Human Factors and Ergonomics Society

Accreditation Self-Study Report Guide
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**Human Factors and Ergonomics Society**
P. O. Box 1369
Santa Monica, CA 90406-1369, USA
310/394-1811, FAX: 310/394-2410
info@hfes.org
http://hfes.org
Accreditation Self-Study Report Guide

Overview
These guidelines and the appendixes that follow set forth the information required for application for accreditation to the Human Factors and Ergonomics Society.

Prerequisite
Accreditation shall be accorded to programs, not degrees. A program may be composed of elements in different departments and colleges. Degree requirements may reflect in part the parent discipline(s) rather than exclusively the human factors content. However, the requirements in the sections on curriculum and staffing standards of the Human Factors and Ergonomics Society Self-Study Report Guide must be satisfied.

Accreditation Decisions
Accreditation shall be possible only after at least six students have graduated from the program. Advance accreditation of programs shall not be granted.

Accreditation of a program shall be for a basic unit of six years. The decision following an accreditation review may be one of the following:

a. Full six-year accreditation.
b. Accreditation for a period of three years, at which time evidence of progress toward satisfying the requirements for full-term accreditation is required.
c. Immediate “show cause” notice that accreditation will be denied or revoked unless specified steps are taken.
d. Notification of denial or revocation of accreditation. This decision may be appealed to the Executive Council.

The information required for accreditation is requested in the form of a self-report instrument. Appendixes A-C provide the criteria to be used by the Accreditation Review Panel in evaluating a program’s curriculum, staffing standards, and opportunities for practical experience. The report’s contents largely follow the engineering accreditation (ABET) model; differences take into account the multidisciplinary nature of human factors and the flexible nature of the core-plus-specialization curriculum requirements described in Appendix A. Documentation is required whenever it is likely to be available (e.g., examinations, transcripts, sample lab reports). In preparing the self-report, care should be taken to provide all the information requested in the guidelines in order to satisfy the criteria for accreditation set forth in Appendixes A-C. A Site visit will be necessary only in cases that cannot be resolved by the self-report.

If you believe you have documentation not specifically requested which demonstrates the quality of your program, please attach it with an explanation of its relevance.
Applicants should provide an original and two copies of all materials to the current Chair of the Accreditation Review Committee in an electronic form. Contact the Central Office Executive Director to determine the appropriate medium. Paper only document should be scanned into PDF form. Electronic document should be typed in Microsoft Word. Sections on the table of contents must correspond to the sections specified in the self-study report guide work best since they allow:

- you to easily modify your package, and
- the reviewers to easily insert updates and clarifications which you may provide.

Arrange the course material by Departments (Psychology, Industrial Engineering, etc) and within Departments arrange the material by increasing course number. This procedure will also facilitate your preparation of material for subsequent reviews at the three or six year review point.

Applicants should mail the nonrefundable application fee of $200 to the Human Factors and Ergonomics Society at P.O. Box 1369, Santa Monica, CA 90406-1369.

Please attach a copy of the payment check to the original Self-Study Report Guide.
The cover page should include at least the following information:

- University name
- Name of Program for which accreditation is being sought
- Major Academic unit (e.g., college, school, and department)
- Dean/director/chair of this major unit
- Name of director of the human factors program
- Address for correspondence
- Submission Date
- Type of Submission: Original or Renewal

1. Description of the Program Environment

1.1 Describe the university in general terms (e.g., size, Colleges/Schools location). Provide material, not a series of links. However specific URLs can be provided so the reviewers can access the most current information.

1.2 Describe the major unit within which your human factors program resides (e.g., school and department). In addition, indicate all degrees and programs offered by this unit.

1.3 Describe resources available to the human factors program from the local area (e.g., libraries, other universities and human factors employers) and how these are utilized.

1.4 Specify any university/college overall entrance requirements that are in addition to your human factors program entrance requirements.

2. Human Factors Specifics

2.1 Provide a general description of your human factors program, including (brochures are welcome):

2.1.1 Degrees offered
2.1.2 Number of graduates in the graduate program over the past six years
2.1.3 Focus of the program
2.1.4 Administrative organization (college, department, etc.)

