

MicroEP Graduate Program - PhD Candidacy Exam Guidelines

March 12, 2004

Introduction

This exam is unlike any you've ever taken because it's testing you for skills that you've never had to demonstrate before. Throughout your undergrad years, you were given information and, very shortly after that, were asked to give it back on a test or a homework or a project. In the MicroEP Candidacy Exam, we are testing your accumulated skills in understanding a problem, putting it into the context of available technology, and using your own knowledge base to synthesize a novel solution. Furthermore, it is particularly important for you to be able to make your concepts understandable to someone who is not intimately familiar with either the problem or your way of solving it.

This is the fourth time we've used this type of exam and it will be a work in progress for as long as we follow this concept. In that regard, it is also a test for us in evaluating your skill sets. You're going to find this to be a lot of work and, since it is somewhat ill-defined, perhaps a bit more stressful than what you're used to. But we think that this approach is more representative of the type of intellectual task you'll be doing for the rest of your life either in industry or academia. We hope that when you're successfully past this exam, you'll give us some feedback on the process so we can continue to improve our methods.

Logistics

You will meet on Friday, March 12 at 1:30 in the CHEG conference room just inside of the CHEG office at 3202 Bell Engineering. You will receive a copy of each of three exams, one each for Microelectronics, Materials and Processing, and Photonics. You will have one hour to read the exams and choose which exam to take. The MicroEP exam administrator will document your choice by you signing an exam roster with your choice indicated.

You can request exam clarifications from the MicroEP exam administrator, Dr. Ulrich. You can ask any question you want, and Dr. Ulrich will either answer it then, get the answer from the prof who wrote the exam, or tell you that you're not entitled to an answer. To contact him, go down this list in order:

cell phone: 799-6910
home phone: 751-3154
email: rulrich@uark.edu

The completed examination must be returned to Dr. Ulrich in his office by 9:00 am, Monday March 22nd. He will be there from 7:30 to 9:00 to personally receive it. You may hand it in early if you want, but it will not be accepted late. You are required to submit one hardcopy printout, with dated signature on each page. You will also submit one electronic file on a CD

containing your Word document, with your dated signature on the label of the CD. Do not email these files. **NO EXAMS WILL BE ACCEPTED AFTER 9:00 AM SHARP!**

You may use any written source of information in formulating your answer. This does include on-line searches and internet materials. If you are using textbooks that are in any of the university libraries, please do not check them out. Your MicroEP colleagues taking this exam may also need to use them in the course of formulating their own answers.

You may **NOT** discuss this exam in any fashion (oral, written, sign language, smoke signal, etc) with any person except the MicroEP exam administrator. It is emphasized that your major advisor should specifically not be approached in casual conversation on your approach or progress to date.

It is expected that you will have casual contact with faculty, MicroEP students, and other candidates during your exam week. General conversations with your colleagues are not restricted during this week, but it is your responsibility to immediately disengage from any conversation that might be construed to pertain to the examination process.

It is anticipated that the submitted solutions will be completely graded by the faculty within two weeks. If in grading the solutions the faculty feels that the intent of an answer is unclear, the candidate may be required to join the grading committee to orally discuss his solution. A minimum of twenty-four hours notice will be given to the candidate to prepare for this discussion.

Areas of Emphasis

Three exams were created using the following concentrations:

- Microelectronics
- Photonics
- Materials and Processing

In addition, the exams have been designed to balance assessment of your understanding of both the science and engineering aspects of the given problems. We anticipate that your response will give appropriate treatment to both of these areas.

Examination format

We are providing this document as a template for you to use, but in general:

1. Use 12 point, Times New Roman font. Smaller font may be used in diagrams or figures, provided it is readable to the exam graders when printed on normal office printers.
2. Use one inch margins on sides, top, and bottom.
3. Line spacing may be no smaller than single spacing.
4. Modify the footer of the document to replace “nnnnn” with a random five-digit number of your choice. Choose a number sequence that will not be associated with you by any of the grading faculty.
5. You are limited to a maximum of 15 pages in your problem solution (including diagrams and illustrations). We believe that it is impossible to fully answer the given problems in less than 15 pages, and that you will feel that you are leaving out critical information in order to compress the response to 15 pages. Since you will probably initially develop much more than 15 pages, please be sure to leave yourself time to edit the responses to meet the limit.
6. Don't use a dedicated cover sheet - just put the title on the top of the first page and start writing.
7. It is not necessary to fully restate the problem.
8. It is critically important to fully reference any materials directly copied from another source. Plagiarism will be grounds for failure without grading of content.

NOTE: Two appendices will be allowed that will not be counted toward the fifteen page limit. Your bibliographic list of any references you feel are appropriate in your solution should be included as an appendix. A second list of publications examined as part of the intellectual property question should also be included as an appendix.

Special Note to Candidates

This is a PhD capability assessment process and should be approached with a great deal of seriousness. It is anticipated that fully answering the questions in the exam should require the full nine days to accomplish the examination process (reflection, solution, documentation, reflection, and final documentation). Answers are expected to contain the level of detail necessary to fully evaluate your understanding of the microelectronics-photonics field.