

*Master of Science in Applied Experimental and Engineering Psychology*

*Rochester Institute of Technology, Department of Psychology*

**Graduate Student Handbook (Final Version Approved on Nov. 9, 2007)**

1. Introduction

The MS Program in Applied Experimental and Engineering Psychology emphasizes human behavior and performance in both simple and complex human-machine systems. Engineering psychology examines human capabilities and limitations to sense, perceive, store, and process information and how these human factors impact human interactions with technology. This knowledge is applied to the design, use, and maintenance of human-machine systems. Students will be trained both in research methods of experimental psychology and application of the results in contemporary problems in the industry.

Expert faculty from the Department of Psychology, the Department of Industrial & Systems Engineering and the Department of Information Technology all contribute to the teaching of specialty courses in the program. The mission of RIT is to provide technology-based educational programs and to vigorously pursue emerging careers by developing new programs in response to changing technology. The RIT MS in Applied Experimental and Engineering Psychology prepares students to function as effective engineering psychologists in industrial, governmental, or consulting organizations. The program also provides a foundation for further advanced academic study in Engineering Psychology, Human Factors, or Experimental Psychology. Teaching and research assistantships are available.

1.1. Definitions

1.1.1. *Applied Experimental and Engineering Psychology* is the application of psychological principles, knowledge, and research to improve the ability of humans to operate more effectively in a technological society. [Its] research focuses on people's interaction with or involvement with communication, decision making, and computer information systems, work places, energy and transportation systems, medical and health care settings, consumer product design, living environments, etc. The goal is safer, more effective, and more reliable systems through improved understanding of the user's requirements and performance capabilities. (Division of Applied Experimental and Engineering Psychology; Division 21: American Psychological Association).

1.1.2. Applied Experimental and Engineering Psychology is a specialized sub-discipline of *Human Factors/Ergonomics*, which is defined thus:

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and other methods to design in order to optimize human well-being and overall system performance.

(Definition adopted by the International Ergonomics Association in August 2000)

### 1.1.3. *Thesis*

- (1) A proposition that is maintained by argument.
- (2) A dissertation advancing an original point of view as a result of research, especially as a requirement for an academic degree.  
(The American Heritage Dictionary of the English Language, Fourth Edition, © 2007, 2000 Houghton Mifflin Co.)

## 2. Admission Requirements:

Applicants to this program are expected to have 20 quarter credit hours (or 15 semester hours) of course work in undergraduate psychology or related field (e.g., engineering, computer science, information technology), including one course in experimental psychology and another in statistics.

Admission decisions will be based on:

- (1) a minimum GPA of 3.0 for undergraduate work,
- (2) Graduate Record Examination scores (within the last five years),
- (3) two letters of reference from professors or supervisors,
- (4) a biographical statement describing the applicant's experience and goals regarding the program,
- (5) a completed application for graduate admission to RIT.

## 3. Curriculum

### 3.1. Core courses

#### 3.1.1. Required Experimental Core Courses

	Qtr. Cr. Hrs.
0514-784 Graduate Statistics	4
0514-785 Advanced Perception	4
0514-786 Research Methodology	4
0514-787 Advanced Cognition	4

#### 3.1.2. Required Engineering Psychology Courses

0514-788 Topics in Engineering Psychology (topics may vary)	4
4004-745 Foundations of Human-Computer Interaction	4
0303-731 Advanced Topics: Ergonomics/Human Factors	4
0303-734 Systems Safety Engineering	4

### 3.2. Elective courses: Students select two from the following (prerequisites are in brackets):

4002-317 Visual Basic for Programmers (4002-218 or equivalent)  
 OR Computer Programming (with a list of applicable/recommended courses)  
 4004-748 Usability Engineering (4004-745 and 4004-741)  
 4004-749 Usability Testing (4004-748 and Statistics)  
 4004-755 Advanced Topics in HCI (4004-745)  
 0303-530 Engineering Design  
 0303-732 Biomechanics (0304-331, 0304-332, 0303-730 or equivalent)  
 2014-701 Introduction to Computer Graphics (permission of the instructor required)

2014-717 Authoring Multimedia (permission of the instructor required)  
 2014-723 Graphical User Interface

[Note: Provision for an individualized, independent, special topics course for graduate credit is being researched]

### 3.3. Required Thesis Credits

0514-889 Thesis Proposal	4
0514-890 Thesis (may be repeated)	4

3.4. Co-op option: The MS degree program in Applied Experimental and Engineering Psychology has an optional cooperative education component. It is generally taken in the summer quarter of the first year of the program. The goal of co-op education is to provide for students the experiential learning that integrates with classroom education. It allows students to apply psychological principles to problems in a variety of work environments. Co-op education may be taken at any business or industrial setting.