2.2 Specify the admission requirements for each of your human factors programs.

2.3 Program History:

2.3.1 New applications: For the year preceding the self-report year, provide the number of applicants (from within and outside of the university), number of students accepted for admission in the human factors program, and number enrolled (i.e. started classes). Indicate whether these are full- or part- time students. Also indicate the number admitted in “special” or “non degree” categories. If these data are available for more than the previous year please provide them.
2.3.2 Renewing applicants: For the years since your last application provide the number of applicants (from within and outside of the university), number of students accepted for admission in the human factors program, and number enrolled (i.e., started classes). Indicate whether these are full- or part-time students. Also indicate the number admitted in “special” or “non degree” categories.

2.4 Include actual course of studies for students in each of the degree programs for which accreditation is sought.

2.5 List and describe the specific requirements for graduation for each degree. Include courses, exams, projects, etc. Indicate any sequence or time limitations required in fulfilling these requirements.

2.6 If faculty outside the program advises students, provide an elaboration of this arrangement.

2.7 For each program for which accreditation is sought, complete a separate copy of Table 1 in these guidelines. Lines may be added to this table if necessary, but please retain the format shown.

2.8 For each course offered by your unit (or other participating units), and which is considered to have significant human factors content, provide the following information:

2.8.1 Title
2.8.2 Credit hours
2.8.3 Course objectives
2.8.4 Course description
2.8.5 How often the course is offered
2.8.6 Most recent syllabus including course outline and texts

It is important that the course outline for each human factors course be sufficiently detailed to permit assessment of breadth and depth of coverage of topics. Adequate description is particularly critical for those courses listed in Table 1 as contributing to meeting core curriculum requirements. Include laboratory work; indicate the number of laboratory hours required during a semester/quarter.

2.9 Show in Table 1 how each course contributes to fulfilling the curriculum requirements stated in Appendix A.

2.10 Identify each listed course, if any, that is a joint graduate/undergraduate course (i.e., meets in the same room at the same time regardless of numbering techniques). For each such course, state the measures taken (if any) to ensure a “graduate experience” for the graduate students.

2.11 Describe specializations available in your program and the title, credit hours, and course descriptions for each specialization (follow the format in item 2.8 above).

2.12 Specify individual study requirements (e.g., thesis, dissertation, comprehensive examination and internships). Indicate whether graduate students have a nonthesis option. In addition, indicate how many theses, dissertations, etc. have been published or presented at professional meetings in the last five years.

2.13 Provide any materials that reflect the quality of your program and/or its graduates (e.g., dissertations, theses, research reports, university/grants/contract funding and videotapes of promotional materials).
3. Facilities

3.1 Describe any special facilities and services that support the human factors program, including:

3.1.1 Research facilities
3.1.2 Instructional facilities
3.1.3 Computational facilities
3.1.4 Simulation facilities
3.1.5 Library facilities (include a listing of journals regularly acquired that are relevant to human factors, include electronic journals from which students can download articles)
3.1.6 Student financial support (e.g., fellowships and internships)

This may be accomplished or supplemented by brochures, photos, etc. if suitable.

4. Faculty

4.1 Provide detailed information on faculty qualifications and experience. This section should specify how your program meets the staffing requirements of Appendix B, including:

4.1.1 List all full- and part-time faculty and current curriculum vitae for each. The vitae should include professional affiliation, refereed and manuscript publications, research, consulting and teaching experience.
4.1.2 Indicate who are considered “core” faculty in the program and give details of their roles and responsibilities. Specify the percentage of time devoted to teaching as opposed to research as opposed to outside consulting.
4.1.3 List the courses taught by all full- and part-time faculty for the last academic cycle preceding the self-study year.
4.1.4 Describe how teaching evaluation is handled in your unit.
4.1.5 Describe the administrative and academic responsibilities for the human factors program.
4.1.6 Specify the teaching load in your unit.
4.1.7 Specify the promotion and tenure policies of your unit.

4.2 List and indicate the duties of nonacademic staff who support the program (e.g., computer support personnel, laboratory technicians).

5. Other Participating Departments

5.1 List and describe other departments that participate in your program.
5.2 Indicate the nature of their participation and how it contributes to your program. Also indicate how many students are involved.

6. Practical Experience

6.1 For doctoral programs or master’s programs which require practical experience, indicate how your program satisfies the requirements of Appendix C.

