

**Graduate student handbook**  
**Human Systems Engineering,**  
**MS**



2022-2023



The Polytechnic School



[poly.engineering.asu.edu/hse/ms](https://poly.engineering.asu.edu/hse/ms)



**MS Human Systems Engineering  
2022-2023 Handbook**

**TABLE OF CONTENTS**

<b>MS Human Systems Engineering</b> .....	<b>4</b>
Program Overview .....	4
Admissions.....	5
Program Requirements .....	7
Milestones and Timeline .....	15
Culminating Experience Overview .....	16
Research Expectations .....	19
Labs & Research .....	20
Faculty .....	22
Completing a Thesis in Human Systems Engineering .....	25
Completing an Applied Project in Human Systems Engineering .....	30
Completing a Portfolio in Human Systems Engineering.....	33
Accelerated Bachelor’s to Master’s 4+1 Program .....	35
Professional Development .....	34
Additional Information .....	37
Academic & Faculty Advising .....	39
<b>Polytechnic School Overview</b> .....	<b>40</b>
About the Polytechnic School .....	40
Graduate Programs.....	40
Purpose of this Handbook.....	41
Student Responsibility.....	41
Diversity and Inclusion Initiative .....	41
Facilities & Labs .....	42
Faculty .....	42
Graduate Advising .....	42
<b>Accelerated Bachelor’s + Master’s Degree Program (4+1)</b> .....	<b>42</b>
4+1 Probation Policy .....	42
<b>Academic Standards and Policies</b> .....	<b>43</b>

Grades .....	43
Academic Performance Standards .....	44
Evaluation of Academic Performance Requirements .....	44
Plan of Study (iPOS) .....	46
Time Limit for Degree Completion .....	46
Continuous Enrollment and Leave of Absence Policies .....	47
Graduate College Policies and Procedures .....	47
Policy on Maximum Courseload .....	47
Internships .....	48
Applying for Graduation .....	48
Culminating Experience Definitions .....	48
<b>General ASU Information</b> .....	<b>50</b>
Academic Calendar .....	50
Student Code of Conduct .....	50
Prohibition Against Discrimination, Harassment, and Retaliation .....	50
Academic Integrity .....	50
Department & University Resources .....	51
Contact Information .....	51
<b>Appendix A</b> .....	<b>52</b>
Instructions for the Master of Science in Human Systems Engineering Portfolio .....	53

# MS Human Systems Engineering

---

## Program Overview

The **Master of Science (MS) degree in Human Systems Engineering (HSE)** is offered through the Human Systems Engineering (HSE) program at Arizona State University Polytechnic School (part of the Fulton Schools of Engineering). The HSE program emphasizes the application of psychological science, cognitive science, and engineering principles to diverse areas, including decision making, health, human factors, human-computer interaction, learning and education, perception, social processes, team cognition, usability, and product development. Areas of specific focus have included aviation, consumer products, human-agent teaming, educational technology, health care, military applications, cyber security, and public safety. The MS HSE program is accredited by the [Human Factors and Ergonomics Society](#).

The degree requires completion of **30 credits** with an average grade of “B” or better. In addition to coursework, students must complete a research-based Thesis, a client-sponsored Applied Project, or submit a portfolio that elucidates the quality of the education that the student has received through the course of study. The **Thesis** involves conducting, analyzing, and presenting a novel research project under the direction of a faculty advisor. The thesis is orally defended in front of a committee and the final document is submitted through the Graduate College office. The thesis is recommended for students planning to later pursue a doctoral program. The **Applied Project** involves the application of psychological principles to problems and questions determined by a client sponsor. For example, students might work with a startup company to provide website or product usability evaluations, consult with a community organization to develop improved methods for real-world practices, or perhaps conduct a usability analysis on a new piece of software. Students should work closely with their faculty advisor(s) to develop a plan of study and project that meets degree requirements and academic standards. The **Portfolio** involves a demonstration of the high level of mastery of the principles and practices of human systems engineering through a compilation of work that the student has completed through the course of their graduate study.

The MS Human Systems Engineering program also offers four **concentrations**: aviation human factors, health systems, intelligent systems, and user experience research. Students must be admitted into the MS HSE program with the concentration to be awarded that degree. The concentration details will also be outlined in this handbook.

Upon completion of the degree, there are **many opportunities** available to graduates. Some students pursue a doctoral degree at Arizona State University or another institution. Other students seek positions as applied psychologists, human factors engineers, usability engineers, or other jobs in industry or government. Graduates have obtained jobs at the Air Force Research Laboratory, Boeing, GoDaddy, Exponent, Intel, Research Collective, Sandia Research Corp., and Veteran’s Administration Hospitals.

## Admissions

Admission to the MS in Human Systems Engineering program requires the completion of all general admission requirements and procedures set forth by Graduate Admission Services. For general information on applications, deadlines, international requirements, application requirements, and other information, please see **Graduate Admission Services**. Prior to submitting an application to Graduate Admission Services, applicants should review the information provided in this handbook regarding the degree program, including specific application requirements and deadlines.

