

**Department of Cognitive and Learning Sciences
College of Sciences and Arts
Michigan Technological University**

Graduate Handbook

**Applied Cognitive Science &
Human Factors Program**



Revised and Approved
8.29.2016



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Primary Program Faculty (i.e., Graduate Student Advisors)

Primary program faculty serve as primary advisors and MS or PhD committee chairs. Primary program faculty may also serve as secondary co-advisors.

<http://www.mtu.edu/gradschool/administration/dean/locator/>

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Affiliated Program Faculty (e.g., Graduate Committee Members or Co-Advisors)

Affiliated faculty in this section do not serve as primary advisors but can serve as external members of MS and PhD committees. Some affiliated faculty occasionally serve as second

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ACSHF FACULTY RESEARCH INTERESTS

Susan Amato-Henderson (Ph.D.) studies motivational science. Dr. Amato directs the Social Motivation, Affect & Cognition lab (SMAC lab). The SMAC lab focuses on examining how one’s motivation, affect, and thoughts impact or are impacted by social situations. Current research includes: self-efficacy in academics; the impact of micro-aggressions and micro-affirmations on one’s persistence in STEM fields; cross cultural differences in the need to belong; ethical sensitivity in responsible conduct of research; and choking under pressure. Other past and future topics of interest include self-serving bias, entrepreneurial intentions, cognitive dissonance, and the motivational consequences of various affective states. Social Cognitive Theory serves as the foundation for much of the SMAC lab work.

Jason R. Carter (Ph.D.) specializes in integrative physiology of humans, with a focus on sympathetic neural control of circulation. He has the capability of monitoring several human physiological variables in real time during various cognitive states and laboratory-restricted maneuvers. The unique measure in Jason's laboratory is direct sympathetic neural traffic via microneurography, an invasive technique that presently considered the gold standard in the field. Other physiological measures include beat-to-beat blood pressure, heart rate, limb blood flow, and cerebral blood flow.

Adam Feltz (Ph.D.) specializes in ethical decision-making and applied ethics. His emphasis is on how attitudes toward freedom, knowledge, intentional action, and ethics relate to actions in applied domains such as medicine, law, and health. He directs the Ethical Decision-making and Ethical Naturalism (EDEN) Laboratory. The



laboratory aims to understand individual differences in ethically relevant decisions, how to help improve those decisions, and how these differences can help generate more ethically or socially desirable outcomes.

Kedmon Hungwe (Ph.D.) specializes in science education, design of instructional environments for effective learning, and communication technologies.

Myounghoon 'Philart' Jeon (Ph.D.) specializes in auditory displays, affective computing, assistive technologies, automotive user interface design, and aesthetic computing. His primary research goal is directed toward understanding the mechanisms of human mind (including both affective and cognitive aspects) and designing better interactions between people and technologies. He is director of the Mind Music Machine Laboratory, which houses computer vision technologies, digital audio workstation, sound booth, driving simulators, robots, and other devices and sensors. He also serves as a director of the Center for Human-Centered Computing at ICC (Institute of Computing and Cybersystems). Some of the current research projects in his lab include interactive sonification/visualization for performing artists and dancers, musical robots for children with autism, and emotion detection and regulation interfaces for users in the automated driving environment, etc.

Karla Kitalong (Ph.D.) is a technical communication teacher/scholar whose research centers on usability and process evaluation. She has been the project evaluator for formal and informal learning environments, library and database systems, websites, technical documents, and interactive virtual worlds. She is associate professor and director of composition, and teaches courses in interactive media, technology studies, writing, and usability.

Scott A. Kuhl (Ph.D.) specializes in virtual environment displays, human space perception, and display calibration. He is specifically interested improving the utility of virtual environment technology, comparing human performance in real and virtual environments, and developing methods to improve human performance in virtual environments. For example, numerous studies have shown that people judge distances in the real world differently than they do in a similar virtual environment shown in a head-mounted display. Some of his previous research measured this difference, explored what might cause it, and proposed possible solutions to reduce the difference. He is director of the Virtual Reality Laboratory in the Department of Computer Science, which consists of a see-through head-mounted display and 6 degree-of-freedom tracking system.

Michele H. Miller (Ph.D.) teaches an introductory human factors class to mechanical engineering students and specializes in engineering education research. She initiated the Innovations in Engineering Education research group in the mechanical engineering department. Her current research aims to: improve the understanding of hands-on ability and develop more effective ways to teach it;



integrate sustainability concepts into the mechanical engineering curriculum; develop and assess online modules that teach metacognition.

Shane Mueller (Ph.D.) specializes in research on human cognitive, perceptual, and memory systems using empirical, computational, mathematical, and statistical techniques. His primary research interest is in developing models of how human memory systems represent knowledge, and how people use that knowledge to accomplish tasks. This ranges from low-level representations of the perceptual systems to high-level decisions made on the basis of expert knowledge.

Amlan Mukherjee (Ph.D.) focuses his research and professional activities primarily in the area of planning and decision making in infrastructure system management. He develops models and implements simulations that can aid decision makers assess design alternatives and explore what-if scenarios. The goal of his research is to investigate and predict behavior of civil infrastructure systems, and develop new predictive algorithms that support the decision-making processes.

Robert Pastel (Ph.D.) develops user/operator interface designs and evaluates interaction techniques. He is director of the Human-Computer Interaction (HCI) Laboratory, where he develops efficient interfaces for panel displays, mobile devices and robot controls in order to construct general usability principles in these domains. In addition, the HCI lab develops novel interaction and evaluation techniques to explore the unique characteristics of mobile devices and multiple degree of freedom input devices

Kelly Steelman (Ph.D.) specializes in basic and applied aspects of human attention in complex visual environments. She is the director of the Safety, Technology, and Attention Research Laboratory (STARLab). Current work examines the attentional mechanisms that drive search performance within aviation and radar displays and the instructional design factors that influence learning from multimedia educational materials. Dr. Steelman is also a member of the Breaking Digital Barriers (BDB) research group that studies the social-cognitive factors that influence technology adoption and use among older adults. The BDB group runs a digital literacy program at the local library that pairs Michigan Tech students with community members to provide assistance with digital tools and applications.

Kevin Trewartha (Ph.D.) specializes in cognition, motor control, and neuroscience of aging. His research uses a blend of methods from cognitive psychology, movement science, and neuroscience aimed at broadening our understanding of age-related changes in cognitive functioning and exploring the impact of those changes on the way in which we interact with the environment. For example, how do age-related declines in memory and cognitive control impact our ability to interact with objects in our environment, or learn new motor skills? The ultimate goal of this research is to understand the complex interaction between cognitive and motor control processes and how these processes contribute to declines in functional independence in later life.



Elizabeth S. Veinott (Ph.D.) specializes in judgment and decision making research. She focuses on translational research taking basic theory and applying it in complex and naturalistic domains. Her research includes research using video games as learning technologies, especially in STEM domains.

Charles Wallace (Ph.D.) is primarily interested in how humans can better understand the software they build and use. He is exploring the idea of lightweight formal methods as a means of harnessing the analytical power of computers to enlighten software developers, by identifying dark corners and hidden assumptions. He is also interested in how humans can enlighten one another, through effective communication in software development.



GRADUATE PROGRAM

Definitions

Human Factors, also known as Ergonomics, 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” (International Ergonomics Association, 2000; The Human Factors and Ergonomics Society, 2014).

Applied Cognitive Science is the application-oriented “multidisciplinary study of minds and other intelligent systems”. Applied cognitive scientist-practitioners follow a problem-oriented approach (i.e., non-discipline-oriented) to inform, model, and improve information processing by people, machines, teams, organizations, and other complex systems (Cognitive Science Society, 2014; Thagard, 2005).

