

# Ph.D. in Engineering Physics

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The Ph.D. in Engineering Physics program provides advanced education and research opportunities to exceptional students by providing a research environment that fosters collaboration and creative thinking, with research findings published in nationally recognized journals. Areas of research emphasis include the measurement, theory, and modeling of the near-space and space neutral and plasma environment; studies of the sun and stellar activity; orbital stability and dynamics; engineering spacecraft instrumentation and remote sensing measurements; and the design and implementation of electro-optical and radar systems.

Learn more about the program at the <http://erau.edu/epphd> website.

## Dissertation Proposal (prospectus)

This is an opportunity for the students to demonstrate to their dissertation committee that they understand the current research in their area of interest and can formulate a thesis topic and a workable approach to the research. Committee members should have opportunities for in-depth discussions in the preparation of the proposal. The proposal is an opportunity for the student to demonstrate their verbal and written communication skills. Acceptance of the dissertation proposal is a significant milestone in the dissertation process.

## Dissertation Process

The purpose of the dissertation process is to give the Ph.D. candidate an authentic experience in performing and reporting research which leads to generating new knowledge. For the Ph.D. in Engineering Physics, the general areas of research will be Spacecraft Engineering, Space Physics, Upper Atmospheric Physics, and Astrophysics. The dissertation process begins with a preliminary search of the scientific & engineering literature around certain possible research topics. Then, in conjunction with the dissertation advisor (DA), a specific topic is chosen. The candidate then writes a prospectus (a research proposal) which is presented and discussed with the full Dissertation Committee (DC). Once all comments and suggestions are addressed, the candidate begins to work full-time on i) a more specific literature search, ii) formulation of tools for simulations, experimentation, or analysis required, iii) informally discuss progress on the research with the DA and the DC and, iv) when completed, writes up the work in clear, technical English prose. The dissertation is then presented verbally in an advertised, public seminar, followed by a more thorough examination and defense with the DA and the DC. It is the expectation of the Ph.D. Program that each dissertation will lead to one or more peer-reviewed journal articles or proceedings papers.

## Dissertation Committee(s)

Every student will be required to form a dissertation committee after they have passed their qualifying (comprehensive) examination and before they defend their dissertation proposal. The committee will be comprised of a minimum of four members all of whom must be approved by the Ph.D. Program Committee. It will be chaired by the student's research advisor. One committee member will be external to the Ph.D. program. The committee will be charged with monitoring student progress and examining student performance in their research through their dissertation proposal defense, seminars, their written dissertation and their dissertation verbal defense. When requested (by the student or advisor), the committee will also evaluate other student accomplishments related to research, such as accepted or published peer-reviewed journal and proceedings papers. The committee will meet at least once a semester.

## Seminars

At least once a year, students will be asked to give seminars on research topics that are pertinent to their research activities. Such seminars help demonstrate both scientific maturity as well as verbal communication

skills. Student progress will be monitored and appropriate feedback will be given both to the student (self-improvement) and to the dissertation committee (evaluation).

## Dissertation Defense

A dissertation is a major writing accomplishment and one that is heavily reviewed by the student's dissertation committee. It is also a major presentation accomplishment because students are under pressure to respond quickly and accurately to all questions fielded by the committee and by others attending.

## Dissemination of Student Research Results

Students will be strongly encouraged to present the results of their research at national (and international) conferences, to hone their presentation skills, to solicit feedback from other experts in the field and to strengthen their ties to the University and research communities. Students will also be strongly encouraged to write the results of their research for publication in high-quality, peer-reviewed journals or proceedings.