### *Submission of an Application*

For admission information and procedures, review the **How and When to Apply For Graduate Admission** website. Applications for all graduate degree programs and non-degree status must be submitted via the **application website**.

Current students with an approved *Request to Maintain Continuous Enrollment* petition on file with the Graduate College prior to their semester of nonregistration and are continuing the same degree program for the semester immediately following the approved request are not required to submit a new application for admission.

### *Application Deadlines*

The dates noted are priority deadlines for submitting a complete application. Applications received after this date may still be considered but are not guaranteed to be evaluated for the semester of application.

<b>Fall semester</b> (August)	April 1
<b>Spring semester</b> (January)	September 15

### *Admission and Eligibility*

Admission to the MS in Human Systems Engineering program requires completion of a Bachelor of Science degree in Psychology or a related Human Factors field (including engineering, computer science or business) from a regionally accredited institution or the equivalent of a U.S. bachelor's degree from an international institution that is officially recognized by that country. Applicants should have completed statistics and experimental design coursework.

Admission to the MS in Human Systems Engineering with the **concentration in aviation human factors** requires completion of a Bachelor of Science degree in Aviation, Human Systems Engineering, Psychology, or a closely related field from a regionally accredited institution or the equivalent of a U.S. bachelor's degree from an international institution that is officially recognized by that country. Experience in aviation and human factors research or applied/industry experience is optimal.

Admission to the MS in Human Systems Engineering with the **concentration in health systems** requires completion of a Bachelor of Science degree in Healthcare, Human Systems Engineering, Psychology, or a closely related field from a regionally accredited institution or the equivalent of a U.S. bachelor's degree from an international institution that is officially recognized by that country. Experience in health systems research or applied/industry experience is optimal.

Admission to the MS in Human Systems Engineering with the **concentration in intelligent systems** requires completion of a Bachelor of Science degree in Human Systems Engineering, Robotics, Intelligent Systems, or a closely related field from a regionally accredited institution or the equivalent of a U.S. bachelor's degree from an international institution that is officially recognized by that country. Applicants are expected to have successfully completed undergraduate coursework in calculus I, II, and III, as well as differential equations, and have knowledge in programming and big data.

Admission to the MS in Human Systems Engineering with the concentration in **user experience research** requires completion of a Bachelor of Science degree in Human Systems Engineering, Psychology or a closely related field from a regionally accredited institution or the equivalent of a U.S. bachelor's degree from an international institution that is officially recognized by that country. User experience research experience or industry experience is optimal.

Applicants must meet the following admission requirements:

- Minimum of a 3.00 cumulative GPA (scale is 4.0) in the last 60 hours of a student's first bachelor's degree program.
- Minimum of 3.00 cumulative GPA (scale is 4.00) in graduate work, if applicable

A complete application for admission includes the following items:

- An online **Graduate Admission** application, including attachments of the following documents:
  - A professional resume or CV
  - Statement on Qualifications and Goals for the program (*additional details in the online application*)
  - Summary of relevant journal article (*additional details in the online application*)
- Transcripts from each college and/or university attended
  - Unofficial transcripts can be uploaded directly to the online application. Official transcripts will be required if admitted.
  - Applicants are responsible for submitting official transcripts to Graduate Admission Services for their undergraduate degree and graduate coursework, if applicable.
- Three (3) letters of recommendation
- International applicants must also meet the **English proficiency requirements**, as defined by Graduate Admission Services. Please be sure to review the **TOEFL, IELTS, Duolingo, or PTE score requirements**, as International applications will not be processed without valid proof of English proficiency.

Academic units submit recommendations regarding admission decisions to Graduate Admission Services; only the Dean of Graduate Admission can make formal offers of admission. Applicants are able to monitor the status of their application through **My ASU**. If admitted, the formal letter of admission can be downloaded from My ASU. If denied admission, letters are sent via email to the address on record.

If the applicant does not meet the minimum GPA requirements (3.00 cumulative GPA (scale is 4.0)) the application may still be considered. In certain cases, demonstrated aptitude through professional experience or additional post baccalaureate education will be considered.

In rare cases, provisional or probationary admission may be granted to the MS in Human Systems Engineering program. Students in this category may be assigned deficiency courses, additional GPA requirements, or both. The conditions of probationary admission are discussed in more detail in the section on Grades and Academic Performance requirements later in this document.

### ***Deficiency or Provisional Admission***

Upon admission, a student may be assigned one or more deficiency courses to complete in addition to the 30-credit hour requirement for the MS HSE program.

Students should refer to their admit letter to verify any assigned deficiencies. Deficiencies must be completed by the end of the first year with a grade of B or better, unless otherwise noted, but it is highly encouraged that deficiencies are taken within the first semester.

Students admitted with provisional admission must successfully complete their first year with a 3.0 GPA or better. A student's inability to meet this requirement may result in immediate dismissal from their graduate program.

### ***Financial Aid***

Several resources are available to help students understand how to finance a graduate degree. We recommend visiting **Pay for your Graduate Education** via Graduate College, and **Paying for College** via Financial Aid and Scholarship Services. For an estimated cost of enrollment, visit: **Standard Cost of Attendance**.