6.2 List any university units either directly or externally affiliated with your program which provide collaborative professionals, or student work opportunities, or which contribute in other ways to the development of human factors specialists.
7. Plans

7.1 Describe any plans that are under way to expand laboratory facilities.

7.2 Describe any plans that are under way to expand the faculty.

8. Summary

8.1 Describe the strengths of your program, including the best indicators of its quality.

8.2 Describe the areas of your program that need strengthening, if any. Indicate the resources (faculty, laboratories, etc.) that would provide this strength.
This appendix contains the criteria used in evaluating the curriculum of programs for which accreditation is sought. The results of several surveys were reviewed during the formulation of these criteria. Some of the general conclusions from the results of the surveys are summarized below.

- Graduate education in this field takes place in the organizational context of a variety of academic disciplines. The majority, however, are located in either departments of industrial engineering or in departments of psychology, with a somewhat larger number in the former.

- Human factors specialists are employed in a variety of settings, including different types of businesses and industries, government organizations, and academic institutions.

- Human factors specialists engage or participate in a broad range of activities, including designing equipment, environments, and jobs; analyzing systems (task analysis, mission analysis, etc.); research; teaching; writing proposals, reports, and other technical documents; selling ideas, plans and people; managing human factors projects; and training operators.

- There is a range of viewpoints about what knowledge, skills, and experience graduates of human factors programs should have.

- There are a considerable variety of current graduate programs regarding the breadth and depth with which topics relevant to human factors are covered.

One thing is very clear from the foregoing observations: the field is broad in virtually all respects. It is to be expected that graduate programs will vary a great deal in their specifics. This line of reasoning leads to considering the accreditation in terms of what should be basic or common to all programs: in academic terms, what should be the core and what are the appropriate specializations that may be present in varying degrees of breadth and depth among programs.
The Core

Human Factors is concerned with the application of what we know about people, their abilities, characteristics, and limitations to the design of equipment they use, environments in which they function, and jobs they perform. This focus of concern, in combination with some of the observations about roles of human factors specialists, serves to clarify what the core of education in this field must include. It should contain knowledge about the properties of people, research methodologies, analysis and design methodologies, and some basic skills in mathematics, computers, writing, and speaking. It should contain practical experience in defining and solving human factors problems. Finally, it should include research experience.

The objective of the core is to be sufficient, not exhaustive. The following paragraphs suggest breadth and depth for each topic.

1. Knowledge About Properties of People

Many dimensions of people are relevant to the work of human factors and ergonomics specialists, among them are the intellectual, physical, motivational, learning, and social dimensions. Two dimensions appear to be of such fundamental importance to a variety of human-equipment-environmental systems that they merit a special place in the curriculum: the human as a processor of information and the human as a physical engine.

The study of the human as an information processor would include the areas of attention, perception, memory, learning, decision-making, stress, and workload. Quantitative methods in this area include signal detection, psychophysical scaling, and information theory.

A study of the human as a physical engine should address the following areas: anatomical descriptive terms, the skeletal and muscular systems, anthropometry and its application in design, workplace design (including a section on computer workstations), work physiology and its application to occupational tasks, repetitive trauma disorders and its prevention and treatment, and manual material handling (including risk factors and prevention, available guideline and NIOSH equations).

2. Research Methodologies

One of the basic tenets of this accreditation proposal is that human factors specialists must be prepared to engage in research on people. At the master’s level, they must be trained to execute research projects including the collection and analysis of data and the preparation of technical reports.

At the doctoral level, they should be able to formulate research problems and deep strategies to address them. At both levels, knowledge or statistical procedures and experimental design are expected.
This category focuses on traditional human factors methodologies such as mission analysis, function allocation, function analysis, and task analysis/cognitive task analysis, critical incident techniques and simulation modeling. Part of the training in this area is to understand the application of such common criteria as performance, cost, and safety to the design and/or evaluation of various systems.

Human Factors and Ergonomics professionals require skills in mathematics and/or computer programming to communicate with engineers and computer scientists. Programs should ensure that each student develops skills that are appropriate to the student’s course of study and at the cutting edge of the student’s specialization. The level and type of skills involved will vary as a function of each program’s area of specialization. Thus a program with an emphasis on biomechanics would require mathematical skills, while a program with an emphasis on interface design would require programming skills. As a minimum, students must have at least one course in either higher mathematics (calculus or equivalent) or computer programming (e.g. C++, Visual Basic, prototyping). These requirements can be met at the undergraduate level. Programs are encouraged to provide students with opportunities to develop mathematical/statistical modeling skills in areas such as anthropometry, biomechanics, cognition, decision making, system development, and evaluations.