## 4. Thesis; General Requirements

- 4.1. The research must add to the existing body of knowledge on the given subject. That is, the thesis research must represent original work, or deal with a research question that has not been answered before. Replication of previous research is acceptable as long as the work adds new knowledge to previous results.
- 4.2. The research must be empirical. That is, the research must be based on data, which are properly analyzed and interpreted. The data, however, may come from any applicable source; the student may run an experiment and collect his or her own data, or the student may analyze existing data to answer novel research questions about them, or the research may deal with metadata (i.e., data about data).
- 4.3. Because the thesis will be in the field of engineering psychology, it is imperative that the topic has applied value. The distinction between applied and basic research is not dichotomous; rather, applied and basic research are at the opposite ends of a continuum allowing much flexibility in determination of the scope and specific topic of the thesis. However, if the thesis topic lies towards the basic end of the aforementioned continuum, the research should nevertheless be capable of suggesting practical applications; conversely, applied research should always be based on the state of the art of theories of perception and cognition as well as make a contribution to advancing our knowledge about the underlying principles and theoretical constructs of human behavior and performance.
- 4.4. The scope and the depth of analysis, and the significance of the topic must be sufficient to warrant publication of the results in a peer-reviewed scientific journal or conference proceedings of similar stature, and the research must be of sufficient quality so that the work may reasonably be expected to get accepted for publication.

## 5. Thesis Proposal

- 5.1. The thesis proposal will be developed collaboratively between the student and the thesis adviser. The thesis proposal is produced while the student completes the thesis proposal credits, typically during the 3<sup>rd</sup> quarter of the program.
- 5.2. Following the development of the thesis proposal, and before registering for graduate thesis credits, a graduate thesis committee will be formed. The thesis proposal must be presented to and accepted by the thesis committee and the Psychology Department chair. The students must present their proposed research orally before the proposal can be approved. The main purpose of the thesis proposal is to define the scope of the thesis project and obtain approval for the student's topic from the thesis committee.
- 5.3. The thesis proposal must contain the following elements:
  - (1) The thesis title, the name of the thesis faculty advisor, and the names of the faculty members that participate in the thesis committee as readers. Committee members indicate their approval of the thesis topic by signing the cover page.
  - (2) A review of relevant literature. The literature review serves two distinct purposes. First, it ensures that the research is indeed original by searching the existing body of literature for similar studies conducted in the past. From this it follows that the literature search must be exhaustive. Second, review of relevant literature will allow the candidates to amass sufficient knowledge about their topic to be able to carry out the empirical part of their thesis research.
  - (3) Statement of thesis objectives and significance of the research. A brief description of the project and a clear statement of the purpose of the research and the project deliverables, as well as demonstration of how these follow from or are related to the existing body of knowledge as revealed by the literature review.
  - (4) A research plan, including a proposed timeline of major research activities, and a detailed description of the planned research method are required. The method must furthermore include the following:
    - (a) Participants: Description of the procedures planned for finding and recruiting subjects or obtaining pre-existing data or materials.
    - (b) Apparatus/materials: Description of the experimental apparatus or other materials; here the student should also indicate needs for equipment or software or other resources necessary for the research.
    - (c) Design: Detailed description of the experimental design or the analyses of pre-existing data; this section must allow for assessment of the validity of the proposed research.
    - (d) Procedure: Detailed description of the experimental procedures.

## 6. Thesis Committee

- 6.1. The thesis committee shall consist of three members, a committee chair and two readers.
- 6.2. The committee chair shall be the student's thesis adviser, who must be a full-time faculty member in the Psychology Department. A thesis adviser will be initially assigned to the

student by the Psychology Department chair; however, the student may choose a different adviser among the full-time psychology faculty according to a match between the student's thesis topic and faculty expertise. The thesis adviser will be responsible for the planning of the thesis project and day-to-day guidance and supervision of the student through the experimental design and setup, data collection and analysis, and writing phases of the thesis.

- 6.3. The two readers shall be invited to the student's thesis committee by the committee chair (thesis adviser) and approved by the Psychology Department chair. The primary role of the readers shall be to ensure that the thesis meets the requirements as stated above and provide constructive criticism and commentary on it. The readers must approve the thesis proposal as well as the final thesis.
  - 6.4. One of the readers may be from outside the Psychology Department. The outside eligible departments are those with a formal collaborative teaching relationship with the MSAE &EP program. These departments are Information Technology, Industrial and Systems Engineering, and Computer Graphics Design of CIAS.
  - 6.5. In special cases that must be justified separately, one of the readers may also come from outside the aforementioned eligible departments or outside the Institute. An outside reader shall be invited by the thesis committee chair and approved by the Psychology Department chair. An eligible reader from outside the eligible departments or the Institute must be a nationally/internationally recognized expert on the topic of the student's thesis whose participation will be demonstrably advantageous to the student's work.
7. Thesis Timeline
- 7.1. The thesis requires a minimum of eight credit hours.
  - 7.2. The program can be completed in four quarters, excluding summer, with the thesis research occupying a significant proportion of that time.
  - 7.3. The first step in thesis project is completion the Thesis Proposal credits (0514.890.99) and a thesis proposal. The proposal must be submitted to the Psychology Department chair in writing as well as presented to the psychology faculty. The students must present their proposed research orally before the proposal can be approved.
  - 7.4. Thesis research is not to begin in earnest until:
    - (1) The thesis proposal has been approved by the committee, AND
    - (2) The research protocol has been reviewed and approved by RIT's Sponsored Research Services (SRS) Institutional Review Board (IRB).
  - 7.5. The final thesis must be unanimously approved by the thesis committee and the Psychology Department chair. Final (oral) defense of the thesis will be open to the Institute, departments, and students. After the final defense and possibly required revisions to the thesis, it will be signed by the thesis committee members and Psychology Department chair for a final approval.

