

**ADD, CHANGE OR DELETE UNIT, PROGRAM REQUIREMENTS, OR ACADEMIC POLICIES**

Complete this form consistent with the instructions in Academic Policy 1622.20. Use the form to add, change, or delete a program or unit or to change program policies. Proposed additions and changes must be consistent with Academic Policies 1100.40 and 1621.10 and any other policies which apply.

**SECTION I: Approvals**

Department / Program Chair _____	Date Submitted _____	Graduate Council Chair _____	Date _____
College Dean _____	Date _____	Faculty Senate Chair _____	Date _____
Honors College Dean _____	Date _____	Provost _____	Date _____
Core Curriculum Committee _____	Date _____	Board of Trustees Approval/Notification Date _____	
University Course and Programs Committee _____	Date _____	Arkansas Higher Education Coordinating Board Approval/Notification Date _____	

**SECTION II: Profile Data - Required Information and Name Change Information**

Academic Unit:     Major/Field of Study     Minor     Other Unit \_\_\_\_\_     Policy  
 Level:             Undergraduate     Graduate     Law    Effective Catalog Year 2013

Program changes are effective with the next available catalog. See Academic Policy Series 1622.20

Current Name            Minor in Microelectronics-Photonics

College, School, Division GRAD

Department Code GRAD

Current Code (6 digit Alpha) MEPH-M

Proposed Code (6 digit Alpha) \_\_\_\_\_

Prior approval from the Office of the Registrar is required.

Interdisciplinary Program

CIP Code 40.1002

Prior assignment from Office of Institutional Research is required.

Proposed Name \_\_\_\_\_

When a program name is changed, enrollment of current students reflects the new name.

**SECTION III: Add a New Program/Unit**

For new program proposals, complete Sections II and VII and use as a cover sheet for a full program proposal as described in 'Criteria and Procedures for Preparing Proposals for New Programs in Arkansas.' ADHE  
[http://www.adhe.edu/divisions/academicaffairs/Pages/aa\\_academicproposals.aspx](http://www.adhe.edu/divisions/academicaffairs/Pages/aa_academicproposals.aspx)

Program proposal uses courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: \_\_\_\_\_

**SECTION IV: Eliminate an Existing Program/Unit**

Code/Name \_\_\_\_\_ Effective Catalog Year \_\_\_\_\_

No new students admitted to program after Term: \_\_\_\_ Year: \_\_\_\_\_

Allow students in program to complete under this program until Term: \_\_\_\_ Year: \_\_\_\_\_

**SECTION V: Proposed Changes to an Existing Program or Program Policies**

Insert here a statement of the exact changes to be made:

**These changes do not change any requirements of the MEPH undergraduate minor (required courses or total hours for the minor). The changes are proposed to accomplish eight goals:**

(1) Add courses to the pre-approved list that have been approved for an individual student's curriculum by the MEPH administration since the minor program began,

(2) Add courses to the pre-approved list that have been approved by MEPH faculty members from those departments as appropriate to the minor.

(3) Change the approval of a student's MEPH minor courses from "by the microEP Program and by the course instructor" to "by the MEP minor Director and by the student's undergraduate degree department's advisor".

(4) Add wording to match the procedures already established with partner departments to require indication by the department to its student of which courses that he or she chooses for the MEPH minor will also be allowed as part of that student's undergraduate curriculum to meet the departmental bachelor's degree requirements.

(5) Add wording that explicitly states that graduate courses taken out of career, if approved by the departmental undergraduate advisor, may be utilized to fulfill the course requirements of this minor.