4A: Communication Skills. While oral and written communication skills should have been developed at the undergraduate level, supplemental experience may be requires at the graduate level. Students must be provided with the opportunity to sharpen these skills at the graduate level.

4B: Mathematical and Statistical Skills. Professionals also need the mathematical and/or statistical skills necessary to analyze the data, systems, networks, etc. with which they work and to be able to communicate about them with their relevant audiences. Some students may need to study advanced mathematical concepts, whereas others might need advanced courses in statistical analysis. Programs should ensure that each student has the appropriate background of mathematical or statistical courses to provide the skills that meet the requirements of the student’s course of study.

4C: Computer Skills. Graduates must demonstrate strong skills in regard to understanding and applying computers to the content area of their choice. In some instances, students might need to learn programming languages and develop skills in writing targeted software packages. However, all students will need to use computer tools (software or hardware) that are relevant to their disciplines. Programs should ensure that each student develops computer skills appropriate to the student’s course of study and at the cutting edge of the student’s specialization.
It should be noted that while skills such as general computer skills (e.g. web usage, operating systems such as knowledge of PC Operating Systems, presentation software) should have been acquired at the undergraduate level, supplemental training may be necessary at the graduate level.

5. Research Experience

The ability to do research is of fundamental importance. Graduate programs should include research experience. Master’s programs should include a thesis or an equivalent experience that trains research skills; doctoral programs include a dissertation with an emphasis on theory or conceptual development. No distinction is made between basic and applied research in this context. Rather, the emphasis is on the research experience as a means of developing research competence.

6. Practical Experience

Our discipline is an applied field. Although it encompasses research activities in its quest for problem solutions and in turn places a premium on research competence, nevertheless it is still primarily concerned with solving problems. In this regard practitioners should be prepared to identify and define problems and to develop and carry out approaches to solve them. They should also have been exposed to a multidisciplinary team experience as part of their academic experience.

The lack of such experience has been identified as a weakness of many current educational programs therefore human factors graduate programs at the doctoral level must include experience in working on practical problems.

Because graduates at the master’s level are likely to enter the applied human factors work force immediately, it would be a logistical burden to impose a requirement for a practical work experience as part of that degree program. Nonetheless incorporating such an experience into a master’s curriculum is strongly encouraged and will be viewed positively.

There are many ways such experience can be obtained. Examples include internships, research projects involving application, practicum assignments in extra-university organizations, and work on projects within the university. Because of the importance of this topic, strategies for providing practical work experience opportunities are provided in Appendix C.
This document deliberately avoids defining the foregoing set of competencies in terms of a core set of courses because this approach takes too narrow a view of how knowledge and skills are achieved. For example, the written communication skills discussed in paragraph 4 might be acquired by building in proper feedback to such written course work as term papers, theses, and papers for publication. Further, the degree of emphasis on particular areas may vary from program to program. Thus one program may provide familiarity with concepts and techniques of analysis and design methodologies (paragraph 3) as separate pieces in multiple courses, whereas another program may emphasize this area in a specialized, two-course sequence.

It is incumbent on each program for which accreditation is sought to show a sufficient degree of education and training in each of the six areas.

It is recognized that the core requirements for the master’s degree set forth in paragraphs 1-6—with only minimal allowance for satisfying other requirements relating to the organization housing the program (e.g., engineering or psychology)—will probably exceed 30 semester hours. This seems fully justified for the interdisciplinary field of human factors. The intent of the approach described is to allow flexibility and diversity; however, it is not intended to imply that this flexibility should permit the accreditation of a program that is weak or minimal in all or most of the six areas in order to accommodate minor human factors emphasis within a basically traditional program in either engineering or psychology.
Virtually every graduate program will have its own flavor or emphasis, which will be based on its particular goals. Primarily the university and department within which it resides and the specific faculty will determine this emphasis. For example, there are a number of differences between the model human factors programs in departments of industrial engineering and departments of psychology. Indeed, given the breadth of the human factors discipline, it would be difficult (from a resources perspective) to offer a comprehensive graduate program. Furthermore, it would require an extended period for a student to achieve competence in all of the variety of topics or specialty areas encompassed by the discipline. Two issues are relevant for accreditation. First, what is required or permitted in terms of specialization? Second, what are the appropriate areas of specialization?