## 8. Procedures

- 8.1. Application procedure. Admission requirements are listed in section 2 (above). The student must submit an RIT graduate application (all application materials and information are available online at: [http://www.rit.edu/~625www/grad\\_admission.html](http://www.rit.edu/~625www/grad_admission.html)). Students may apply during any quarter of the year.
- 8.2. Maintenance of graduate standing. The student must maintain a minimum graduate GPA of 3.0 and be enrolled at least part time in the program to be considered a graduate student in good standing.
- 8.3. In order to remain enrolled students must show adequate progress towards the completion of their thesis or dissertation. Any student who fails to maintain adequate progress towards the completion of a thesis and is not granted a leave of absence may at any time be terminated from the program on the recommendation of the thesis committee and the Psychology Department Chair. The Master's thesis must be begun (e.g. the written proposal accepted and presented) before or during the Fall Semester of the student's second year in the program.
- 8.4. It is recognized that both the faculty members on a thesis committee and the student have obligations related to the smooth conduct of the MS process. To that end, it is expected that the following guidelines will be observed:
  - (1) There will be a minimum of two weeks between the completion of the thesis proposal and the thesis proposal meeting with a student's thesis committee. The thesis committee should be given a minimum of one week to read and review the thesis proposal and return written comments to the student. The date of the thesis proposal meeting can be scheduled for a minimum of one week after the committee has read and responded to the thesis proposal. If a committee member cannot meet this deadline, she/he must inform the student and the Psychology Department chair immediately and negotiate an alternative acceptable to all parties.
  - (2) There will be a minimum of four weeks between the completion of the MS thesis draft and the scheduled final thesis oral. The committee should be given a minimum of two weeks to read and review the thesis draft. The committee members should write and submit to the student their substantive comments, suggestions, and changes on the thesis draft so that the student can go over them with the committee chair prior to the final thesis orals. (Substantive changes include: extensive new data analyses, extensive alternative data analyses, and extensive alternative interpretations.) It is the student's responsibility to provide the committee members with a current draft of the thesis prior to final oral defense.
  - (3) The date of the final thesis oral defense must be scheduled a minimum of two weeks after the committee has read and responded to a final draft of the thesis. If a committee member cannot meet this deadline she/he must inform the student and the Thesis Chair immediately and negotiate an alternative acceptable to all parties.

- 8.5. Time limits: The student must successfully complete all required courses of the Institute and the college within seven years of the time of initial registration for graduate study.
- 8.6. Interruption of the study: Existing RIT regulations concerning leave of absence apply. A leave of absence may be requested by a student in preference to withdrawal from the Institute.
- 8.7. Students must be registered at least part-time during the quarter they complete the oral defense of the thesis.

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**Appendix: Thesis Proposal Checklist (Approved on November 9, 2007)**

- The proposal contains (1) the thesis title, (2) the name of the thesis faculty advisor, and (3) the names of two faculty members that participate in the thesis committee as readers.
- The proposed research represent original work, as demonstrated by an exhaustive review of relevant literature.
- The proposal clearly describes the theoretical foundation it is based on as well as its contribution to advancing knowledge about the underlying principles and theoretical constructs of human behavior and performance.
- The proposal contains a statement of thesis objectives and significance of the research.
- The proposal contains a research plan, including a proposed timeline of major research activities.
- The proposal contains a detailed description of the planned research method.
- The proposal contains description of the procedures planned for finding and recruiting subjects OR for obtaining pre-existing data or materials.
- The proposal contains description of the experimental apparatus or other materials and possible needs for equipment or software or other resources necessary for the research.
- The proposal contains a detailed description of the experimental design OR the analyses of pre-existing data.
- The proposal contains a detailed description of the experimental procedures.
- The proposal clearly describes the independent variables and how they are to be manipulated, OR the data sources the research is based on.
- The proposal clearly describes the dependent variables and how they are to be measured, OR the metadata and how they are derived from pre-existing data.
- The proposal suggests practical applications for the results of the research.
- The proposed research appears to be of sufficient significance and quality for publication.