

Date Submitted: 06/21/19 12:03 pm

Viewing: **MSENP** ~~MEPH~~ : **Materials Science & Engineering, Microelectronics-Photonics, Doctor of Philosophy**

Last edit: 07/16/19 4:01 pm

Changes proposed by: rickwise

Catalog Pages Using this Program

[Microelectronics-Photonics \(MEPH\)](#)

Submitter:	User ID:	rickwise	Phone:	575-2875
Program Status	Active			
Academic Level	Graduate			
Type of proposal	Major/Field of Study			
Select a reason for this modification				
Reconfiguring an Existing Degree—(LON)				
Are you adding a concentration?	No			
Are you adding a track?	No			
Are you adding a focused study?	No			
Effective Catalog Year	Fall 2020			
College/School Code	Graduate School and International Education (GRAD)			
Department Code	Materials Science and Engineering (MSEN) Department of Graduate Dean (GRSD)			
Program Code	MSENP MEPH			
Degree	Doctor of Philosophy			
CIP Code	14.1801 40.1002 - Materials Engineering . Chemistry .			

Program Title
Materials Science & Engineering, Microelectronics-Photonics, Doctor of Philosophy

Program Delivery Method
On Campus

Is this program interdisciplinary?
Yes

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

In Workflow

1. GRAD Dean Initial
2. GRAD Dean Initial
3. Provost Initial
4. Director of Program Assessment and Review
5. Registrar Initial
6. Institutional Research
7. GRSD Chair
8. GRAD Dean
9. ARSC Dean
10. ENGR Dean
11. Global Campus
12. Provost Review
13. University Course and Program Committee
14. Graduate Committee
15. Faculty Senate
16. Provost Final
17. Provost's Office-- Documentation sent to System Office
18. Higher Learning Commission
19. Board of Trustees
20. ADHE Final
21. Provost's Office-- Notification of Approval
22. Registrar Final
23. Catalog Editor Final

Approval Path

1. 06/21/19 1:26 pm
Pat Koski (pkoski):
Approved for GRAD Dean Initial
2. 06/21/19 1:29 pm
Pat Koski (pkoski):
Approved for GRAD Dean Initial

College/School Name
College of Engineering (ENGR)

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

No

What are the total hours needed to complete the program? **48**

Program Requirements and Description

Requirements

3. 07/03/19 9:25 am
Terry Martin (tmartin): Approved for Provost Initial
4. 07/03/19 10:38 am
Alice Griffin (agriffin): Approved for Director of Program Assessment and Review
5. 07/11/19 5:56 pm
Lisa Kulczak (lkulcza): Approved for Registrar Initial
6. 07/12/19 8:49 am
Gary Gunderman (ggunderm): Approved for Institutional Research
7. 07/12/19 11:39 am
Pat Koski (pkoski): Approved for GRSD Chair
8. 07/12/19 11:43 am
Pat Koski (pkoski): Approved for GRAD Dean
9. 07/16/19 12:19 pm
Jeannie Hulen (jhulen): Approved for ARSC Dean
10. 07/19/19 2:33 pm
Norman Dennis (ndennis): Approved for ENGR Dean
11. 07/22/19 11:40 am
Suzanne Kenner (skenner): Approved for Global Campus
12. 07/24/19 1:50 pm
Terry Martin (tmartin): Approved for Provost Review
13. 08/05/19 3:07 pm
Alice Griffin (agriffin): Approved for University

Course and Program
Committee
14. 08/22/19 4:50 pm
Pat Koski (pkoski):
Approved for
Graduate
Committee

Materials Science & Engineering, Ph.D.

Requirements for the Doctor of Philosophy Degree in Materials Science & Engineering: ~~Degree-~~Students choosing this degree program will be assigned an initial adviser upon acceptance to the program. ~~This adviser will be their Cohort manager during that academic year.~~ Students will work with the **Materials Science & Engineering (MSEN) Program** Director ~~of the Microelectronics-Photonics program~~ to define their dissertation committee after they are accepted by a research faculty for a research project. This committee will be made up of at least four faculty members, with at least one faculty member each from the Fulbright College of Arts and Sciences and the College of Engineering. The student's research professor will chair the dissertation committee.

Candidates for the Ph.D. program are expected to have completed a Master of Science degree in either engineering or science, with each candidate's academic background being evaluated by the **Graduate Studies Committee of the Materials Science & Engineering program (GSCMSEN)**. ~~GSCMEP-~~ Doctoral candidates in **Materials Science & Engineering Microelectronics-Photonics** are expected to have proficiency in the core curriculum of the Master of ~~Science~~ **Science** in **Materials Engineering or Master Microelectronics-Photonics at the University of Science in Materials Science at the University** of Arkansas. This core is described in ~~detail above and in~~ the **requirements for the Master of Science in Materials Engineering and the Master of Science in Materials Science, as well as in the** handbook of the **Materials Science & Engineering of the Microelectronics-Photonics** program and is ~~the~~ **the** knowledge that will be tested **in the Materials Science & Engineering in the Microelectronics-Photonics** specific candidacy exam administered **in the** ~~in the~~ spring semester **of** ~~of~~ each academic year.

