

# Ph.D. Degree Plan

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The plan on the following pages represents an optimal (but achievable) scenario for a full-time Ph.D. student. Adherence to this plan will ensure a successful, worthwhile, and meaningful educational experience while building highly desirable and marketable credentials.

## 1. Phase I: Admission and Orientation

- (a) Masters degree awarded
- (b) Select area of specialization (e.g. Computer Architecture, Machine Learning, Evolvable Hardware)
- (c) Ph.D. application submitted
- (d) Ph.D. application approved for *Pre-Ph.D. status*
- (e) Join IEEE, if you have not already done so
  - Register as student member at reduced rates (approx \$40/yr)
  - Enroll in the IEEE Computer Society (approx \$15/yr)
  - Regularly read the Spectrum, Potentials, and Computer magazines you will receive
- (f) Select an advisor and make a commitment to this faculty member
- (g) Obtain and read the following brochures/forms from the ECE website. *Ph.D. Qualifying Exam* description sheet, *Program of Study* form. Discuss these forms with your advisor who will help you complete and submit them.
- (h) Keep channels of communication open with your advisor: inform him of all possibilities, plans, and decisions related to your degree program. This is extremely important.
- (i) Follow your advisors guidance closely, even though his suggestions may seem superfluous at times. He/She will be basing the advice to maximize your long-term success and the efficiency at which your degree program proceeds.

## 2. Phase II: Preparatory Coursework and Qualification

(elapsed time to this point = 0)

- (a) Coursework Begun:  
you must take or have taken the following courses or their equivalent:
  - EEL 4767: Computer System Design I (articulation: no credit towards degree)
  - EEL 4768: Computer System Design II (articulation: no credit towards degree)

- EEL 5707: Computer Architecture
  - EEL 5874: Expert and Knowledge Based Systems
  - EEL 5881: Software Engineering I
  - EEL 5762: Performance Analysis of Computer and Communication Systems
  - EEL 6707: Parallel Processing
  - EEL 4xxx: EE Elective Area: DSP, controls, power, communications (articulation: no credit towards degree)
  - EEL 5xxx: EE Elective Area: DSP, controls, power, communications
  - EEL 6xxx: Independent Study / Research (recommended) (up to 3 credits maximum per semester)
- (b) Perform a *Literature Survey* and write "Current State of the Art" paper on your specialization
- Start a research notebook
    - Take notes and outline as you read so you can discuss key points with your advisor and refer back to your notes when you begin writing your dissertation.
    - Gain practice paraphrasing, generalizing, and qualifying ideas while stating them in your own words in an organized way
    - This information will be essential later when you go to write your Ph.D. dissertation.
  - Build a bibliography database
    - Use endnote or bibtex tools
    - Record all catalog information on each reference including authors, paper title, publication name, journal issue number, publisher, publication date, and page numbers.
    - Keep the index cards sorted by subject or topic heading
  - The literature survey you write should be formatted using the LaTeX document formatting program. LaTeX is the standard program used by researchers and accepted by journal publishing companies.
  - The organization of your paper must follow IEEE format and content guidelines.
- (c) Investigate new research under your Advisor's direction
- Learn the research process
  - Gain experience with basic research tools
  - Start to form conjectures and preliminary opinions on analysis and possible new solutions for your specialization
- (d) Begin writing research papers jointly with your Advisor
- At this point your first conference paper should be submitted and accepted. Each paper will require two versions to be produced: a single column *evaluation copy* submitted for peer review, and a double column *camera-ready copy* which will actually appear in print.
  - Your first Journal paper ("Current State of the Art") should be submitted
  - Each paper will appear as a chapter in your dissertation
- (e) Qualifying Exam Attempt #1 (elapsed time to this point = 1 year)
- Exam offered only once each Fall and Spring semester
  - You must sign-up for the exam at ECE Graduate Office

- Duration of exam is 4 hours
  - Content is roughly equivalent to 4 final exams
  - You should begin preparing for the exam about 3 months in advance. The exam is competitive so take your preparation seriously.
  - Spend at least 20 hours per week reading the recommended texts and solving sample problems
  - Obtain old exams from the ECE department and be familiar with the classical or typical problems in each area
- (f) Qualifying Exam Attempt #2 (elapsed time to this point = 1.5 years)
- Only required if failed on first attempt (you **must** pass on the second attempt or you face expulsion from the Ph.D. program)

