nano Bio Photonics (will be co-listed 4000-level course in the future)	
CHEG 4043	Colloids and Surfaces	
<u>CHEG 5043</u>	Colloid and Interface Science	
<u>CHEM 4213</u>	Instrumental Analysis	
Total Hours		15
Model program for a student majoring in Chemistry		
Required Courses (6 hours)		6
CHEM 4153L	Nanotechnology Laboratory	
<u>CHEM 400V</u>	Chemistry Research	
or <u>CHEM 400VH</u>	Honors Chemistry Research	
Elective Courses (9 hours)		9
<u>CHEM 4123</u>	Advanced Inorganic Chemistry I	
<u>CHEM 4213</u>	Instrumental Analysis	
<u>CHEM 4283</u>	Energy Conversion and Storage	

Total Hours		15
Model program for a student majoring in Electrical Engineering		
Required Courses (6 hours)		6
PHYS 4793L	Nanotechnology Laboratory	
<u>ELEG 488V</u>	Special Problems	
or <u>ELEG 488VH</u>	Honors Special Problems	
Elective Courses (9 hours)		9
<u>PHYS 4213</u>	Physics of Devices	
<u>ELEG 4203</u>	Semiconductor Devices	
<u>ELEG 4303</u>	Introduction to Nanomaterials and Devices	
Total Hours		15
Model program for a student majoring in Mechanical Engineering		
Required Courses		6
MEEG 4323L	Nanotechnology Laboratory	
or MEEG 4323M	Honors Nanotechnology Laboratory	
<u>MEEG 492V</u>	Individual Study in Mechanical Engineering	
or <u>MEEG 492VH</u>	Honors Individual Study in Mechanical Engineering	
<u>MEEG 4903H</u>	Honors Mechanical Engineering Research	
Elective Courses		9
MEEG 491V	Special Topics in Mechanical Engineering	
<u>MEEG 4303</u>	Materials Laboratory	
<u>MEEG 4313</u>	Introduction to Tribology	
<u>MEEG 5263</u>	Introduction to Micro Electro Mechanical Systems	
Total Hours		15
Model program for a student majoring in Physics		
Required Courses (6 hours)		6
PHYS 4793L	Nanotechnology Laboratory	
or PHYS 4793M	Honors Nanotechnology Laboratory	
<u>PHYS 306V</u>	Projects	
<u>PHYS 498V</u>	Senior Thesis	
or <u>PHYS 399VH</u>	Honors	
Elective Courses (9 hours)		9
<u>PHYS 4073</u>	Introduction to Quantum Mechanics	
<u>PHYS 4713</u>	Solid State Physics	
<u>PHYS 4773</u>	Introduction to Optical Properties of Materials	
Total Hours		15

8-Semester Plan

Are Similar Programs available in the area?

No

Estimated Student Demand for Program NA

Scheduled Program Review Date NA

Program Goals and Objectives

Program Goals and Objectives

NA

Learning Outcomes

Learning Outcomes

NA

Description and justification of the request

Description of specific change	Justification for this change
Updated course lists to reflect removal of Nanotechnology Laboratory course (and MEEG 491V - Special Topics).	<p>Nanotechnology Laboratory course is no longer offered. Six hours of required research for the minor are fulfilled by courses in special problems, honors thesis, projects, research, etc. depending upon the department of the student.</p> <p>Appropriate special topics courses may be taken as electives if approved by the Nanotechnology Minor Curriculum Committee and by the course instructor.</p>

Upload attachments

[RE_NANO-M.pdf](#)

Reviewer Comments

Alice Griffin (agriffin) (12/04/20 10:37 am): Changed effective catalog year from spring 2021 to fall 2021. Program changes (not new programs) take effect with the new catalog publication.

Alice Griffin (agriffin) (12/04/20 10:41 am): Checked total box in each model to demonstrate program's total hours are 15 credits.

Alice Griffin (agriffin) (12/04/20 1:18 pm): Removed duplicate listing of BENG 3113H with permission from submitter.

Alice Griffin (agriffin) (12/09/20 1:37 pm): After discussions with program director, COE and GSIE, the college and department have been updated. See attached correspondence.

Alice Griffin (agriffin) (12/09/20 1:49 pm): As an interdisciplinary program, this request will require campus approval.