ACSHF Program Mission and Values

Mission: Creating a user-friendly future at Michigan Tech

Vision & Values: We create world-class science and technology by educating and supporting visionary scientist-practitioners who are effective leaders, teamwork facilitators, and diversity advocates. We are committed to innovation, inclusion, and the pursuit of ethical and sustainable development (e.g., social, economic, and entrepreneurial). Michigan Tech’s Applied Cognitive Science and Human Factors program aspires to the highest standards of academic enterprise commensurate with our position as one of the world’s leading ACSHF PhD programs.

Graduate Program Admissions and Overview

The ACSHF graduate program is offered by the Department of Cognitive and Learning Sciences. The program integrates training in behavioral science and technological design to optimize human performance, health, safety, well-being, and sustainability. All qualified prospective students are encouraged to apply for admission to the graduate program via the MTU graduate school application website (<http://www.mtu.edu/gradschool/admissions/apply/>).

Our program only admits students for graduate study under the direct mentorship of a primary faculty advisor. Secondary mentors are also often selected to facilitate interdisciplinary research (e.g., research at the intersection of two different kinds of expertise such as psychology and computer science). The majority of our students



are admitted to the PhD program; however, we do consider applications from exceptional candidates for training leading to a terminal MS on a case by case basis.

The doctoral program requires a minimum of 72 credit hours and the MS degree requires a minimum of 32 credits (see following sections for complete details). In addition to broad training in physical and cognitive ergonomics, all students will select and declare an area of specialization in which to focus their elective coursework and their thesis/dissertation research. Currently, we offer 5 specialization areas:

- Cognitive Engineering and Decision Making
- Individual Differences in Human Performance
- Human-Centered Design
- Physical Ergonomics
- Educational Technology and STEM education

Areas of expertise among ACSHF faculty include: usability, decision making, perception, attention, computational modeling, STEM education, and bioethics. Current research projects in the program include: usability, user-experience (UX), and human-computer interaction; sonification and auditory display optimization; data visualization; human performance assessment technology; cognitive and behavioral modeling and simulation; decision support systems and personalization; transportation and safety systems; risk communications and decision aids; physiological measurement and user analytics; research ethics, bioethics, informed medical decisions; intelligent-tutoring systems; STEM education.

Prerequisites

The following courses are prerequisites for many of the core and elective courses in the ACSHF graduate program. The prerequisite courses (i.e., 3-9 credits) are required in addition to the minimum course requirements for the graduate degree.

Core prerequisite courses

Undergraduate Behavioral Research Methods (min. 3 credit)

Undergraduate Statistics and Behavioral Modeling (min. 3 credit)

Undergraduate Cognitive Psychology or Cognitive Science (min. 3 credit)

At the discretion of the graduate program director and the student's advisor, these requirements may be substituted or waived given evidence of equivalent preparation. Additional prerequisite courses may also be required in some cases. See "*Advanced Responsible Conduct of Research (RCR)*" for additional general requirements and prerequisites.



Student Evaluation Policies and Guidelines

For complete rules and university policies please see:

<http://www.mtu.edu/gradschool/administration/academics/policies-procedures/good-standing/>

Student Workload Standards and Expectations

Success in research and the development of expertise require extended deliberate practice and the thoughtful investment of one's time in scholarship and professional development. Students who are enrolled in the ACSHF program are expected to work on their research or coursework according to the guidelines at:

<http://www.mtu.edu/gradschool/administration/academics/policies-procedures/credit/>

In summary, these guidelines state: "One credit should average 3½ hours of a student's time per week for one semester. One hour in class and 2½ hours in individual study is a typical division." The 3.5 hours commitment per credit also applied to students enrolled in research credits. On average, graduate students enrolled in 9 credits of research should spend 30 or more hours per week focusing on their research (i.e., $9 \times 3.5 = 31.5$ hours/week). Students who are also supported by grants or department funds (e.g., GRA, GTA, GTI, GADI, etc.) are expected to perform work for the University (e.g., teach courses, provide research support to faculty) at the of usual rate of 20 hours per week for a full appointments. The 20 hours per week are in addition to the amount of time students spend working on coursework or completing research credits. These graduate appointments are considered to be part-time positions that provide some financial assistance to students who are pursuing their degrees on a full-time basis. The sum of credits and supported work activities is on average more than 40 hours but less than 60 hours per week. This does not mean that students should be "watching the clock". Some weeks may require a bit more or a bit less work. In general, those students who understand this expectation and who then focus on making steady progress within these constraints will tend to create professional and academic success.

Academic Standing, Progress, and Dismissal

To remain in good academic standing graduate students must do all of the following:

- Maintain a cumulative overall GPA of at least 3.0.
- Receive grades of "P" (progress) in research credits.
- Maintain continuous enrollment (i.e., min. 1 credit/semester incl. summer)
- Pass all written and oral exams required for completion of the degree. Graduate programs limit the number of attempts students have to pass a required oral or written exam. Graduate programs also require that the exams be taken within a specified time period after a student matriculates into a degree program.
- Make satisfactory progress toward completion of the degree during each academic-year semester and summer session of enrollment.

Students who fail to maintain good academic standing will be subject to a sanction of graduate academic probation, graduate academic suspension, or graduate academic



dismissal. To apply credits earned in non-research courses to a graduate degree or graduate certificate, the courses:

- Must be graded. Pass/fail, audit, or satisfactory/unsatisfactory grades cannot be used on a degree schedule, except when applied as research credits.
- Must have a grade of “B” or better. This requirement can be adjusted at the discretion of a student's graduate program to allow for use of “BC/C” grades in up to six (6) credits.

For more information about standards and policies, including options for appealing grades please see the websites listed below and feel free to contact your primary advisor, the graduate program director, or other ACSHF faculty as appropriate.

<http://www.mtu.edu/gradschool/administration/academics/policies-procedures/good-standing/>