Assistantships are very limited at the master's level. If assistantships are available, the positions are managed within the program's department. Interested students should discuss their research interests and funding needs with HSE faculty members. Many HSE MS students engage in summer internships in industry.

## **Program Requirements – All MS HSE Degrees**

The MS in Human Systems Engineering requires a minimum of 30 credit hours. To earn a Master of Science (MS) degree in Human Systems Engineering, students must meet several core requirements pertaining to coursework, research, and professional development. The degree requires completion of 30 credits with an average grade of "B" or better (for graded courses) or "Pass" (for Pass/Fail courses). These credit hours must include the following:

Students are required to complete several **core courses** that address essential human systems engineering concepts (e.g., HSE 542: *Foundations of Human Systems Engineering*), research methods (e.g., HSE 520: *Methods and Tools in Applied Cognitive Science*), and analysis (e.g., HSE 530 *Intermediate Statistics for Human Systems Engineering*, HSE 531: *Data Analytics*).

Students are required to enroll in 9-18 credits of **elective courses** that explore their areas of interest. Electives can be chosen from any relevant graduate course (relevance determined by the student and advisor), and students may take up to two 400-level undergraduate courses, such as HSE 426: *Training and Expertise* and HSE 424: *Human Automation Interaction*,

Thesis students are required to enroll in 3 credits of research hours, typically the semester prior to enrollment in thesis hours.

### **Additional Student Requirements**

Students should actively engage in research under the guidance of a faculty member.

Students are also required to attend and participate in our **brown bag seminar series** in which students, faculty, and visiting scholars will present their work.

Students are strongly encouraged to meet with their advisor(s) on a regular basis if they are completing a Thesis milestone.

### ***Program Requirements – MS HSE (general program)***

#### **Required Core Courses** (12 credit hours)

HSE 530 Intermediate Statistics for Human Systems Engineering (3) *\*fall offering*

HSE 531 Data Analytics (3) *\*spring offering*

HSE 520 Methods and Tools in Applied Cognitive Science (3) *\*spring offering*

HSE 542 Foundations of Human Systems Engineering (3)

*\*typical semester offering, see class search for details*

#### **Research Course (0-3 credits)**

HSE592 Research (3)

#### **Possible Elective Courses** (9-18 credit hours)

Any HSE 400 or 500 level course including:

HSE 521 Methods and Tools in Human Systems Engineering

HSE 525 Health & Human Systems Engineering

HSE 529 Product Design and Evaluation

HSE 540 Foundations of Applied Cognitive Science

HSE 598 Applied Attention Theory

HSE 598 Inclusive Engineering and Design

HSE 584 Internship (3)

HSE 592 Research (3)

HSE 422 Human Factors in Sport\*\*

HSE 423 Human Factors in Transportation\*\*

HSE 424 Human Automation Interaction\*\*

HSE 426 Training and Expertise\*\*

HSE 427 Designing for Learning\*\*

HSE 428 Judgment and Decision Making\*\*



GIT 542 Usability/User Experience  
 PSY 528 Sensation and Perception

*\*\*A maximum of 6 credits of 400-level coursework is permitted on the graduate plan of study*

The formal approval of elective course selection is accomplished through submission and approval of a Plan of Study, and students are encouraged to complete this document after completing their first semester to ensure that the desired courses meet the curricular requirements.

**Culminating Experience (0-6 credit hours)**

There are three options for the culminating experience:

- Portfolio (0 credits)
- HSE 593 Applied Project (6 credits)
- HSE 599 Thesis (6 credits)

<b>Culminating Experience</b>	<b>Required Credits</b>	<b>Elective Credits</b>	<b>Research Credits</b>	<b>Culminating Experience Credits</b>	<b>Total Credits</b>
Portfolio	12	18	0	0	30
Applied Project	12	12	0	6	30
Thesis	12	9	3	6	30

***Program Requirements – MS HSE with a concentration in Aviation Human Factors***

The MS in Human Systems Engineering with a concentration in Aviation Human Factors requires a minimum of 30 credit hours. These credit hours must include the following:

**Required Core Courses (12 credit hours)**

- HSE 530 Intermediate Statistics for Human Systems Engineering (3) *\*fall offering*
- HSE 531 Data Analytics (3) *\*spring offering*
- HSE 520 Methods and Tools in Applied Cognitive Science (3) *\*spring offering*
- HSE 542 Foundations of Human Systems Engineering (3)  
*\*typical semester offering, see class search for details*

**Research Course (0-3 credits)**

- HSE592 Research (3)

**Concentration Courses (6 credit hours)**

- AMT 533 Aviation Systems and Psychology (3)
- AMT 565 Safety in Complex Systems (3)

**Elective Courses (3-12 credit hours)**

- 400 or 500 level elective(s) as approved by the program chair/committee in AMT or HSE*

- AMT 546 Crew Resource Mgt/Line Oriented Flight Training (3)
- AMT 541 Aerospace Physiology (3)
- AMT 570 Unmanned Aerial Systems (3)

*\*\*A maximum of 6 credits of 400-level coursework is permitted on the graduate plan of study*