It is proposed that graduate programs be structured in such a way that each doctoral student is required to achieve competence in at least one area of specialization. Programs may have strengths in several areas, and students may develop competencies in more than one area, but a minimum of one area is required.

Competency is likely to be achieved through a variety of procedures, such as research projects, internships, etc. in addition to possible formal coursework. The student should be competent to assume a job assignment in which he or she is prepared to work on problems in that area.

In terms of doctoral graduate training, competence might be achieved through the equivalent of one full year’s effort. While the dissertation may constitute the “in depth” component of such competence, complimentary breadth of the confines of the dissertation research is expected.

The combined objective of the core and the area(s) of specialization is to achieve and appropriate balance between breadth and depth of knowledge and skills in human factors.

The issue of defining areas of specialization has several dimensions: How broad or narrow is a specialty area? What are some appropriate specialty areas? To what extent should the Human Factors and Ergonomics Society attempt to define appropriate specialty areas as opposed to being responsive to specialties developed by the universities?
The following list must not be regarded as exhaustive or static but simply as examples that exist in some current graduate programs:

- Biomechanics
- Environmental Design
- Expert Systems
- Human-Computer Interaction
- Human Performance
- Inspection
- Physical Anthropometry
- Safety
- Systems Interface (workspace, controls, displays)
- Training and simulation
- Transportation
- Work Physiology
The selection, development, and retention of competent faculty, qualified in their respective fields, in large part determines the quality of an academic program. The number of faculty committed to human factors, their training and professional experience, their involvement in teaching, advisement, and research in the field are all elements that determine whether a department should consider that it offers a viable option or degree in human factors. The interdisciplinary and emergent character of human factors makes it inadvisable, and virtually impossible, to develop highly specific criteria for faculty in this field. Nevertheless, some general guidelines can be established and specifically related to the field of human factors.

There are four areas of concern relating to staffing standards: faculty resources, faculty qualification, adjunct faculty, and faculty development.

**Faculty Resources**

Faculty resources mean the number, commitment, and rank of faculty assigned responsibilities in the human factors program.

The number of faculty dedicated to the human factors program should reflect its size, the breadth of course offerings, degrees offered, teach loads, administrative requirements, and qualifications of the faculty. The adequacy of faculty committed to the teaching, counseling, and curriculum aspects associated with human factors education. This emphasis recognizes that faculty will also be involved in research, administration, consulting, and other professional activities. However, important as they are, it is essential that such activities not substitute for the primary responsibilities in the academic program and the important daily contact with students.

Rank and tenure of the faculty servicing the human factors program should likewise reflect the program’s size, breadth, and importance in the department.

**Faculty Qualifications**

With few exceptions, human factors programs in the United States are found as an emphasis in some traditional academic departments. This, in addition to the multidisciplinary applications and origins of human factors, has resulted in a diversity of educational and professional backgrounds for human factors professionals. In many cases the faculty member’s discipline will be determined by the discipline of the department offering the program. This diversity has played and probably will continue to play an important role in the dynamic growth and widening application of human factors.
Therefore, guidelines for faculty qualifications need to be consistent with this diversity and applied with careful judgment.

Qualifications of the human factors faculty as a whole should be the determining factor in evaluating adequacy of a faculty, rather than a strict application of criteria to individual members. Within this framework, qualifications should be evaluated in terms of graduate degrees, identification with the field of human factors, relevant professional experience, and the goals of the academic program.

The advanced level of graduate training of the faculty should be appropriate to the field and level of the program offered. When this traditional academic guideline is in question, significant and pertinent equivalent experience may be a substitute qualification. It is a reasonable expectation that a majority of the faculty will hold doctoral degrees.

The human factors program may be augmented by the contributions of faculty members whose primarily academic identity is clearly outside the human factors field. However, a core faculty should have current identification with the field of human factors by some combination of education, experience, scholarship, and professional recognition. In addition to academic qualifications, consideration should be given to the professional experience and activity of the faculty, given that the majority of graduates will work in an applied context. It is important that they be exposed to issues surrounding the practices of human factors and a modeling of commitment to the professional aspects of the field. Faculty professional experience and activity constitute one method of giving credibility to this guideline.