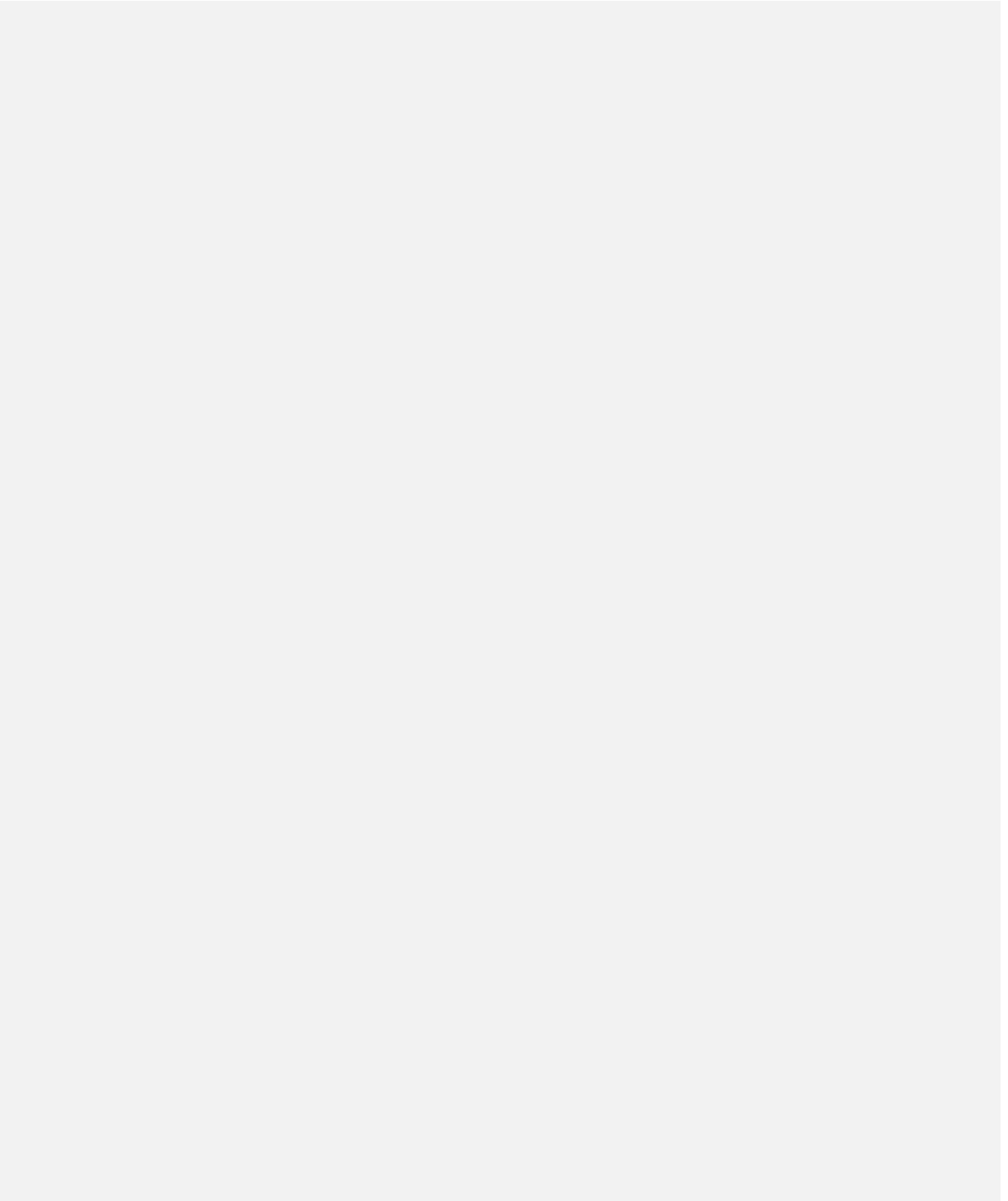
<http://www.mtu.edu/gradschool/administration/academics/policies-procedures/scholastic-standards/>

Annual Graduate Student Progress Reports

Each year, graduate students and their mentors should meeting to discuss and review student progress, including strengths and weaknesses, mutually agreeable goals, professional development milestones, and other issues. Graduate students will discuss and receive the standard *Graduate Student Progress Form* that provides feedback to the student, mentor, and graduate program director and committee. An example of the standard feedback form is below. Note: Faculty primary graduate advisors are required to provide a copy of this form to each student they are mentoring and to submit this form to the graduate program director no later than two weeks after the end of finals during in the Spring semester. The graduate Student Progress Forms are included in graduate student files.



Example: Annual Graduate Student Progress Form



General Policies and Guidelines

All students should be aware of the following policies.

Academic Integrity:

<http://www.admin.mtu.edu/usenate/policies/p109-1.htm>

Academic regulations and procedures are governed by University policy. Academic misconduct cases will be handled in accordance the University's policies.

Assessment:

<http://www.admin.mtu.edu/usenate/policies/p312-1.htm>

Student work products (exams, essays, projects, etc.) may be used for the purposes of university, program, or course assessment. All work used for assessment purposes will not include any individual student identification.

Disability Services:

<http://www.mtu.edu/deanofstudents/students/disability/>

If you have a disability that could affect your performance in any class or that requires an accommodation under the Americans with Disabilities Act, please contact your instructor or Disability Services at 487-1494 as soon as possible so that appropriate arrangements can be made.

The Office of Institutional Equity:

<http://www.mtu.edu/equity>

Michigan Technological University complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990.

Michigan Tech has a policy of affording equal opportunity to all of its employees, students, applicants for employment, and applicants for admission without regard to race, religion, color, national origin, age, sex, sexual orientation, gender identity, height, weight, genetic information, or marital status, disabled veteran status, veteran status, or disability.

Equal Opportunity, Discrimination, or Harassment Statement:

<http://www.admin.mtu.edu/admin/boc/policy/ch5/>

For other concerns about discrimination, you may contact your advisor, Chair/Dean of your academic unit, Dean of Students Office at 487-2212 or The Office of Institutional Equity at 487-3310. Discrimination and harassment are not tolerated.



MASTER'S PROGRAM

MASTER'S PROGRAM DEGREE REQUIREMENTS

The Master's program in ACSHF requires a *minimum* of 32 credit hours, including core courses and a Master's-level thesis or report. Depending upon the background of individual students, some courses may be waived. For more information see the Graduate Program Director. Students wishing to enter the program to receive a terminal Master's degree must be invited to apply (see Admission Requirements). The minimum of 32 hours of core graduate credit required for the Master's degree are made up as follows:

Statistics and Methods Core

7 credits:

PSY 5210 Advanced Statistical Analysis and Design I (4 hrs)

PSY 5220 Advanced Statistical Analysis and Design II (3 hrs) or pre-approved graduate-level alternative taught within ACSHF or another department

Research Core

6 credits:

PSY 5999 Graduate Research (Minimum 6 hrs)

A thesis or report is required for all terminal Master's students and Ph.D. students wishing to attain a Master's degree en route (see Master's Thesis & Report section). Unless waived by the graduate director, students must be enrolled in at least 1 credit of 5999 or 6999 every semester to be considered to remain in the program.

Applied Cognitive Science and Human Factors Core

6 credits:

PSY 5100 Applied Cognitive Science (3 hrs)

PSY 5850 Human Factors Psychology (3 hrs)

"Specialization" Core

6 credits (min):

Specialization courses provide students with a more comprehensive understanding of a research domain and prepare the student to engage in research and apply those findings. Students are required to take 6 credits selected from courses specified as specialization courses. Although the specialization courses offered change each year, courses designated as such in past have included:

PSY 5010 Cognitive Psychology (3 hrs)

PSY 5160 Sensation and Perception (3 hrs)

PSY 5450 Aging, Cognition, and Motor Behavior (3 hrs)

PSY 5510 Memory and Learning: Review, Synthesis, and Applications (3 hrs)

PSY 5610 Automation (3 hrs)

PSY 5620 Displays and Alarms (3 hrs)

PSY 5750 Judgment and Decision Making (3 hrs)

PSY 5770 Affective Design and Computing (3 hrs)



PSY 6990 Special Topics in Cognitive Science (3 hrs; may satisfy specialization depending on course)

PSY 6991 Special Topics in Human Factors (3 hrs; may satisfy specialization depending on course)

PSY 6991 Special Topics in Human Factors: Human-robot Interaction

Courses from the electives list that reflect the student's area of specialization may be substituted for those specialization core credits above with approval from the primary advisor and the graduate director.

“Tools” Core

6 credits (min):

Tools courses focus on specific methodologies that may apply across research domains and have broad applications beyond the core statistical competency requirements. Tools courses expose students to advanced methodological skills that should apply both within their chosen specialization and others. Tools classes provide training in topics such as advanced cognitive modeling, cognitive task analysis, usability analysis, advanced statistics, survey methods, performance assessment, physiological measurement, or other methods used in ACSHF.

Students are required to take 6 credits selected from courses specified as “tools” courses. Although the courses offered change each year, courses designated as such in the past have included:

PSY 5300 Human Performance (3 hrs)

PSY 5860 Human Factors II (3 hrs)

PSY 5390 Testing Measurement & Advanced Psychometrics (3 hrs)

PSY 5400 Ergonomics & Biomechanics

PSY 5410 Computational and Mathematical Models of Human cognition (3 hrs)

PSY 6990 Special topics in Cognitive Science: Survey & Meta-analytic methods (3 hrs)

PSY 6991 Special Topics in Human Factors: Applied Ergonomics (3 hrs)

PSY 6991 Special Topics in Human Factors: Psychometric & User Experience (3 hrs)

ToCS 5760 Human-Computer Interaction and Usability Testing (3 hrs)

PSY 6990 Special Topics in Cognitive Science (3 hrs; may satisfy tools depending on course)

PSY 6991 Special Topics in Human Factors (3 hrs; may satisfy tools depending on course)

Courses from the electives list that reflect the student's area of specialization *and* equip students with additional tools, methods and/or practical skills may be substituted for those above with approval from the primary advisor and graduate director.

