

# Microelectronics-Photonics (MEPH)

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## Courses

### MEPH 5253. Emerging Technologies in Industry. 3 Hours.

Business leaders present technologies used by their companies. Focusing on Arkansas-based companies, technology needs for the industry and innovative ideas for solutions or advancements are discussed. Students work to develop solutions to address company needs or further develop a company's current technology. May be repeated for up to 9 hours of degree credit.

### MEPH 5383. Research Commercialization and Product Development. 3 Hours.

This survey course examines research commercialization through analysis of IP, technology space, market space, manufacturability, financials, and business plans. Entrepreneurial behaviors and product development within large companies are also discussed. A case study using a current UA faculty member's research commercialization effort will be developed. Prerequisite: Graduate Standing.

### MEPH 5393. Product Development Process. 3 Hours.

Demonstration of a student's technical and management knowledge integration by creating a commercially viable product development process to meet a new societal need, with the technical solution based on micro to nanoscale technology. Final grade based on a detailed written report and oral presentation to a panel. Non-thesis students only. Pre- or Corequisite: MEPH 5383. Prerequisite: Instructor permission.

### MEPH 5513. Applied Research in External Technical Organizations. 3 Hours.

A one semester narrow focus graduate level research effort while working at an external technical organization's site. Requires a final report of style and quality suitable for journal submission. This course available only to Professional Path M.S. microEP students, and may substitute for an MEPH 588V External Internship. May be repeated for up to 6 hours of degree credit.

### MEPH 5523. Applied On-Campus Collaborative Research with External Technical Organizations. 3 Hours.

A one semester narrow focus graduate level on-campus research effort performed in collaboration with an external technical organization. Requires a final report of style and quality suitable for journal submission. This course available only to Professional Path M.S. microEP students. May be repeated for up to 6 hours of degree credit.

### MEPH 555V. Internship in External Technical Organization. 1-3 Hour.

Used to document a microEP grad student internship experience in an external technical organization for a minimum duration of six weeks (6-9 weeks=one hour, 10-12 weeks=two hours, and 13-15 weeks=three hours). It may not be used to meet the research requirements of a M.S. degree. Prerequisite: Graduate standing.

### MEPH 5611. Research Communication Seminar of MS Students. 1 Hour.

This course serves as a forum for MS students to develop oral presentation skills and to exchange research ideas. Research presentations will be on various topics in the area of micro to nanoscale materials, processing, and devices, with research management and planning also being addressed. Prerequisite: Graduate standing.

### MEPH 5713. Advanced Nanomaterials Chemistry. 3 Hours.

Science and engineering graduates are using more nanomaterials, and modern industry demands that its scientists and engineers have materials chemistry knowledge. Materials from the micro to nanoscale will be examined in this course from the perspective of fundamental chemistry principles to build a picture of tomorrow's materials. May be repeated for up to 3 hours of degree credit.

### MEPH 5733L. Fabrication at the Nanoscale. 3 Hours.

This hands-on lab course will cover the disciplines needed to make active electronic and photonic devices utilizing nanoscale structures and fabrication techniques presently used in research and industry. Prerequisite: Graduate standing and permission of the instructor.

### MEPH 5742. Transmission Electron Microscopy Theory and Operation. 2 Hours.

This new laboratory course will introduce students to practical electron microscopy and to the operation of the Titan S/TEM for examination of sub-angstrom examination of materials. Students will learn how to conduct a TEM study, how to operate the TEM, and how to extract and interpret useful information. Prerequisite: Graduate standing.

### MEPH 5811. 1st Year Operations Seminar - Infrastructure Management. 1 Hour.

Weekly seminar for 1st year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect organizational infrastructure, career planning, organizational structures, and may include examples from current events. Prerequisite: Graduate standing.

### MEPH 5821. Ethics for Scientists and Engineers. 1 Hour.

This course will introduce methods useful in the practice of ethical decision making in the high technology academic and industrial work place. An emphasis will be placed on applying the methods discussed in the text to student and instructor past professional experiences. Prerequisite: graduate standing.

### MEPH 5832. Proposal Writing and Management. 2 Hours.

This course introduces factors that affect proposal success in both the academic and industrial arenas; demonstrates different approaches to writing successful proposals; and introduces students to the legal responsibilities and ramifications of proposal management. Students will write two proposals for peer review and formal evaluation. Prerequisite: Graduate standing.

### MEPH 587V. Special Topics in Microelectronics-Photonics. 1-4 Hour.

Consideration of current microelectronic-photonic topics not covered in other courses. One section will be created for each topic only after a syllabus is submitted to the microEP office by the faculty member teaching the course. May be repeated for up to 9 hours of degree credit.

### MEPH 588V. Special Problems in Microelectronics-Photonics. 1-3 Hour.

Opportunity for individual study of advanced subjects related to a graduate degree in Microelectronics-Photonics to suit individual requirements. One section will be created for each student only after a syllabus is submitted to the microEP office by the supervising faculty member. May be repeated for up to 6 hours of degree credit.

### MEPH 5911. 1st Year Operations Seminar - Personnel Management. 1 Hour.

Weekly seminar for 1st year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect personnel management, team building and structures, and may include examples from current events. Prerequisite: Graduate standing.

### MEPH 626V. Emerging Technologies in Industry Practicum. 1-3 Hour.

Students engage in demand-driven research projects inspired by Arkansas companies as part of the interdisciplinary IGNITE (Industry Generating New Ideas and Technology through Education) program. These projects, which often result from interactions with companies during MEPH 5253, include visiting company locations; developing project goals, budgets, and timelines; and performing research. May be repeated for up to 9 hours of degree credit.

### MEPH 6611. Research Communication Seminar of PhD Students. 1 Hour.

This course serves as a forum for Ph.D. students to develop oral presentation skills and to exchange research ideas. Research presentations will be on various topics in the area of micro to nanoscale materials, processing and devices, with research management and planning also being addressed. Prerequisite: Graduate standing.

**MEPH 6811. 2nd Year Operations Seminar - Management and Leadership. 1 Hour.**

Weekly seminar for 2nd year Microelectronics-Photonics graduate students to discuss issues that increase professional performance in technology-centered organizations. The discussions will focus on issues that affect management and leadership effectiveness and efficiency, and may include examples from current events. Prerequisite: Graduate standing.

**MEPH 6911. 2nd Year Operations Seminar - Advanced Management and Leadership. 1 Hour.**

Weekly seminar for 2nd year Microelectronics-Photonics graduate students to discuss advanced issues that increase professional performance in technology-centered organizations. The discussions will focus on the complex issues that affect management and leadership effectiveness and efficiency, and may include examples from current events. Prerequisite: Graduate standing.