Check if either of these boxes apply and provide the necessary signature:

- Program change proposal adds courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: \_\_\_\_\_
- Program change proposal deletes courses offered by another academic college, and that college dean's office has been notified. The signature of the dean of that academic college is required here: \_\_\_\_\_

Check all the boxes that apply and complete the required sections of the form:

- Change of Name and Code (Complete only sections I, II, V and VII.)
- Change Course Requirements: (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
- Change Delivery Site/Method (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
- Change Total Hours (Complete all sections of the form except "Proposed Name" in II, section III, and section IV.)
- Change in Program Policies

## **SECTION VI: Justification**

*Justify this change and state its likely effect on any other degree program (including those outside the school or college). Identify any program or program components (other than courses) to be eliminated if this program is implemented. (Program and course change forms must also be submitted for such related changes.)*

**The MEPH program states that its goal is to prepare students for careers involving micro/nano materials, processing, and devices. Changes (1) through (2) address course additions needed to include the new courses now offered on campus (since the last catalog update of this minor) with subject matter focused on micro to nanoscale knowledge appropriate to the MEPH minor.**

**Changes (3) and (4) modify the wording of the MEPH minor to reflect the operational procedures that have evolved with our partner departments since the MEPH minor was defined. These minor procedural changes were put in place to assure full student/department agreement on curriculum as a student enters the MEPH minor program.**

**Change (5) clarifies that if an appropriate graduate course taken out of career is approved by a student's department, then that graduate course may also be used to fulfill the requirements of the MEPH minor.**

**Please note that in Section VII below that there are courses not shown in yellow but are affected by the format change. They were left without yellow highlight in order to better indicate that each was included as pre-approved in the original definition of the MEPH minor.**

**When considering the similarity of the MEPH minor to other programs it should be noted that there may be a new undergraduate minor in Nanotechnology submitted to the approval process in the fall 2012 cycle. Similarities and differences between the two minors include:**

**(1) The Nanotechnology minor's course list is fully contained within the course list presented in this change.**

**(2) The Nanotechnology minor has a specific focus on nanoscale course and laboratory work, whereas the MEPH minor allows coursework in either (or both) microscale and nanoscale focused courses and laboratories.**

**(3) The Nanotechnology minor requires that a student complete three hours of undergrad research, whereas the MEPH minor strongly suggests (but does not require) up to three hours of undergrad research as part of a student's 12 hours of technical electives.**

**(4) The Nanotechnology minor requires a student take its new three-hour laboratory course in Nanotechnology, whereas the MEPH minor would allow that new course as part of a student's 12 hours of technical electives.**

**(5) The MEPH minor requires one three-hour course from Industrial Engineering in an aspect of management of technology, whereas the Nanotechnology minor does not allow a management of technology component in its course requirements.**

## SECTION VII: Catalog Text and Format

In the box below, insert the current catalog text which is to be changed, with changes highlighted with the color yellow. Include all proposed changes identified in Section V. Only changes explicitly stated in Section V will be considered for approval by the University Course and Programs Committee, the Graduate Council and the Faculty Senate. If you are proposing a new program, give proposed text with all of the elements listed below. If you are proposing modified text, include these elements as appropriate.

**Include the following elements, in order, in the catalog text for proposed undergraduate program(s) or program changes:**

- State complete major/program name
- Briefly define or describe the major/program or discipline.
- Identify typical career goals or paths for graduates. (Optional)
- State admission requirements (if any) for entry or entry into upper/advanced level of major/program.
- Identify location in catalog of university, college/school, and department/program requirements which the student must meet in addition to hours in the major, but do not restate these requirements.
- State course requirements in the major and any allied areas, giving number of hours and specific courses; specify electives or elective areas and give numbers of hours and courses in elective pools or categories; identify any other course requirements.
- State any other requirements (required GPA, internship, exit exam, project, thesis, etc.).
- Identify name and requirements for each concentration (if any).
- Specify whether a minor or other program component is allowed or required and provide details.
- State eight-semester plan requirements

**For minors, state requirements in terms of hours, required courses, electives, etc.**

**For graduate program/units, include elements (as needed) parallel to those listed for undergraduate programs above.**

**For Law School program/units, prepare text consistent with current catalog style.**

**For centers, prepare text consistent with current catalog style.**

### MICROELECTRONICS-PHOTONICS (MEPH)

Ken Vickers  
Program Director  
248 Physies  
NANO 104  
479-575-2875

Russell DePriest  
Assistant Program Director for microEP  $\mu$ EP minor  
131 Engineering Hall  
479-575-4719

microep@cavern.uark.edu  
http://microEP.uark.edu

#### **Biological and Agricultural Engineering Faculty:**

- Professors Li, Kim
- Assistant Professors Jin, Kavdia, Kim, Ye

#### **BioMed Biomedical Engineering Faculty:**

- Professor Ye
- Assistant Professors Jin, Muldoon

#### **Chemical Engineering Faculty:**

- Professors Beitle, Ulrich
- Associate Professors Roper, Hestekin (J.)
- Assistant Professors J. Hestekin (J.), Servoss