Advanced Responsible Conduct of Research (RCR)

1 credit required:



Students are required to take an RCR course within the first year of their enrollment. The university and department offer several courses that may satisfy the RCR requirements. A complete listing can be found at:

<http://www.mtu.edu/gradschool/administration/academics/resources/rcr/>

Most RCR courses are 1-2 credit courses, offered during the academic year or summer semesters. Note: UN 0500 is a no-tuition course with lab fee. Its credits can count toward the credits required for full-time enrollment status, but *cannot* count toward the total credits (32) needed for the Master's (or PhD) degree. Students who use UN0500 to satisfy their RCR requirements should ensure they have completed 32 credit hours in other classes (non-research credits).

As part of advanced RCR training, students are required to complete human subjects training using the full social/behavioral research course offered by the CITI program (<http://citiprogram.org>).

PSY 5000: Advanced Responsible Conduct of Research (offered on demand)

Two Year Core Course Rotation and Schedule

Students will be able to complete their masters-level coursework in two calendar years. We intend to offer the four required courses in sequence, alternating in "A" years and "B" years. 2014-15 is an "A" year and 2015-16 is a "B" year. Students who wish to complete their degree or reach candidacy within 2 years should plan to take these courses in this sequence, as each course is only offered every other year. To the extent that faculty teaching schedules allow, one tools course and one specialization course will be offered each semester.

A Fall	Human Factors I (PSY 5850)
A Spring	Applied Cognitive Science (PSY 5100)
B Fall	Stats I (PSY 5210)
B Spring	Stats II (PSY 5220 or alternative)

MASTER'S THESIS AND REPORT

The Master's degree has both thesis and report options that require the student to complete a Master's thesis or a Master's-level report, respectively. All terminal Master's students are required to complete either the thesis or report. All Ph.D. students who wish to obtain a Master's degree en route to their Ph.D. are required to propose and then complete a Master's thesis according to the guidelines in this section. We recommend that Ph.D. students strongly consider completing the MS degree en route. Ph.D. students who do not wish to receive a Master's degree must submit a research report, previously-written Master's thesis, publication submission, or published manuscript covering research conducted during master's-level study in ACSHF or a closely-related field for evaluation by the Graduate Program Director. If this leads to questions about the sufficiency or quality of the document, the Director will consult the Graduate Program Committee to evaluate. If the documents provided are not written in English, students must elect one of the following: (1) provide a



translated version of the document to the program committee; (2) allow external review by at least two scientifically-qualified reviewers who can read the language it is written in and provide an English-language review of the competency. Candidate reviewers will be selected to avoid conflicts of interest, and written reviews will be confidential and not provided to the student. (3) give an English-language presentation to describe and explain the results and methods of the research (this can be in a public forum or a presentation for the Graduate Program Committee and Graduate Program Director). Based on the option taken, the Graduate Program Committee will make a recommendation to the Graduate Program Director.

Submission is recommended once the 32-credit requirements are completed, prior to submitting the qualifying exam (Qualifying Exam Portfolio). In all cases, the thesis or report should be the culmination of a research project that is closely related to the student's area of specialization. The final product should demonstrate the student's capacity to carry out independent research and should provide the student with the opportunity to contribute to knowledge in ACSHF.

Students working on a proposal (see Proposal section below) for their Master's thesis or Master's-level report and/or collecting pilot data in preparation for their thesis/report can elect to enroll in PSY 5999 (Graduate Research). Credits earned from enrolling in PSY 5999 (over and above the 6 credits of PSY 5999 outlined in the core requirements) are earned in addition to the minimum 32 credits required for the Master's degree (*Note:* With approval from their primary advisor and the graduate program director, students in the PhD program *may* count some of these credits toward their PhD—see PhD section).

Primary Advisor & Thesis / Report Committee

Students will be admitted into the ACSHF Master's program under the mentorship of a primary faculty advisor. The primary advisor must hold a regular or adjunct appointment in the Department of Cognitive and Learning Sciences (CLS). The main role of the primary advisor is to advise the student on course selection, supervise the research of the student, and chair the examination committee. The primary advisor will help the student select members of the examination committee. A list of ACSHF faculty and their interests can be found at the beginning of this handbook. The committee must consist of at least 3 members of the graduate faculty, including the primary advisor. At least one of the committee members must be from the Psychology Division of CLS and at least one must be from outside CLS. The task of the committee is to provide advice and consultation at all stages of producing the thesis or report, particularly in the development of the proposal.

The student should complete the *Advisor and Committee Recommendation* form no later than the end of their second semester. The dean of the Graduate School will officially appoint the committee. The masters project, whether a thesis or report, first needs to be proposed to the committee in a formal meeting, during which the committee will advise the student about the scope of work proposed. Once the work has been completed and the thesis has been written, the thesis must be defended to the committee in a forum announced and open to the public.



A basic timeline for this is as follows:

Complete Advisor and Committee Recommendation Form	
Two semesters prior to graduation	
Proposal document submitted to committee	Four weeks prior to proposal
Proposal Meeting	Recommended: Semester prior to defense
Degree Schedule Submission	Semester prior to defense
Thesis Defense Scheduled	Two weeks prior to defense date. Last day: Tuesday, Week 10
Thesis draft to committee	Four weeks prior to defense
Submit thesis and pre-defense form to graduate school and schedule defense	Two weeks prior to defense http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/pdfs/pre-defense.pdf
Oral Thesis Examination/defense	At least 6 weeks before end of semester in which student graduates. Last day to hold oral defense: Tuesday, Week 12 Nov 15, 2016 April 4, 2017
Submit Report on Oral Examination to graduate school	Immediately following oral examination
Advisor-approved revisions submitted to graduate school	At least 2 weeks before end of semester student graduates Monday, Week 13
Final graduate-school requested revision due	Friday of finals week

The student should plan at least a semester ahead in scheduling their oral thesis defense, as delaying the proposal or defense dates to the end of the semester may prevent graduating in the semester in which they hold the defense.

Proposal of the Thesis or Report

The proposal should conform to APA publication manual (6th ed.) guidelines for writing a manuscript. The proposal should contain a review of the literature, a problem statement/rationale, preliminary hypotheses, research design, and proposed methods/research strategy, and pilot data. The proposal should be submitted to the committee no less than four weeks prior to the date of the proposal presentation.



Oral Presentation & Defense of the Proposal

It is the responsibility of the student to coordinate with committee members to schedule the presentation of their Master's thesis / report proposal. The proposal must be orally presented to the examination committee for approval. This presentation is open to individuals outside the committee who may wish to attend. The presentation should last no longer than 30 minutes with an additional 30-60 minutes scheduled for non-public questioning (i.e., a closed forum open only to MTU faculty and the student who is defending). The student should discuss the procedure for this presentation with his/her primary advisor.

Submission of Degree Schedule

Students must submit the Degree Schedule the semester before they are due to defend their report or thesis (not the report/thesis proposal). This form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/masters/>

Research Only Mode

Upon approval of their advisor and the graduate director, terminal Master's students who have completed all of their coursework can submit a Research Only Mode Petition. This must be submitted one week prior to the first day of classes in the semester the student plans to enter research only mode. The appropriate tracking forms must be on file before students are eligible to register in research only mode. More details can be found at:

<http://www.mtu.edu/gradschool/administration/academics/policies-procedures/research-mode/>

MASTER'S THESIS OR REPORT PREPARATION AND SUBMISSION

Once students have presented and successfully defended their Master's proposal to their committee, they should continue to work towards their thesis or report by enrolling in PSY 5999 (Graduate Research).