### 3. Phase III: Defining your Dissertation Content and Obtaining Preliminary Results

(elapsed time to this point = 1.5 - 2 years)

(a) Write a *Ph.D. Research Proposal*

- The proposal must be **novel** and **original** work. This means these must be *new* ideas from *your own mind* that haven't been published by others previously.
- Your ideas must be substantiated with **results**. Since we are in an engineering field, this means "*graphs, tables, or equations.*" English papers and Book Reports **don't count!**
- The proposed work must represent a "**significant**" **contribution** to the field. This means that the ideas you propose *cannot be trivial* nor *obvious to one who works in your field of specialization*.
- The proposal length should roughly 50 pages long.
- Defining the precise problem to be solved typically takes some time and often a few iterations/retries. **Do not become discouraged** if some changes in plans or even "dead-ends" are encountered along the way before you reach the final problem specification. These difficulties are normal and typical. *Keep your mind open*. Bear in mind that you are *still learning knowledge and skills* that will broaden and improve the quality of your final dissertation in both direct and indirect ways.

(b) Complete all coursework requirements to provide in-depth knowledge of your specialization area

- outside college courses:
  - CS6xxx Parallel Algorithms and Complexity Theory
- EEL6769: Parallel Knowledge Processing
- EEL6763: Current Topics in Parallel Processing

(c) Specify your *Guidance Committee*

- 4 faculty total, including advisor and 1 professor outside ECE department
- Your advisor may consider pre-circulating the draft Ph.D. proposal to committee
- Revise as necessary per committee's initial comments

(d) Write new research papers jointly with your Advisor

- At this point your Second & Third Conference Papers should be submitted and accepted

- Reviews from your first journal paper will be received, upon which the paper will be revised to obtain acceptance
  - Your Second Journal paper should be submitted
  - Each paper will appear as a chapter in your dissertation
- (e) Candidacy Exam
- This is a 1 hour long oral presentation of your work to-date
  - You should provide an updated copy of your resume including publications to-date
  - Your job is to convince the committee that the work you are proposing is worthy of receiving the Ph.D. degree
  - The committee may dictate additional future work. Their suggestions can be very helpful in improving the quality of your dissertation. It is beneficial to get these comments in writing when possible by writing a summarizing email afterwards on your own that thanks the committee members for coming to your presentation.

#### 4. Phase IV: Completion of your Ph.D. Research

(elapsed time to this point = 2 - 2.5 years)

- (a) Write the majority of your Ph.D. Dissertation
- Address all the requirements specified in the *Future Work* section of your Ph.D. Research Proposal
  - Typically, 150 - 200 pages total would be required for a complete Ph.D. Dissertation (not including appendices such as simulation programs/code/output, etc.)
- (b) Propose and begin new papers with your advisor
- Third Journal paper submitted
  - First Journal paper appears in print
  - Each paper will appear as a chapter in your dissertation
- (c) Gain experience writing and submitting formal research proposals for follow-on research
- (d) Submit job applications (at least 6 mos. prior to graduation)
- (e) *Final Defense of your Dissertation* (elapsed time to this point = 3 - 3.5 years)
- Complete the required paperwork, abstract, and announcements
  - This is a 1 hour long oral presentation of your work and results
  - It is open to public attendance
  - It must be approved by majority vote of all committee members
  - The committee will usually dictate revisions required before your dissertation is considered complete
- (f) Perform Dissertation Revisions
- You must adequately address all issues raised by your committee
  - Produce the camera-ready copies of your dissertation per the UCF format guidelines
  - Complete all paperwork, obtain university approval for your dissertation, and submit your dissertation for archiving

## 5. **Phase V. Graduation**

(elapsed time to this point = 3 - 3.5 years)

- (a) Publish your Ph.D. Dissertation as a book through publishers of computer-related monographs
- (b) Invest some time to reflect on your future work as an independent researcher
- (c) Begin your independent career at a College, University, or Research Institute