Faculty qualifications, as outlines above, are likely to be more critical when the faculty size is small.

Adjunct faculty are important in most academic programs. They provide program breadth and a valuable contact with professional activity. However, excessive reliance on part-time faculty may provide for poor integration and continuity in course offerings. A widely assumed guideline is that at least 50% of the courses should be taught by full-time faculty. When this general guideline is not maintained, special efforts should be directed at ensuring continuity and integration of the human factors program.

Full-time faculty workloads should reflect the full range of activities expected of academic faculty (i.e., teaching, research, publications, committee service, and professional society responsibilities). Teaching loads should be consistent with other campus units and allow reasonable time for nonteaching activities. Faculty have the responsibility to remain abreast of new knowledge and to contribute to the development and application of human factors through professional leaves and sabbaticals.
Appendix C: Practical Experience Opportunities

In Appendix A it was proposed that doctoral programs in human factors require inclusion of experience in working on practical problems. It was also noted that there are many ways in which experience can be gained.

The requirement for practical experience is based on a virtual consensus from earlier survey data concerning the educational and training merits of such experience. However, the requirement represents a substantial departure from the present practice of many (probably most) doctoral programs in human factors.

Practical experience means the experience or the application of human factors methodology to real world operational problems. This entails the integration of a) problem definition, e.g. through task analysis, error analysis, operational analysis; b) the design of experiments or the design of equipment; c) the statistical analysis and interpretation of such data; and e) the presentation of the data to operational personnel.

The Human Factors and Ergonomics Society Accreditation Review Committee conducted extensive surveys to determine the feasibility of including an internship requirement. Despite some opportunities for internships, however, the committee concluded that including such a requirement, as part of the accreditation qualifications was not feasible.

However, there are ways other than an internship to accomplish the goal of achieving practical experience. Possibilities include the following:

1. Formal or informal “co-op” arrangements with local (or not so local) industry, government agencies, etc.

2. Work on projects which take place within the university environment but which have an external “user” whom has a need for a solution to a problem involving human factors.

3. Practicum assignments in extra-university organizations.

4. Direct involvement in some aspect of professional (consulting) effort of a faculty member, provided that involvement is based on the capability to isolate some aspect of the problem-solving effort, which provides the student an opportunity to gain closure on a practical work issue.

5. In addition to the foregoing, some level of support and availability for internship experience.

6. Involvement in research projects focusing on practical applications.
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<th>Core Requirement Areas</th>
<th>Master's Level Degree Required Course Number(s)</th>
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<td></td>
<td>Describe non-course requirements contributing to compliance</td>
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<tr>
<td>Core Area 4A:</td>
<td>Describe specific requirements, including coursework, ensuring the ability to communicate verbally and in writing</td>
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<tr>
<td>Communication Skills</td>
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<tr>
<td>Core Area 4B:</td>
<td>Describe specific requirements, including coursework, which ensures the ability to analyze data, systems, networks, etc.</td>
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<tr>
<td>Mathematical Skills</td>
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<tr>
<td>Core Area 4C:</td>
<td>Describe specific requirements, including coursework, which ensures the ability to understand and apply computer technology to the content area</td>
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<tr>
<td>Computer Skills</td>
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<tr>
<td>Core Requirement Areas</td>
<td>Master's-Level Degree Required Course Number (s)</td>
<td>Doctoral-Level Degree Required Course Number (s)</td>
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<tr>
<td><strong>Core Area 5:</strong></td>
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<tr>
<td>Research Experience</td>
<td>Is master’s thesis required?</td>
<td>Is dissertation required?</td>
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<tr>
<td></td>
<td>If not, how requirement is met?</td>
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<td><strong>Core Area 6:</strong></td>
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<tr>
<td>Practical Experience</td>
<td>No requirement</td>
<td>How is requirement met?</td>
</tr>
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<td>(but describe if met)</td>
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<tr>
<td>Specialization</td>
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<tr>
<td></td>
<td>No requirement</td>
<td>How is requirement met?</td>
</tr>
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<td>(but describe if met)</td>
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</table>

Revised November 18, 2004

Human Factors and Ergonomics Society
P.O. Box 1369
Santa Monica, CA 90406-1369, USA
310/394-1811, FAX: 310/394-2410
info@hfes.org
http://hfes.org