**Culminating Experience (0-6 credit hours)**

There are three options for the culminating experience:

- Portfolio (0 credits)
- HSE 593 Applied Project (6 credits)
- HSE 599 Thesis (6 credits)

<b>Culminating Experience</b>	<b>Required Credits</b>	<b>Concentration Credits</b>	<b>Elective Credits</b>	<b>Culminating Experience Credits</b>	<b>Total Credits</b>
Portfolio	12	6	12	0	30
Applied Project	12	6	6	6	30
Thesis	15	6	3	6	30

***Program Requirements – MS HSE with a concentration in Health Systems***

The MS in Human Systems Engineering with a concentration in Health Systems requires a minimum of 30 credit hours. These credit hours must include the following:

**Required Core Courses (12 credit hours)**

- HSE 530 Intermediate Statistics for Human Systems Engineering (3) *\*fall offering*
- HSE 531 Data Analytics (3) *\*spring offering*
- HSE 520 Methods and Tools in Applied Cognitive Science (3) *\*spring offering*
- HSE 542 Foundations of Human Systems Engineering (3)
- \*typical semester offering, see class search for details*

**Research Course (0-3 credits)**

- HSE592 Research (3)

**Concentration Courses (6 credit hours)**

*Select two courses from the list:*

- HCD 502 Health Care Systems & Design (3)
- HCD 570 Process Engineering (3)
- HCD 575 Leadership & Professionalism (3)
- BMI 605 Health Information Systems & Applications (3)
- BMI 613 Workflow Analysis & Redesign in Health Systems Engineering (3)
- BMI 616 Clinical Decision Support & Evidence-Based Medicine (3)

**Elective Courses (3-12 credit hours)**

400 or 500 level elective(s) as approved by the program chair/committee. Examples of electives include:

- HSE 525 Human Factors in Medical Systems (3)
- HSE 529 Product Design & Evaluation (3)
- ASB 502 Health of Ethnic Minorities (3)
- ASB 503 Medical Anthropology (3)
- ASB 512 Social Science Applications in Community Health (3)
- ASM 546 Principles of Human Genetics (3)
- ESS 513 Institutions (3)
- ESS 514 Urban and Environmental Health (3)
- HCD 540 Process Engineering for Health Care Quality & Safety (3)
- HCI 538 Innovation and the Individual (3)
- HCI 540 Applying Principles of Evidence Based Practice (3)
- HCI 542 Systems Thinking (3)
- HCI 561 Innovation Methods (3)

*\*\*A maximum of 6 credits of 400-level coursework is permitted on the graduate plan of study*

**Culminating Experience (0-6 credit hours)**

There are three options for the culminating experience:

- Portfolio (0 credits)
- HSE 593 Applied Project (6 credits)
- HSE 599 Thesis (6 credits)

<b>Culminating Experience</b>	<b>Required Credits</b>	<b>Concentration Credits</b>	<b>Elective Credits</b>	<b>Culminating Experience Credits</b>	<b>Total Credits</b>
Portfolio	12	6	12	0	30
Applied Project	12	6	6	6	30
Thesis	15	6	3	6	30

***Program Requirements – MS HSE with a concentration in Intelligent Systems***

The MS in Human Systems Engineering with a concentration in Intelligent Systems requires a minimum of 30 credit hours. These credit hours must include the following:

**Required Core Courses (12 credit hours)**

- HSE 530 Intermediate Statistics for Human Systems Engineering (3) *\*fall offering*
- HSE 531 Data Analytics (3) *\*spring offering*
- HSE 520 Methods and Tools in Applied Cognitive Science (3) *\*spring offering*
- HSE 542 Foundations of Human Systems Engineering (3)  
*\*typical semester offering, see class search for details*

**Research Course (0-3 credits)**

- HSE592 Research (3)

**Concentration Courses** (9 credit hours)

- HSE 424 Human Automation Interaction (3)\*\*
- EGR 545 Robotic Systems I (3)
- EGR 546 Robotic Systems II (3)
- IFT 511 Analyzing Big Data (3)
- IFT 512 Advanced Analytics for Big Data/AI (3)

**Elective Courses** (0-9 credit hours)

400 or 500 level elective(s) as approved by the program chair/committee. Examples of electives include: graduate level EGR, HSE, MAE courses. Overrides may be required.

*\*\*A maximum of 6 credits of 400-level coursework is permitted on the graduate plan of study*

**Culminating Experience (0-6 credit hours)**

There are three options for the culminating experience:

- Portfolio (0 credits)
- HSE 593 Applied Project (6 credits)
- HSE 599 Thesis (6 credits)

Culminating Experience	Required Credits	Concentration Credits	Elective Credits	Culminating Experience Credits	Total Credits
Portfolio	12	9	9	0	30
Applied Project	12	9	3	6	30
Thesis	15	9	0	6	30

**Program Requirements – MS HSE with a concentration in User Experience Research**

The MS in Human Systems Engineering with a concentration in User Experience Research requires a minimum of 30 credit hours. These credit hours must include the following:

**Required Core Courses** (12 credit hours)

- HSE 530 Intermediate Statistics for Human Systems Engineering (3) *\*fall offering*
- HSE 531 Data Analytics (3) *\*spring offering*
- HSE 520 Methods and Tools in Applied Cognitive Science (3) *\*spring offering*
- HSE 542 Foundations of Human Systems Engineering (3) *\*fall offering*
- \*typical semester offering, see class search for details*

**Research Course (0-3 credits)**

- HSE592 Research (3)

**Concentration Courses** (9 credit hours)

Select three courses from the list below:

HSE 521 Methods & Tools in Human Systems Engineering (3)

HSE 525 Human Factors in Medical Systems (3)

HSE 529 Product Design & Evaluation (3)

TWC 511 Principles of Visual Communication (3)

TWC 514 Visualizing Data & Information (3)

TWC 544 User Experience (3)

**Elective Courses** (0-9 credit hours)

400 or 500 level elective(s) as approved by the program chair/committee. Examples of electives include: graduate level GIT, HSE, TWC. Other elective options include: IND 598 Advanced UX Design – UX for Emerging Technologies, GRA 590 Information Design I.

*\*\*A maximum of 6 credits of 400-level coursework is permitted on the graduate plan of study*

**Culminating Experience (0-6 credit hours)**

There are three options for the culminating experience:

Portfolio (0 credits)

HSE 593 Applied Project (6 credits)

HSE 599 Thesis (6 credits)

Culminating Experience	Required Credits	Concentration Credits	Elective Credits	Culminating Experience Credits	Total Credits
Portfolio	12	9	9	0	30
Applied Project	12	9	3	6	30
Thesis	15	9	0	6	30

**Required Courses**

**HSE 530: Intermediate Statistics for Human Systems Engineering** (3 credits)

This course prepares students to conduct and analyze statistical procedures related to one-way and factorial designs, contrasts, post-hoc tests, probing of interactions, mixed designs, and power. Relevant computer software applications (e.g., SPSS) are also discussed.

**HSE 531 Data Analytics** (3 credits)

This course is designed to introduce graduate students and senior undergraduates in Human Systems Engineering, or in closely related fields, to principles and methods of analyzing human subjects data. The purpose of this course is to impart students with the necessary critical thinking, self-learning, and analysis skills to be competitive for current academic and private sector positions in human factors, systems engineering, or human systems design and evaluation. The objectives of this course are to improve analytical and communication skills for scientific research, to learn how to learn R, and to build confidence in wrangling, analyzing, and visualizing human subjects data.

**HSE 520: *Methods and Tools in Applied Cognitive Science*** (3 credits)

This course provides a hands-on approach to understanding and using advanced methodologies commonly implemented in the field of cognitive science, such as experimental designs, quasi-experimental designs, cognitive task analysis, eye-tracking, electroencephalography (EEG) recordings, and other behavioral and physiological recordings. It is highly recommended that you take a research methods course as early as possible.

**HSE 542: *Foundations of Human Systems Engineering*** (3 credits)

A wide variety of methodologies utilized by and applications of the broad field of human systems engineering.

***Research and Capstone Courses***

**HSE 592: *Research*** (up to 6 credits)

Under the supervision of a faculty member, students can conduct research that is expected to lead to a specific project such as a thesis or dissertation, report, or publication. Research assignments and responsibilities are determined by the supervising faculty member and might include data collection, experimental work, data analysis, or preparation of a manuscript. Students may enroll in between 1 credit to 6 credits of HSE 592: *Research* in one semester. Students who work on a paid research project over the summer will enroll in HSE 592: *Research*.

**HSE 599: *Thesis*** (6 credits)

Under the supervision of a faculty member, students will identify a topic and research question(s) of interest; conduct a thorough literature review; develop testable hypotheses; and develop a detailed proposed plan of empirical research and analysis to address those hypotheses. Once the thesis proposal is approved, the student will conduct the planned work. The Thesis should result in an original, meaningful, and rigorous product that contributes to the research literature on the chosen topic. Students should strive to conduct work that merits publication in respected journals within their field.

Typically, students will enroll in 1-3 credits HSE 599: *Thesis* per semester during their second year, following the completion of introductory research and analysis training. Students must be enrolled in at least one credit of HSE 599: *Thesis* during the semester they graduate. A “Z” grade is reported on all credits until all thesis requirements are fulfilled.

For more specific details about the processes and projects of conducting a Thesis, please see the **Completing a Thesis in Human Systems Engineering** section.

**HSE 593: *Applied Project*** (6 credits)

Under the supervision of a faculty member and in collaboration with an industry or community client, students will identify a topic or problem of interest; conduct a thorough literature review; and develop a proposed plan of analysis, design, or product development. Once the proposed project is

approved, the student will conduct the planned work. The Applied Project should result in an original, meaningful, and useful final product. Such products might include a new piece of software or technology, an analysis of an important phenomenon or problem, recommended solutions or actions, and so on.

Typically, students will enroll in 1-3 credits of HSE 593: *Applied Project* per semester during their second year, following the completion of introductory research and analysis training. Students must be enrolled in at least one credit of HSE 593: *Applied Project* during the semester they graduate. A “Z” grade is reported on all credits until all project requirements are fulfilled.