Writing the Thesis or Report

Students should format their thesis or report according to the guidelines outlined in the APA Publication Manual (6th edition). Supplementary procedures for preparing and submitting a Master's'-level thesis or report can be found on the Graduate School website:

Report Guidelines:

<http://www.mtu.edu/gradschool/administration/academics/report/formatting/>

Thesis Guidelines:

<http://www.mtu.edu/gradschool/administration/academics/thesis-dissertation/formatting/>

The thesis or report should contain a review of the literature, including problem statement/rationale, hypotheses, methods, results from data and statistical analyses, discussion, conclusion, references, and appendices. Before a draft is submitted to the committee, the student, with guidance from his/her advisor, should have refined the thesis/report as much as possible in terms of content, grammar, and format (i.e., a



potentially final product submitted for approval, revision, or rejection).

Submitting the Thesis or Report Prior to the Defense

The members of the committee should receive a draft of the thesis or report no less than four weeks prior to the planned date of the oral presentation and defense. At least two weeks before the defense date, students must submit a completed draft of their thesis or report and the *Pre-defense Form* to the Graduate School. The *Pre-defense Form* can be found on the Graduate School website for *Forms and Deadlines*: <http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/masters/>

If these two items are not received by the Graduate School two weeks prior to the defense, the defense will be cancelled and the student will need to begin the scheduling process again. For more details see:

Theses and dissertations

<http://www.mtu.edu/gradschool/administration/academics/thesis-dissertation/submission/>

Reports

<http://www.mtu.edu/gradschool/administration/academics/report/submission/>

The Graduate School will review your draft thesis or report and provide feedback via the *TDR-Review Form*:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/masters/>

Oral Presentation & Defense of the Thesis or Report

Students are required to orally present and defend their thesis or report to their examination committee. It is the responsibility of the student to coordinate with committee members to schedule the oral presentation. The student's primary advisor will chair the oral presentation and defense of the thesis or report. The student should discuss the procedure for this presentation with his/her primary advisor. In general, the oral presentation and defense should be concerned with the problem, design, method, interpretation, and knowledge in the general area of the thesis or report. The presentation should last no longer than 30 minutes (open to the public) with an additional 30-60 minutes scheduled for questioning (open only to Michigan Tech Faculty and the presenting student).

The committee reports the result of the oral examination by completing the Report on final oral examination form. This form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/masters/>

Students who do not successfully pass their oral examination will be allowed one more opportunity to do so. If a student does not successfully complete the oral exam in two (2) attempts, the program director will request that the Dean of the Graduate School dismiss the student for lack of progress.

The signed Report on oral examination form must be submitted immediately after the oral examination. If the student is required to make revisions, they must be done as per the time frame and instructions described on the form. The advisor, along with



the department chair, approves the final thesis or report on behalf of the committee by completing the Approval of a final dissertation, thesis, or report form. This form is submitted after the student has completed all of the technical and formatting changes required by the committee, and within one week of submitting the final thesis or report to the Graduate School. This form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/masters/>



DOCTORAL PROGRAM

DOCTORAL DEGREE REQUIREMENTS

The Doctoral program in ACSHF requires a minimum of 72 credit hours, including core courses, elective courses and required research as follows:

- 32 hours of Core Graduate Credit including:
 - 32 Masters Core Credits
- 30 hours of Elective Graduate Credit including:
 - At least 9 credits of elective coursework
 - Up to 18 credits of independent research that will be counted toward degree requirements
 - 3 credits of PSY 5095 Practicum, which may be substituted by coursework or research credit if a practicum is completed outside of PSY 5095. If substituted, a student may count 21 credits of independent research toward degree requirements.
- 10 hours of Dissertation Research Credit

Once all required core courses and credits (i.e., 32 hours *Core Graduate Credit*—see below) and course-based electives (i.e., at least 9 hours of coursework of the 30 hours of *Elective Graduate Credit*—see below) have been taken, students are required to complete a qualifying exam (see *Qualifying Examination*). Required and elective credits and other requirements must be satisfied before a student can take the qualifying exam. After successfully passing their qualifying exam students will obtain doctoral candidacy status, at which point they can officially form a dissertation committee (see *Dissertation Research Credit*). Unless otherwise specified, students not holding a Master’s degree prior to enrollment in the doctoral program should elect to receive a Master’s degree en route to Ph.D. (assuming the requirements are fulfilled). However, it is the responsibility of each student to ensure that the necessary paperwork is completed (see Master’s Degree Requirements).

A. CORE GRADUATE CREDITS

A total of 35 hours of core graduate credits are required as follows.

Core ‘Class’ Credits

The core credits required for the doctoral program include the 32 hours of core graduate credit for the Master’s degree. For more details, see “Masters Program Degree Requirements”.

The core class credits (as outlined in the Masters Program Degree Requirements section) include a Master’s-level graduate research project. For Ph.D. students



wishing to obtain a Master's degree en route to their Ph.D. at Michigan Tech, this project must result in a Master's thesis or report (see Master's Thesis & Report section for requirements). Attaining a passing grade for, and sufficient credits in, PSY 5900 or 5999 without successful completion of a thesis or report will not constitute fulfillment of the requirements for that degree.

Ph.D. students who do not wish to receive a Master's degree must submit a research report, previously-written Master's thesis, publication submission, or published manuscript covering research conducted during master's-level study in ACSHF or a closely-related field to the ACSHF Graduate Program Committee for evaluation, typically prior to or as part of their qualifying exam (qualifying exam binder) process. In all cases, the thesis or report should be the culmination of a research project that is closely related to his/her area of specialization, and be a professional representation of the student's work, the advisor, program, and university. The final product should demonstrate the student's capacity to carry out independent research and should provide the student with the opportunity to contribute to knowledge in ACSHF.

Practicum Core

PSY 5095 Practicum (3 credits minimum, 2-12 weeks)

The practicum core is an independent activity wherein students (1) apply existing ACSHF knowledge and skills and (2) acquire new knowledge, skills and methods from the operational setting in which the practicum activity takes place. Students should choose their practicum activity in consultation with their advisor. The practicum is designed to help ensure all ACSHF scientist-practitioners are well-prepared to identify, define, and solve applied problems. This practicum experience should allow for the development of expertise in the application of Human Factors methodology to real world operational problems. It must integrate (a) problem definition (e.g., through task analysis, error analysis, operational analysis), (b) the design of experiments or the design of system, (c) the statistical analysis and interpretation of such data, and (d) the presentation of the results to stakeholders. Appropriate supervision of relevant practical experiences is required. Suggestions on how to meet this requirement include:

- Structured internships in the private or public sector.
- Formal or informal cooperative assignments in the private or public sector.
- Work on projects that take place within the university environment but that have an external "user" who has a need for a solution to a problem involving human factors (e.g., working outside of the department to solve operational problems for the university).
- Practicum assignments in extra-university organizations (e.g., government or other institutes).

The practicum activity may be paid or unpaid. Relevant work, design and/or applied experience prior to enrollment in the ACSHF program may fulfill this requirement with the approval of the ACSHF Graduate Program Committee and the graduate



program director. To ensure that the proposed practicum will satisfy the intent of this requirement, the student should prepare and submit a Practicum Proposal (see Appendix A) for review and approval by their advisor and the Graduate Program Committee prior to starting the project or course.

Note. If students elect to take more than 3 credits of PSY 5095 (e.g., multi-semester practicum experiences), these additional credits will count towards the *Elective Research Credit* requirement (see next section B).

