

2019-2020 Microelectronics Photonics Doctor of Philosophy

Requirements for the Doctor of Philosophy 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 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 GSCMEP. Doctoral candidates in Microelectronics-Photonics are expected to have proficiency in the core curriculum of the Master of Science in Microelectronics-Photonics at the University of Arkansas. This core is described in detail above and in the handbook of the Microelectronics-Photonics program and is the knowledge that will be tested in the Microelectronics-Photonics specific candidacy exam administered in the spring semester of each academic year.

Students who have graduated with a Master of Science degree in Microelectronics-Photonics from the University of Arkansas will be expected to take the Microelectronics-Photonics written Ph.D. candidacy exam in the spring semester after M.S. graduation. Students requesting admission to the Ph.D. program with a Master of Science degree in another discipline will be required to take the Microelectronics-Photonics written Ph.D. candidacy exam within four semesters after 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 their Cohort Manager to formulate a specific action plan to correct student deficiencies identified by 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.

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 doctoral advisory committee. 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:

1. at least 27 hours of 5000- and 6000-level courses in science and engineering,
2. at least six hours of courses relevant to the management of technology,

3. no more than six hours of special problems and no more than nine hours of special topics courses,
4. and no more than four hours of:

<u>MEPH 5811</u>	1st Year Operations Seminar - Infrastructure Management	1
<u>MEPH 5911</u>	1st Year Operations Seminar - Personnel Management	1
<u>MEPH 6811</u>	2nd Year Operations Seminar - Management and Leadership	1
<u>MEPH 5821</u>	Ethics for Scientists and Engineers	1
<u>MEPH 5832</u>	Proposal Writing and Management	2

If a student is taking either a special problems independent study course (such as [MEPH 588V](#)) or a special topics course (such as [MEPH 587V](#)) to meet partial requirements for their Ph.D. degree, then the instructor must supply the 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, sources of content knowledge, and method by which the student's mastery of the learning objectives is demonstrated.

Students are required to attend monthly Microelectronics-Photonics Research Communication Seminars during the first five semesters of their Ph.D. 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 Microelectronics-Photonics guidelines as listed in the 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 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 GSCMEP required before permission can be granted.

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

2020-2021 Materials Science & Engineering Doctor of Philosophy

Requirements for the Doctor of Philosophy Degree in Materials Science & Engineering:

Students choosing this degree program will be assigned an initial adviser upon acceptance to the program. Students will work with the Materials Science & Engineering (MSEN) Program Director 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). Doctoral candidates in Materials Science & Engineering are expected to have proficiency in the core curriculum of the Master of Science in Materials Engineering or Master of Science in Materials Science at the University of Arkansas. This core is described 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 program and is the knowledge that will be tested in the Materials Science & Engineering specific candidacy exam administered in the spring semester of each academic year.

Students who have graduated with a Master of Science degree in Materials Engineering or a Master of Science degree in Materials Science from the University of Arkansas will be expected to take the Materials Science & Engineering 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 another institution or from another discipline will be required to take the Materials Science & Engineering written Ph.D. candidacy exam within four semesters after M.S. graduation and after having completed MSEN 5383 - Research Commercialization & 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 to formulate a specific action plan to correct student deficiencies identified by 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 ensure the Materials 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:

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

If a student is taking either a special problems independent study course (such as MSEN 588V) or a special topics course (such as MSEN 587V) to meet partial requirements for their Ph.D. degree, then the instructor must supply the MSEN 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, sources of content knowledge, and method by which the student's mastery of the learning objectives is demonstrated.

Students are required to attend monthly Materials Science & Engineering 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.

The dissertation format must meet all Graduate School published guidelines and the MSEN guidelines as listed in the Materials Science & Engineering 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 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 required before permission can be granted.

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