For more specific details about the processes and projects of conducting an Applied Project, please see the **Completing an Applied Project in Human Systems Engineering** section.

## Milestones and Timeline

The following milestones and timeline will help you track your progress through the degree program. The milestones assume that you will complete the degree over a period of about four semesters, though you may make faster or slower progress depending on your work.

- **Exploration Milestone:** in your **first semester**, you should begin actively exploring topics related to your interests and those of potential faculty mentors. Begin by meeting with each of the program faculty and discussing research topics of mutual interest. Faculty can help you do a deeper dive into one or more topics. For instance, you may be asked to read a set of articles or chapters and prepare an annotated bibliography on the topic. You are encouraged to enroll in HSE 592 and get involved with at least one lab and research. You must meet with your assigned faculty advisor as soon as possible. By the end of the semester, you must have chosen a topic for continued investigation if you plan to pursue the applied project or thesis options.
- **Development Milestone:** in your **second semester**, will explore your chosen topic in greater depth through additional readings and discussions with your advisor. You are encouraged to enroll in HSE 592 and get involved with at least one lab and research. By the end of the semester, you must identify a well-defined research question to answer (Thesis) or a client-driven problem to analyze or solve (Applied Project).
- **Proposal Milestone:** in your **third semester**, you will enroll in HSE 599 (Thesis) or HSE 593 (Applied Project). You will expand the literature review related to your project focus, and will develop a formal proposal. By the end of the semester, you must submit a proposal to your committee (and client, for Applied Projects). Completing your proposal earlier in the semester offers more time to conduct the work.
- **Synthesis Milestone:** in your **fourth semester** (and beyond), you will conduct your proposed project and enroll in HSE 599 (Thesis) or HSE 593 (Applied Project). Complete the work outlined in your proposal, including data collection, analyses, and interpretation. Next, author your thesis or applied project report and revise based on committee feedback. These

tasks may extend across more than one semester depending on the scope of your project and efficiency in conducting the work.

You are solely responsible your own progress through the program. Failing to complete the above milestones may delay your graduation.

<b>Milestone</b>	<b>Action</b>	<b>Deadline (earlier is always better)</b>
Exploration	Meet with your assigned faculty advisor and identify MS topic	End of Semester 1
Development	Identify research question or applied problem	End of Semester 2
Proposal	Submit thesis or applied project proposal	End of Semester 3
Synthesis	Complete thesis or applied project	End of Semester 4

## Culminating Experience Overview

### Portfolio

This is the default option for all students enrolled in the MS Human Systems Engineering program. To complete the MS Human Systems Engineering degree under these requirements, a student must complete a total of 30 credit hours of approved coursework and, in the semester the student intends to graduate, submit a portfolio to the Committee Chair and Graduate Program Chair within the submission window noted below.

The portfolio must elucidate the quality of the education that the student has received through the course of study. The purpose of the portfolio is to demonstrate a high level of mastery of the principles and practice of human systems engineering through a compilation of work that the student has completed through the course of their graduate study. Although the specific details will vary, all portfolios must describe three notable projects or academic accomplishments that have been completed through the course of graduate study that illustrate the evolution and advancement of technical expertise and mastery of the field of engineering achieved by the student. The portfolio is a professional document that is written in APA or IEEE style (minimum of 10 pages) and will be reviewed and evaluated for both technical content and the quality of writing and presentation. The required dates for submission of the portfolio are given in the table below:

<b>Graduation Semester</b>	<b>Submission window</b>	<b>Resubmission (if required)</b>
Spring	March 1 to 30	Before April 30
Summer	June 1 to 30	Before August 7



Fall	October 1 to 30	Before December 7
------	-----------------	-------------------

Detailed requirements and the evaluation rubric that will be used to grade the portfolio are given in the appendix of this document.

### **Applied Project**

To complete the MS Human Systems Engineering degree under these requirements, a student must complete a total of 24 credit hours of approved coursework with a GPA of 3.0 or higher, coupled with the completion of an Applied Project (HSE 593).

A student completing the Applied Project will be supervised by a Polytechnic School Human Systems Engineering program faculty member or a qualified faculty member from outside of the program who has been approved by the Graduate Program Chair and the Graduate College. Consequently, to complete an Applied Project a student must first obtain approval of a faculty member to work with them on a project, and subsequent approval of the Graduate Program Chair. The faculty advisor is then responsible for specifying the requirements of the project and for reviewing and approving the final report.

The Applied Project is a demonstration of application of the theory of human systems engineering to solve a practical technical problem of general interest. The subject matter of an Applied Project is more flexible than that of a thesis given that the result is not expected to be published, although the project may directly or indirectly support research programs. The faculty advisor has responsibility for establishing the requirements of the project and for approval of the final written report. In all cases, the student must prepare and present the applied project to the faculty advisor and discuss the implementation and results of their project. This presentation will be open to all graduate students. A student will be considered eligible for graduation when the sponsoring faculty member approves the report and presentation and a grade of B or better is assigned on the HSE 593 course(s).