B. ELECTIVE GRADUATE CREDITS

A total of 27 hours of elective graduate credits are required. Courses taken for elective graduate credit can be selected from the tools and specialization courses listed in the Master's degree requirements, as well as the 'Elective Courses' list or the 'Other Elective Courses' list below. Relevant courses not listed here may also satisfy the requirements for elective coursework, provided they are taken within the student's area of specialization. At least 9 elective credits must be chosen from coursework within a student's area of ACSHF specialization. Students will select courses in consultation with their advisor. Up to 18 credits of research (e.g., PSY 5910 [Independent Research], PSY 5999 [Graduate Research] or PSY 6999 [Doctoral Research]) may be applied towards the 27 hours of elective credit. Courses that have been used to satisfy other degree requirements cannot be used to satisfy elective course requirements (e.g., cannot list cognitive psychology as a core course and an elective course).

Elective Courses

PSY 5010 Cognitive Psychology (3 hrs)
PSY 5060 Cognitive Systems (3 hrs)
PSY 5160 Sensation and Perception (3 hrs)
PSY 5300 Human Performance (3 hrs)
PSY 5400 Ergonomics and Biomechanics (3 hrs)
PSY 5500 Supervised Teaching Practicum (3 hrs)
PSY 5750 Judgment and Decision Making (3 hrs)
PSY 5860 Human Factors II (3 hrs)
PSY 5880 Current Issues in Human Factors (1-3 hrs)
PSY 5770 Affective Design & Computing (3 hrs)
PSY 6991 Human-Robot Interaction (3 hrs)
PSY 5910 Independent Research (1-6 hrs)
PSY 5999 Graduate Research (1-12 hrs)
PSY 6990 Special Topics in Cognitive Science (1-3 hrs)
PSY 6991 Special Topics in Human Factors (1-3 hrs)
PSY 6999 Doctoral Research (1-12 hrs)
CE/SSE 4750 Decision Risk Analysis and Management
CE/CSE 5710 Modeling and Simulation
CS 4760 Human-Computer Interaction
CS 5760 Human-Computer Interaction and Usability Testing (3 hrs)



CS 5090 Special Topics in Computer Science: Software Requirements Engineering
CS 5090 Special Topics in Computer Science: Data Visualization
CS 5090 Special Topics in Computer Science: Virtual Environment
ED 5510 Educational Technology
ED 5540 Special Studies in Education: Cognition and Technology
ED 5540 Studies in Education: Cultural Perspectives on Learning and Development
ED 5540 Special Studies in Education: Design of Media for Learning (3 hrs)
EH 5350 Special Topics in Kinesiology (3 hrs)
EH 5350 Special Topics in Kinesiology: Motor Learning and Control (3 hrs)
EH 5350 Special Topics in Kinesiology: Motor Development (3 hrs)
EH 5350 Special Topics in Kinesiology: Biomechanics of Human Movement (3 hrs)
HU5112 Simulation, Virtuality, and the Design of Experience (3 hrs)
HU6112 The Consequences of Classification (Archives, Databases, Content Management Systems) (3 hrs)
ME 5990 Modeling Operator Performance
SU 5010 Geospatial Concepts, Technologies and Data (3 hrs)

Other Elective Courses

BE 5110 Neuroengineering
BE 5700 Biosensors
BL 4470 Analysis of Biological Data
CE 5404 Transportation Planning
CE 5410 Intelligent Transportation Systems
CS 4811 Artificial Intelligence
CS 5811 Advanced Artificial Intelligence
ED 5510 Special Studies in Educational Technology
EE 4250 Communication Theory
EE 4257 Digital Image Processing
EE 5530 Wireless Digital Communication
MA 4720 Design and Analysis of Experiments
MEEM 4660 Data Based Modeling & Control
MEEM 4705 Introduction to Robotics and Mechatronics
MEEM 5602 Process and Product Design and Improvement

For graduate course descriptions:

https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr

C. DISSERTATION RESEARCH CREDIT

10 credits:

PSY 6999 Doctoral Research (10 hrs)

This course code is reserved for graduate students who have completed all the core MS degree requirements (or equivalent) and who are working towards their dissertation proposal or dissertation. Students must complete all coursework and pass their qualifying exam before proposing their dissertation (see Dissertation Proposal section).



QUALIFYING EXAMINATION

Qualifying Exam Portfolio

Students are required to collate all evidence relevant to their qualifying exam in a portfolio (i.e., binder), including detailed supplemental materials attached in appendices (e.g., articles, statistical analyses, grant proposal, etc.). The portfolio must be a high-quality representation of the student's professional preparation as an independent researcher, suitable for presentation to external stakeholders (e.g., review by accreditation committees, presentation to industry collaborators). The portfolio should begin with a general overview and introduction describing the student's skills, key achievements, and career plans. This 1-2 page overview should address each of the following questions:

- What is your official specialization and what are your major achievements and essential skills in that area?
- What can an expert in your sub-specialization do that other people cannot do (or cannot do as well), and how or why is this type of skill valuable/useful?
- How have your educational and professional experiences prepared you to contribute to your field?
- How have you prepared yourself to support inclusion and diversity?
- How have you prepared yourself to facilitate teamwork and communication?
- How have you prepared yourself to conduct ethical human subjects research?
- What is the general topic of your dissertation and (briefly) why is this an interesting topic that connects basic and applied science? (not required but strongly recommended when the topic is known)
- What will you do with your expertise in the coming years? What are your professional career goals? (e.g., professor at a teaching or research university, professional in a specific industry, government contractor, etc.)

Students are also required to include their CV with their qualifying exam binder either as part of the body of the portfolio (recommended) or in the appendix. Finally, students should include a copy of the ***Agreement to Release Qualifying Exam Portfolio*** (see Appendix B). Declining to allow the portfolio to be released will not impact the evaluation of the exam, but is necessary because of educational confidentiality. The core of qualifying examination portfolio is discussion of evidence of competency in five essential skill areas, namely: Independent Research, Research Funding, Research Presentation, Practical Skills, and Statistical Skills. To pass the qualifying exam, the students must meet or exceed all requirements. In some special cases, demonstrated excellence in four areas may compensate for some weakness in a fifth area, at the discretion of the graduate program committee and the student's primary advisor (student should consult with their advisor before submission). For each essential competency the student should prepare a brief essay with supporting materials included in appendices. In addition to providing evidence of each competency, students will prepare brief essays that describe their experience and skills, and highlight how each competency (a) demonstrates utility and (b) addresses a fundamental theoretical issue. The following provides detailed discussion of what



constitutes relevant evidence of each competency and instructions for each of the five required essays.

1) Independent Research Skills

PhD candidates should be qualified to lead independent research and should have substantive experience at all major research stages in their area of specialization, including:

- (a) Problem identification and literature review
- (b) Design, ethical review, and research approval
- (c) Data collection, analysis, and interpretation
- (d) Manuscript preparation, revision, and submission

In a short essay (i.e., 1-2 pages with supplemental materials included in appendices), please describe your preparation and qualifications in your area of research specialization, including evidence of research skills at each of the stages described above. The goal of this essay is to provide an honest evidence-based account of your experiences and the skills that qualify you to lead independent research in your area of specialization. Clear evidence of being qualified to lead independent research includes having already lead independent research that resulted in a high-quality first-authored manuscript submitted for peer-review and publication (i.e., submitted but not necessarily accepted). Substantive roles in research leading to first-authored technical reports, peer-reviewed proceedings papers, high-quality book chapters, and related scholarship activities may also provide suitable evidence of independent research skills. While important, research poster presentations and related dissemination activities are not sufficient evidence of independent research skills. In rare cases, students who have not completed a first-authored manuscript may still satisfy requirements if they can provide considerable evidence showing equivalent preparation in their area of specialization such as substantive experiences leading to multiple submitted and/or published peer-reviewed manuscripts on which the student is a co-author. In such cases, it is essential that the student demonstrate independent research across all four research stages in their area of specialization. Statements from co-authors that certify your independent contributions and other supplemental materials should be included in your appendices. Students are encouraged to discuss and review their essay and qualifications with their mentor or any member of the graduate program committee before submission.