Students who have graduated with a Master of Science degree in **Materials Engineering or a Master Microelectronics-Photonics from the University of Science degree in Materials Science from the University of** Arkansas will be expected to take the **Materials Science & Engineering Microelectronics-Photonics** written Ph.D. candidacy exam in the **first** spring semester after M.S. graduation. Students requesting admission to the Ph.D. program with a Master of Science degree ~~from in~~ another **institution or from another** discipline will be required to take the **Materials Science & Engineering Microelectronics-Photonics** written Ph.D. candidacy exam within four semesters after **admission to the PhD program and after having completed MSEN 5383 - Research Commercialization & Product Development.** ~~M.S.~~

~~graduation, but not before completing MEPH 5911 1st Year Operations Seminar—Personnel Management and MEPH 5383 Research Commercialization and Product Development.~~ A second part of the candidacy exam, a detailed Ph.D. research proposal, must be accepted by the student's committee before the end of the 24th month after the start date of the student's first semester as a Ph.D. student, or the student will be removed from the Ph.D. program. This research proposal is not linked to the written candidacy exam and may be presented to the committee any time in this 24 month period.

Students who fail to pass their written candidacy exam will have a joint consultation with their major professor and **the MSEN Program Director** ~~their Cohort Manager~~ to formulate a specific action plan to correct student deficiencies identified by ~~the~~ **the** exam. The student will be allowed to retake the written exam only one additional time, which must be during the next scheduled written examination period.

A Ph.D. ~~curriculum will be defined to meet each student's research interests as well as the Microelectronics-Photonics program's interest in course breadth. It is to be expected that certain Master of Science degrees will be poorer matches to the Microelectronics-Photonics program focus areas and will therefore require a greater number of graduate courses in the Ph.D. curriculum as a requirement for graduation.~~ **curriculum will be defined to meet** ~~The course plan for~~ each **student's research interests as well as ensure student must include a minimum of 27 hours of graduate coursework beyond the **Materials Master of Science & Engineering program's core courses have been taken. The course plan for each student must include a minimum of 27 hours of graduate coursework beyond the Master of Science** degree requirements. Specific courses will be chosen by the student and must be approved by the student's **major professor and****

the MSEN Program Director. The coursework list for the Ph.D degree will be dependent upon the MS degree with which the student enters the program: ~~doctoral advisory committee:~~

MEPH 5811	1st Year Operations Seminar—Infrastructure Management	±
MEPH 5911	1st Year Operations Seminar—Personnel Management	±
MEPH 6811	2nd Year Operations Seminar—Management and Leadership	±
MEPH 5821	Ethics for Scientists and Engineers	±
MEPH 5832	Proposal Writing and Management	±

Requirements for the PhD Degree

Subject Area	M.S. in Materials Engineering or Materials Science from UA/Hours	M.S. in Materials Engineering or Materials Science from another institution/Hours	Other Science or Engineering M.S. degrees/Hours
MSEN 6313 Advanced Materials Science & Engineering	3	3	3
BENG 5703 Design and Analysis of Experiments for Engineering Research OR INEG 5333 Design of Industrial Experiments OR other Design of Experiments course	3	3	3
MSEN 5821 Ethics for Scientists and Engineers	1 (Applied from MS curriculum)	1	1
MSEN 6323 Materials Engineering Design	If not taken in MS curriculum	3	3
MSEN 5811 / MSEN 5911 / MSEN 6811 / MSEN 6911 Operations Management Seminar Series (Core)	Taken in MS curriculum	4	4
MSEN 5383 Research Commercialization and Product Development	Taken in MS curriculum	3	3
5000- and 6000-level elective courses in science and engineering	17-20	10	5
MEEG 591V Special Topics (Introduction to Manufacturing)	Taken in MS curriculum	Recommended elective	Recommended elective
MSEN 5322 Materials Characterization	Taken in MS curriculum	Recommended elective	2
MSEN 5313 Fundamentals of Materials Science	Taken in MS curriculum	Recommended elective	3
MSEN 5253 Emerging Technologies in Industry	Recommended elective	Recommended elective	Recommended Elective
MSEN 700V Dissertation	21	21	21
Total	48	48	48

~~The coursework list for the Ph.D. degree will then be combined with the courses completed during the student’s Master of Science studies to assure that the combined course list includes: at least 27 hours of 5000- and 6000-level courses in science and engineering, at least six hours of courses relevant to the management of technology, no more than six hours of special problems and no more than nine hours of special topics courses, and no more than four hours of:~~ If a student is taking either a special problems independent study course (such as **MSEN 588V**) or ~~MEPH 588V~~ or a special topics course (such as **MSEN 587V**) to ~~MEPH 587V~~ to meet partial requirements for their Ph.D. degree, then the instructor must supply the **MSEN Microelectronics-Photonics** program office with a syllabus of that class to be included in their program records. The syllabus must include at least the course title, semester, instructor name, a list of specific course objectives, **a list of student learning outcomes**, sources ~~of~~ content knowledge, and method by which the student’s mastery ~~of~~ of the **learning learning** objectives is demonstrated.