### **Thesis**

To complete the MS Human Systems Engineering degree under these requirements, a student must complete a total of 24 credit hours of approved coursework with a GPA of 3.0 or higher, coupled with the completion of a Thesis (HSE 599).

This option requires students to participate with faculty to carry out original research. A member of the HSE graduate faculty must agree to serve as the faculty advisor before a student can choose to enroll in this option. This will require a written (including email) confirmation from the faculty advisor that they are agreeing to serve in this capacity. The student, in consultation with the faculty advisor, must then identify at least two additional faculty members from the graduate faculty within the Fulton Schools of Engineering to serve on the MS in Human Systems Engineering thesis committee.

A thesis proposal meeting needs to take place at the latest in the third semester of the program. A preproposal meeting in which a student presents their idea to the committee provides more room for committee input. However, a full written proposal approved by the committee must follow within 30

days of the preproposal meeting. A proposal meeting may also follow the full written proposal. Please give the committee at least one week to review the proposal.

A thesis is a document that reflects and reports research that is of sufficient depth and interest that it can be published in a peer reviewed journal in the field of interest. Successful publication of the work reported in the thesis will be considered evidence of peer acceptance of the work. The thesis document should demonstrate original, independent, and creative thought, demonstrate proficiency with written English, and adhere to the Graduate College format guidelines. A thesis contains an introduction/literature review, hypothesis/hypotheses, methods, results, and discussion sections. Upon completion of the Master's thesis, the student is required to defend the research in a public forum.

The requirements for completion of the thesis include a formal format review by the Graduate College, a public announcement of the defense time and location, and submission of a copy of the thesis to committee members at least one week in advance of the defense date. The deadlines for these processes are non-negotiable, and it is the responsibility of the student to be aware of all submission and scheduling requirements. It is also the responsibility of the student to identify a room and ensure all necessary equipment and resources are available for the defense.

Establishing the details of the final defense of the thesis is the responsibility of the faculty advisor. At the beginning of the defense, the advisor will introduce the candidate and explain the exact protocol that will be followed. The candidate will present a brief seminar to the audience that explains their accomplishments. The presentation should not exceed 30 minutes, after which the audience will be allowed to ask questions. At the discretion of the faculty advisor, questions may or may not be allowed during the presentation. The general audience is then dismissed and the supervisory committee continues to question the student in depth. At the conclusion of this questioning, the student is asked to briefly leave the room and the committee discusses whether or not the thesis is acceptable and reports their conclusions on the Report for Master's Thesis Defense form. The student will be asked back into the room and the results of the examination and the subsequent path forward will be explained to the student.

Thesis students must adhere to specific deadlines for the thesis defense and paper submission. At the beginning of the semester a student intends to defend their thesis, they should notify the Polytechnic School Graduate Advising office ([polygrad@asu.edu](mailto:polygrad@asu.edu)). Schedule an advising appointment to review key information and deadlines.

Preparing for/Scheduling your Defense: <https://graduate.asu.edu/completing-your-degree/defenses>  
Format/Submit your document: <https://graduate.asu.edu/completing-your-degree/format>  
After your Defense: <https://graduate.asu.edu/completing-your-degree/defenses>  
Graduation Deadlines: <https://graduate.asu.edu/completing-your-degree/deadlines>

It is critical that students establish a timeline for completing a thesis by the stated graduation deadlines noted above. Expect that the time from proposal to defense can be 10-16 weeks

depending on the nature of your experiment. It is best to identify the deadline and work backwards with these constraints in mind.

- Set up your defense date early in the semester in which you will defend. It's important to note that due to scheduling conflicts and faculty commitments, all graduating students cannot defend on the same day. Please work with your faculty to establish a defense date and time.
- The final advisor approved document needs to be given to your committee to review at least one week ahead of the defense.
- The advisor needs to iterate on the document with you. The introduction and methods should have been reviewed at the time of the proposal so most of this review will concern data analysis and interpretation of the data. This process should be iterative and can take some time. Allow 4 to 6 weeks for at least 2 to 3 iterations. Advisors need at least a week to review each iteration. Meetings on the data analysis with your advisor during this period are strongly encouraged.
- Data analysis can take some time as well, depending on your experiment. Allow a couple of weeks for this.
- Data collection may take days to weeks depending on the nature of your experiment. Remember that not everything will go as planned so you might want to add buffer time to your schedule.
- You should complete an IRB protocol as soon as you have an approved proposal. Once the forms are submitted it may be processed quickly, but iterations are generally needed.

### **Research Expectations for Students Pursuing Applied Project and Thesis**

Students are expected to actively engage in research under the guidance of a faculty member. During the first year of the program, students will work closely with the faculty member to support an existing research agenda. Students will typically enroll in 3 credits of HSE 592: Research during the first or second semester of the program. Students who participate in research during the summer (e.g., as a paid RA) can also enroll in HSE 592: Research.

During the second year of the program, students will complete an original and independent research-based Thesis or a client-sponsored Applied Project.