#### **Chemistry Faculty:**

- Professors Fritsch, Peng, Stenken
- Associate Professor Tian
- Assistant Professors Tian, Chen, Heyes

#### **Civil Engineering Faculty:**

- University Professor Selvam

• Assistant Associate Professor Di

**Electrical Engineering Faculty:**

• Distinguished Professors Mantooth, Varadan (V.K), Varadan (V.V.)

• University Professor Balda

• Professors Ang, Balda, El-Shenawee, Manasreh, Mantooth, Naseem

• Associate Professor El-Shenawee

• Assistant Professors Ji, Yu

• Research Professor Lostetter

• Research Associate Porter

**Mechanical Engineering Faculty:**

• Distinguished Professor Malshe

• Professors Gordon, Malshe

• Associate Professors Huang, Spearot, Tung, Zou

• Assistant Professors Huang, Spearot, Wejinya

**Microelectronics-Photonics Faculty:**

• Research Assistant Professor Benamara

• Adjunct Professors DePriest, Foster

**Physics Faculty:**

• Distinguished Professors Salamo, Xiao

• Professors Bellaiche, Singh

• Research Professor Vickers

• Associate Professors Fu, Li, Oliver, Tchakhalian

• Assistant Professors Barraza-Lopez, Gross, Li, Shew, Tchakhalian

Microelectronics-Photonics (microEP  $\mu$ EP) is an interdisciplinary program based in the Division of Interdisciplinary Studies in the Graduate School that prepares students for careers involving micro/nano materials, processing, and devices applied in areas such as photonics, microelectronics, bio/chemical analysis, etc. The microEP  $\mu$ EP Graduate Program offers M.S. and Ph.D. degrees, as well as an undergraduate minor in Microelectronics-Photonics.

The purpose of this minor is to allow undergraduates in science and engineering to be able to capitalize on the research and educational core of the microEP  $\mu$ EP Graduate Program as they prepare to enter the job market or compete for positions in top level graduate programs.

Requirements for a minor in Microelectronics Photonics: Three hours of required courses (One of INEG 4323, INEG 4433, or INEG 4443). At least 12 additional hours must be taken from the following undergraduate courses (BENG 4123, CHEM 4213, ELEG 4203, ELEG 4223, MEEG 4303, MEPH 488V, PHYS 3603, PHYS 4713, and PHYS 4213), or from other appropriate courses not on this list if approved first by the microEP Program and by the course instructor. See examples at the microEP Web site.

Courses chosen will be reviewed and approved by the  $\mu$ EP minor Director and by a student's undergraduate degree departmental advisor. The departmental advisor will indicate which of the proposed courses for the minor will also fulfill part of that student's undergraduate degree graduation requirements.

The 15 semester hours of courses required for a minor in Microelectronics-Photonics include:

Required: One of these three courses

INEG 4323 Quality Engineering and Management

INEG 4433 Systems Engineering and Management

INEG 4443 Project Management

Twelve additional hours from the following:

Strongly suggested: Three hours of approved research under the appropriate departmental listing:

BENG 450V Special Problems

BENG 451VH Honors Thesis

BMEG 450VH Honors Thesis

BMEG 460V Individual Study

CHEG 488V Special Problems

CHEM 400V Chemistry Research

CHEM 498V Senior Thesis

ELEG 488V Special Problems

ELEG 488VH Honors Special Problems

MEEG 4903H Honors Mechanical Engineering Research

MEEG 491V Special Projects

MEEG 491VH Honors Special Projects

MEEG 492V Individual Study

PHYS 498V Senior Thesis

Pre-approved courses:

BENG 3104 Electronic Instrumentation for Biological Systems  
BENG 3213 Biomedical Engineering: Emerging Methods and Applications  
BENG 4103 Measurement and Control for Biological Systems  
BENG 4123 Biosensors & Bioinstrumentation  
BENG 4203 Biomedical Engineering Principles  
BENG 4243 Biomaterials  
BENG 4753L Nanotechnology Laboratory (new course submitted for fall 2012 approval)  
BMEG 3103 Electronic Instrumentation for Biomedical Systems  
BMEG 4103L Nanotechnology Laboratory (new course submitted for fall 2012 approval)  
BMEG 4243 Advanced Biomaterials and Biocompatibility  
BMEG 4743 Drug and Gene Delivery  
BMEG 4873 Bionanotechnology  
CHEG 3713 Chemical Engineering Materials Technology  
CHEM 3504 Physical Chemistry I  
CHEM 4153L Nanotechnology Laboratory (new course submitted for fall 2012 approval)  
CHEM 4213 Instrumental Analysis  
CHEM 4283 Energy Conversion and Storage (new course submitted for fall 2012 approval)  
ELEG 4203 Semiconductor Devices  
ELEG 4213 MEMS and Microsensors  
ELEG 4223 Design and Fabrication of Solar Cells  
ELEG 4253 Nanotechnology  
ELEG 4303 Introduction to Nanomaterials and Devices  
ELEG 4343 Organic Electronics Technology  
ELEG 4773 Electronic Response of Biological Tissues  
MEEG 4303 Materials Laboratory  
MEEG 4313 Introduction to Tribology  
MEEG 4323L Nanotechnology Laboratory (new course submitted for fall 2012 approval)  
PHYS 3544 Optics  
PHYS 3614 Modern Physics  
PHYS 4073 Introduction to Quantum Mechanics  
PHYS 4613 Introduction to Biophysics and Biophysical Techniques  
PHYS 4713 Solid State Physics  
PHYS 4734 Introduction to Laser Physics  
PHYS 4774 Introduction to Optical Properties of Materials  
PHYS 4793L Nanotechnology Laboratory (new course submitted for fall 2012 approval)

Possible courses (if supporting appropriate undergraduate research):

BENG 3733 Transport Phenomena in Biological Systems  
BENG 3743 Food and Bio-Product Systems Engineering  
BMEG 3823 Biomolecular Engineering  
BMEG 4623 Biomedical Transport Phenomena  
CHEG 3153 Non-Equil Mass Transfer  
CHEM 3514 Physical Chemistry II  
CHEM 4123 Advanced Inorganic Chemistry I  
MEEG 4433 Aerospace Propulsion  
Other Research-appropriate course – instructor approval required

Note: Graduate level courses taken out of career to fulfill the requirements for completion of an undergraduate degree may also be approved to meet the curriculum requirements of this minor. See <http://microEP.uark.edu> for a list of graduate courses appropriate for this minor.

Students accepted into the microEP  $\mu$ EP minor must attend an orientation session at the beginning of each semester as well as the monthly microEP  $\mu$ EP graduate student research presentations. Students enrolled in the microEP  $\mu$ EP minor must attend at least one public presentation of a Master of Science thesis in microEP  $\mu$ EP or a Doctor of Philosophy dissertation in microEP  $\mu$ EP each semester. Students wishing to declare this minor must apply through the microEP  $\mu$ EP Program Web site, <http://microEP.uark.edu>, and be accepted into the minor at least two regular semesters before their graduation date.

**SECTION VIII: Action Recorded by Registrar's Office**

PROGRAM INVENTORY/DARS

PGRM \_\_\_\_\_ SUBJ \_\_\_\_\_ CIP \_\_\_\_\_ CRTS \_\_\_\_\_

DGRE \_\_\_\_\_ PGCT \_\_\_\_\_ OFFC&CRTY VALID \_\_\_\_\_

REPORTING CODES

PROG. DEF. \_\_\_\_\_ REQ. DEF. \_\_\_\_\_  
Initials \_\_\_\_\_ Date \_\_\_\_\_

**Distribution**

Notification to:

- (1) College (2) Department (3) Admissions (4) Institutional Research (5) Continuing Education (6) Graduate School  
(7) Treasurer (8) Undergraduate Program Committee

5/12/08