2) Research Funding Skills

PhD candidates should be qualified to prepare high-quality proposals for research funding in their area of specialization. In a short essay (i.e., 1-2 pages with supplemental materials included in appendices), please describe your preparation and research proposal-writing qualifications. The goal of the essay is to provide an honest evidence-based account of your experiences and the skills that qualify you to prepare high-quality research funding proposals in your area of specialization. Clear evidence of being qualified to prepare research funding proposals includes having



already prepared and submitted research funding proposals (e.g., contracts, grants, fellowships; submission is recommended but not required). One or more fellowship-type grant application or grant proposal as a course requirement can provide evidence of qualification but these should be comparable to a regular request for proposals (RFP) or broad agency announcement (BAA). Students who are co-investigators (formally or informally) on research funding proposal within their area of specialization must present evidence of their substantive role in the proposal development and writing. Statements from principal investigators that certify your independent contributions and other supplemental materials should be included in your appendices. Students are encouraged to discuss and review their essay and qualifications with their mentor or any member of the graduate program committee before submission.

3) Presentation Skills

Professional researchers need to be able to present their research results to peers, research sponsors, and other professional researchers. In a short 1-2 page essay, students should demonstrate that they have prepared themselves for making such presentations. Students should have experience preparing presentation materials and presenting research results. Students should provide evidence of this preparation, including major presentations at regional, national, or international conferences, and experience as a certain type of instructor (e.g., undergraduate course or outreach programs). Typically, a combination of poster presentations and oral presentations at a mixture of local and national venues will satisfy this requirement.

4) Practical Skills

PhD candidates should be qualified to apply their knowledge and skills to real world problem solving. To this end, they should show substantive experience (at least, they should pass the practicum course) at all major practical research stages in their area of specialization, including:

- (a) Problem definition (e.g., task analysis, error analysis, operational analysis)
- (b) Design of experiments or the design of equipment
- (c) Statistical analysis and interpretation of such data
- (d) Presentation of the results to various stake holders

In a short essay (i.e., 1-2 pages with supplemental materials included in appendices), please describe your preparation and qualifications in your area of research specialization, including evidence of your practical skills and experiences as to each of the research stages described above. The goal of this essay is to provide an honest evidence-based account of your experiences and the skills that qualify you to be a Human Factors practitioner in your area of specialization. Clear evidence of being qualified to be a Human Factors practitioner includes completion of an approved internship, design project, enterprise-type project, or consultancy project via PSY 5095 (see Practicum core). Alternatively, students may seek approval to submit a patent or write a publishable design-based article that emphasizes the practical



applications of their research (e.g., to Ergonomics in Design or other similar design/application based outlet). To ensure that the scope of the project is appropriate, students should prepare and submit the Practicum Proposal and Plan (Appendix A) for review by their advisor and the Graduate Program Committee before the project is started.

5) Statistical Skills

A professional researcher must have the ability to conduct both basic and advanced statistical analysis on behavioral and other data. In a short 1-2 page essay, students should document that they have received adequate training (e.g., coursework, workshops, etc.), identify the breadth of their statistical competency (e.g., identifying tools and methods they have used), and describe how they have applied an advanced statistical method in a research, design, or coursework project (not conducted as part of a course in statistics). We recommend that students demonstrate their statistical competency using the following template:

1. List all relevant coursework, workshops, and formal education in statistical and data analysis skills.
2. Identify the primary statistical, programming, data analysis, and modeling tools and methods the student is proficient or experienced in (i.e., software such as SPSS, R, python; methods such as regression, ANOVA, Social network analysis, particular computational models, etc.)
3. A brief account of the projects (published, underway, etc.) to which they have applied these skills. A bullet list is sufficient.
4. A sample evidence from a manuscript, report, publication, or conference presentation in which these skills were exercised outside of the classroom. This could include results sections of a paper, raw data analysis output, or other materials showing the process or product of statistical thinking.

Submission of the Portfolio. The portfolio containing evidence of each qualifying competency and the overview/summaries, CV, and supplemental materials as described above should be submitted to the student's advisor for initial review and approval. Upon approval of the advisor, final materials should be submitted for review by the ACSHF Graduate Program Committee Chair, (NOT the Doctoral Dissertation Examination Committee). A copy should be forwarded to the Graduate Program Director. Electronic submissions are preferred. The student's advisor and the ACSHF Graduate Program Committee must approve the qualifying exam before students are permitted to propose their dissertation.

Committee Composition and Review Process

The student's advisor and the ACSHF Graduate Program Committee will review the qualifying exam binder and will meet in a closed session to discussion grading and issue a decision. If the student's advisor currently serves as a member of the ACSHF



Graduate Program Committee, the committee will nominate one additional tenure-track faculty member to serve as part of the review process, which will normally involve a total of four reviewers (the student's advisor and three others). At the start of an evaluation process, the ACSHF Graduate Program Committee or the student's advisor may request additional information (e.g., if documents are missing or more detailed supplemental materials are useful). During the normal academic year (fall and spring), under typical conditions, the committee members will review the qualifying exam within one month of submission and make a decision. All members of the committee will provide supporting comments to the GPC Chair. The Chair or designee will integrate the comments and determine if consensus has been reached (i.e., via formal in person vote during the meeting), and draft a written response to the student that will be reviewed by all committee members to ensure that the contents accurately reflect the committee's views. A copy of this response will be given to the student, the student's advisor, and the Graduate Program Director. If revisions are required, the committee will decide if a full committee review is required following a revision or if partial review is sufficient (e.g., the Committee Chair may confirm that minor revisions have been completed without full re-review). Normally, if revisions are required, the student will have one month from the date of initial notification to address concerns and revisions. The revised qualifying exam binder should be accompanied by an explanation of how (and on what pages) the issues were addressed, including a brief summary of all changes that were made. Within one month, the revision will be graded as Pass/Fail.

Qualifying Exam Grading

- **Pass:** The Qualifying Exam Binder meets or exceeds the expectations of the committee members; it is of high quality and no changes are required. Committee members may provide comments and suggestions.
- **Minor Revisions Required:** The Qualifying Exam Binder must be revised and re-reviewed. Committee members will provide a list of the specific issues of concern that will need to be addressed by the student before the paper will be re-reviewed. The committee may request or require a full review or only a review by the Committee Chair (student's advisor) as determined by the committee at the time of initial student feedback (i.e., the decision).
- **Fail:** The Qualifying Exam Binder does not meet the goals described above. Extensive revision is required or may not be possible without first developing new skills and collected new evidence of competencies.

The decision about the qualifying exam grade will be based on the majority opinion of the committee members based on a formal vote in a closed session. The goal is to reach a consensus of the committee members. However, a decision can be issued if a *majority* of the committee members are in agreement. In the event of a dissenting minority, the committee will work to provide constructive written feedback including discussion of the major concerns by the dissenting faculty member. In the event the committee cannot come to consensus on the specific feedback, the graduate program director or the chair of the department will be consulted. If the student has questions



or concerns that cannot be answered by the students primary advisor, the student is encouraged to meet with individual committee members to better understand the issues each raised. After successful completion of the qualifying examination process, students should complete the *Report on qualifying examination*:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>

Successful completion of the qualifying examination criteria should occur no later than five years after enrollment and should occur at least two terms prior to the final oral doctoral dissertation defense. Students who do not successfully pass their qualifying examination will be allowed one more opportunity to do so. If a student does not successfully complete the qualifying exam in *two (2)* attempts, the program director may request that the Dean of the Graduate School dismiss the student for lack of progress.