Students are required to attend monthly **Materials Science & Engineering Microelectronics-Photonics** Research Communication Seminars during the first five semesters of their Ph.D. **degree program, and will enroll in MSEN 6611 Research Communication Seminar of PhD Students in their fifth semester.**

~~degree program, and will enroll in MEPH 6611 Research Communication Seminar of PhD Students in their fifth semester. Students working more than 20 hours per week in a technology-based professional position approved by the Microelectronics-Photonics Director will not be required to be enrolled in this class or attend the monthly seminars as a condition for graduation. In addition to these conditions, the 21 hours of research dissertation will be taken under departmental course numbers such as PHYS 700V, CHEG 700V,~~

~~CHEM 700V, ELEG 700V, etc. as appropriate to match to the department of each student's major research professor.~~ The dissertation format must meet all Graduate School published guidelines and the **MSEN Microelectronics-Photonics** guidelines as listed in the **Materials Science & Engineering Microelectronics-Photonics** Graduate Student Handbook. A Ph.D. candidate wishing to use a compilation of published papers for the dissertation must receive explicit permission from the **GSCMSEN GSCMEP** to use this style dissertation at least six months prior to his or her dissertation defense, with a meeting between the student's committee chair and the **GSCMSEN GSCMEP** required before permission can be granted.

Students should also be aware of Graduate School requirements with regard to [doctoral degrees](#).

Are Similar Programs available in the area?

No

Estimated Student Demand for Program **40**

Scheduled Program Review Date **2020-2021**

Program Goals and Objectives

Program Goals and Objectives

- 1. Provide students with interdisciplinary education and training in materials science engineering to meet the needs of emerging technology industries.**
- 2. Place students in interdisciplinary groups performing rigorous and challenging research to prepare them for careers in industrial research teams, national labs, and academic positions.**
- 3. Prepare students to be effective in technology management and entrepreneurship.**

Learning Outcomes

Learning Outcomes

Learning Outcomes

1. Define and explore new areas of research in an interdisciplinary environment, expanding the breadth and depth of state-of-the-art knowledge in the field of materials, materials processing, and devices enabled by advances in materials.
2. Master knowledge, practices, and skills from traditional graduate level programs in Physics, Chemistry, Electrical Engineering, Chemical Engineering, Mechanical Engineering, Biological Engineering, and Biomedical Engineering, regardless of prior traditional educational background.
3. Communicate effectively deep level knowledge of their work to persons well-versed in their field, detailed technical concepts to persons with strong technical backgrounds outside of their field, and general concepts and applications to the general public.
4. Work efficiently in interdisciplinary team environments, fully supporting team goals through active membership or through team leadership as appropriate.
5. Implement intellectual property management and research commercialization processes, encouraging migration of ideas from formulation to societal benefit during their professional careers.
6. Execute duties found in entry-level professional positions with the operational skills equivalent to at least one year’s experience in that position.
7. Embrace the role of citizen-scientist in both their professional and societal communities, utilizing their sound ethical and analytical backgrounds, to lead the discussions that will be needed to balance what can be done with what should be done.

Description and justification of the request

Description of specific change	Justification for this change
Reconfiguration of the Microelectronics-Photonics PhD program into the PhD in Materials Science & Engineering.	Program has developed with a clear focus on materials science and engineering which is a nationally recognized degree. Given a world-class materials research building and facilities, faculty trained in materials and research on materials, the marketability of our graduates can be improved by granting them degrees in Materials Science & Engineering. With an established track record (grants, PhDs produced, publications, facilities, etc.), the program should soon be recognized as a top national program. This will further attract top students and faculty, result in more research funding, and garner increased interest from industry.

Upload attachments [MSENPB - Reconfig - Ltr of Notification.pdf](#)
[MSENPB - Reconfig - Curriculum.pdf](#)

Reviewer Comments **Alice Griffin (agriffin) (07/03/19 10:12 am):** Attention Registrar Staff: No new students admitted into the MEPHPH after summer 2020. Allow students in MEPHPH program to complete through summer 2025.
Alice Griffin (agriffin) (07/03/19 10:38 am): Updated LON and Curriculum in consultation with submitter.
Norman Dennis (ndennis) (07/16/19 4:01 pm): Added the requirement of student learning

outcomes in course syllabi. Change the wording in candidacy exam requirements for non-UAF grads to four semesters "after admission to the PhD program"