DOCTORAL DISSERTATION

All Ph.D. students are required to submit a Doctoral Dissertation. The dissertation should be closely related to his/her area of specialization. It should demonstrate the student's capacity to carry out independent research and should provide the student with the opportunity to contribute to knowledge in ACSHF. Students working on their dissertation proposal and/or collecting pilot data in preparation for their dissertation can enroll in PSY 6999 (Doctoral Research) to meet part of their elective requirement (see above: Doctoral Degree Requirements—Section B).

Primary Advisor & Dissertation Committee

Students in the doctoral program that have progressed from the Master's program should already be working under the mentorship of a primary faculty advisor. The primary advisor must hold a regular or adjunct appointment in the Department of Cognitive and Learning Sciences (CLS) and will chair the dissertation committee. When the primary advisor is not a faculty member from the Psychology Division of the Department of CLS, a co-advisor from the Psychology Division will be responsible to chair of the committee for administrative purposes. The primary advisor will help the student select members of the examination committee. A list of ACSHF faculty and their interests can be found in this handbook.

The doctoral dissertation committee must consist of *at least four* members of the graduate faculty, including the primary advisor. At least two of the committee members must be from the Psychology Division of the Department of CLS and at least one must be from outside CLS. A person external to Michigan Tech may be appointed as an ad hoc member of the Graduate Faculty to serve as the outside examiner. The task of the committee is to provide advice and consultation at all stages of the dissertation, particularly in the development of the proposal. Any student entering the program at the doctoral level who has already completed all of the Master's degree requirements, should complete the *Advisor and Committee Recommendation* form to appoint their committee no later than the end of their fourth academic semester. The dean of the Graduate School will appoint the committee. Timelines and



milestones can be found here:

<http://www.mtu.edu/gradschool/administration/academics/requirements/phd/>

Dissertation Proposal

Students must have all of their coursework completed and the ACSHF Graduate Program Committee must have approved the qualifying exam portfolio before the student can propose their dissertation (see Dissertation Proposal section).

The proposal should conform to APA publication manual (6th ed.) guidelines for writing a manuscript. (NOTE – this format may differ from the Dissertation format—see below). The proposal should contain a review of the literature, a problem statement/rationale, preliminary hypotheses, research design, and proposed methods/research strategy, and pilot data. The proposal should be submitted to the committee no less than four weeks prior to the date of the proposal presentation.

Oral Presentation & Defense of the Proposal

It is the responsibility of the student to coordinate with committee members to schedule the proposal presentation. The dissertation proposal must be presented to the committee for approval. This presentation is open to individuals outside the committee who may wish to attend (i.e., public). The presentation should last no longer than 30 minutes and an additional 60-120 minutes should be scheduled for questioning (i.e., a closed session including only the proposing student and faculty). The student should discuss the procedure for this presentation with his/her primary advisor. Once the committee has accepted the Dissertation Proposal the student must complete the *Report on research proposal examination* form:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>

Submission of Degree Schedule

Students must submit the Degree schedule the semester before they are due to defend their dissertation (not the dissertation proposal) or the semester prior to entering full-time research-only mode. This form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>

RESEARCH ONLY MODE

Students who have completed all of their coursework, their qualifying exam and have successfully defended their dissertation *proposal* can submit a petition to enter full-time research-only mode. This must be submitted one week prior to the first day of classes in the semester the student plans to enter research only mode. The appropriate tracking forms must be on file before student is eligible to register in research-only mode. Research only mode provides mechanisms for reduced tuition costs during the final phases of a student's graduate training.

DISSERTATION RESEARCH PREPARATION & SUBMISSION

Once students have presented and successfully defended their dissertation proposal



to the committee they should commence work towards their dissertation by enrolling in PSY 6999 (Doctoral Research).

Writing the Dissertation

Procedures for formatting, preparing and submitting a Doctoral Dissertation can be found on the Graduate School website:

<http://www.mtu.edu/gradschool/administration/academics/thesis-dissertation/formatting/>

The dissertation should contain a review of the literature, including problem statement/rationale, hypotheses, methods, results from data and statistical analyses, discussion, conclusion, references, and appendices. Before a draft is submitted to the committee, the student with guidance from his/her advisor should have refined the dissertation as much as possible in terms of content, grammar, and format. The submission to the committee should be the students best estimation of a final product.

Submitting the Dissertation Prior to the Defense

The members of the committee should receive a draft of the Doctoral Dissertation no less than four weeks prior to the planned date of the Dissertation Oral Presentation and Defense. At least two weeks before the proposed defense date, students must submit a draft of their dissertation and the Pre-defense form to the Graduate School.

The Pre-defense form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>

If these two items are not in the Graduate School two weeks prior to the defense, the defense will be cancelled, and the student will need to begin the scheduling process again (see Graduate School web page for more details).

The Graduate School will review your draft report and provide feedback via the *TDR-Review Form*:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>

Oral Presentation & Defense of the Dissertation

Students are required to present an oral defense of their final dissertation to the committee. It is the responsibility of the student to coordinate with committee members to schedule the final dissertation presentation and defense. The presentation and defense will be chaired by the student's primary advisor or by the co-advisor from the psychology division of the Department of Cognitive and Learning Sciences. The student should discuss the procedure for this presentation with his/her primary advisor and/or co-advisor(s). In general, the dissertation presentation and defense should be concerned with the problem, design, method, interpretation, and knowledge in the general area of the dissertation. The public presentation should last no longer than 30 minutes and should be accessible to an audience of educated non-experts. A closed forum and defense will follow for an additional 60-120 minutes including questioning and review. Only members of the committee, Michigan Tech faculty, and the defending student will be allowed in the closed session.

The committee reports the results of the final oral examination by completing the



Report on final oral examination form. This form can be found at:

<http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral/>.

The signed Report on final oral examination form must be submitted immediately following the oral defense. If a student does not successfully complete the oral exam in two (2) attempts, the program director will request that the Dean of the Graduate School dismiss the student for lack of progress. The committee approves the final dissertation by completing the Approval of a final dissertation, thesis, or report form. This form is submitted after the student has completed all of the technical and formatting changes required by the committee, and within one week of submitting the final thesis or report to the Graduate School. This form can be found at:

http://www.mtu.edu/gradschool/administration/academics/forms-deadlines/doctoral



APPENDIX A: Practicum Proposal and Syllabus

Students who are planning a practicum, either through PSY 5095, or outside the course, should prepare and submit the following Practicum Proposal for review by the Graduate Program Committee. A signed copy of this form should be included in the comprehensive binder in support of practical skill, along with evidence of completion of the project (a report or letter of support from advisor).

Student Name:

Project Description:

Goals of Project:

Proposed Timeline:

Project Advisor/Client:

Name:

Contact:

Organization:

Project Outcomes/Deliverables:

Student Signature Date

Advisor's Signature Date

Graduate Program Committee:



APPENDIX B: Agreement to Release Qualifying Exam Portfolio

The following form may be included in the comprehensive portfolio to allow the ACSHF Graduate Program Committee to make the document available to others in the future. Your response will not impact the evaluation of the portfolio, and this consent is not needed for the committee to evaluate the portfolio.

By agreeing below, I consent to allow the ACSHF program to make my qualifying exam portfolio available outside the evaluation committee, including but not limited to faculty within the program, accrediting and external reviewers, students in the program (as guidance for preparing their own document), and administrators at the university or government (to demonstrate capabilities of students in the program). This does not grant copyright of the document to the university, and the document will not be made available on publicly-accessible web sites without explicit consent.

I agree. This document may be made available to others.

I do not agree. This document may not be made available.

Name

Signature

Date