- The **Thesis** involves conducting, analyzing, and presenting a novel research project under the direction of a faculty advisor. The Thesis is particularly recommended for students planning to pursue a doctoral program. For the Thesis, students enroll in 3 credits of HSE 599: *Thesis* for two semesters (6 credits total).
- The **Applied Project** involves the application of psychological principles to problems and processes determined by a client. For example, students might develop a comprehensive report that recommends actionable solutions to real-world challenges, develop improved methods for real-world tasks, or design a novel product. Students will work with a client and faculty advisor to develop a project that meets requirements and standards. For the Applied

Project, students typically enroll in 3 credits of HSE 593: *Applied Project* for two semesters (i.e., 6 credits total).

**Should I pursue a Thesis or Applied Project?** A thesis involves empirical data collection to answer an applied or theoretical question. A thesis may eventually be published in an academic journal. An applied project may or may not involve data collection. Instead it may involve prototyping, design, or a thorough literature review to address a specific client-centered problem. An applied project may also be published but is more to lead to a patent or portfolio item. The specific track chosen does not appear on the diploma, and those who pursue the applied project do not necessarily rule out advancing toward a PhD program. Similarly, those pursuing a thesis are not ruling out working in industry. The decision is really a matter of preference for experimental human factors or applied human factors work, though keep in mind that the applied project's research question is initiated by industry.

## Labs & Research

Discover the twelve vibrant human systems engineering laboratories located within the Ira A. Fulton Schools of Engineering's Polytechnic School. Here we conduct research on how people interact with technology and with each other, and work to improve these processes with innovations in human-centered system design and training.

### Applied Attention Research (AAR) Lab

Research Focus: attention and human factors in cyberspace defense, attention in multitasking, human-automation interaction, human-machine teaming

*Director: Robert Gutzwiller Assistant Professor / [robert.gutzwiller@asu.edu](mailto:robert.gutzwiller@asu.edu)*

### Applied Psychonomics and Ecological Simulations (APES) Lab

Research Focus: social cognition, evolutionary psychology, emotions as modulators of cognition and behavior, agent-based models of complex social systems.

*Director: Vaughn Becker Associate Professor / [vaughn.becker@asu.edu](mailto:vaughn.becker@asu.edu)*

### ASU Advanced Distributed Learning Partnership Laboratory

Research Focus: This lab is an official collaboration between the US Department of Defense and Arizona State University to improve the understanding and implementation of distributed learning techniques into learning ecosystems.

*Director: Scotty D. Craig Associate Professor / [scotty.craig@asu.edu](mailto:scotty.craig@asu.edu)*

### Automation Design Advancing People and Technology (ADAPT) Laboratory

Research Focus: human-computer interaction, trust in automation, accountability and fairness, sociotechnical systems, resilience engineering, health systems.

*Director: Erin K. Chiou Assistant Professor / [erin.chiou@asu.edu](mailto:erin.chiou@asu.edu)*

### Center for Human, Artificial Intelligence, and Robot Teaming (CHART)

Research Focus: One of the centers of ASU's Global Security Institute which focuses on the coordination of teams composed of multiple humans and synthetic agents.

*Director: Nancy J. Cooke Professor / [nancy.cooke@asu.edu](mailto:nancy.cooke@asu.edu)*

### **Cognitive-Based Applied Learning Technology (CoBALT) Laboratory**

Research Focus: learning sciences, multimedia learning, virtual humans, learning and training with technology.

*Director: Scotty D. Craig Associate Professor / [scotty.craig@asu.edu](mailto:scotty.craig@asu.edu)*

### **Cognitive Engineering Research on Team Tasks (CERTT) Laboratory**

Research Focus: team cognition, human-autonomy teaming, team science, remotely piloted aircraft systems

*Director: Nancy J. Cooke Professor / [ncooke@asu.edu](mailto:ncooke@asu.edu)*

### **Human-in-Mind Engineering Research (HiMER) Lab**

Research Focus: The HiMER lab develops human performance models based on eye/motion tracking, biological/physiological data, and cognitive processing theories. The Lab also develops experimental prototypes and tools to evaluate the usability and effectiveness of the human interactive systems. Research areas include human-computer interaction, human-robot interaction, human performance/behavior modeling, transportation safety, occupational safety, and human interactions with modern emerging technology (e.g., augmented/virtual reality, collaborative robots, and artificial intelligence)

*Director: Heejin Jeong / [heejin.jeong@asu.edu](mailto:heejin.jeong@asu.edu)*

### **Perception and Action Laboratory (PAL)**

Research Focus: perception and cognition in driving, flying and sports, multisensory interface development, sports training, simulator development, intelligent transportation systems

*Director: Rob Gray Associate Professor and Program Chair / [robgray@asu.edu](mailto:robgray@asu.edu)*

### **Sustainable Learning and Adaptive Technology for Education Laboratory**

Research Focus: self-regulated and self-directed learning in authentic settings, deep learning experiences, adaptive educational technologies, learning with real-world impact

*Director: Rod Roscoe Assistant Professor / [rod.roscoe@asu.edu](mailto:rod.roscoe@asu.edu)*

### **Systems Psychology Lab**

Research Focus: Coordination, teams, dynamical systems, adaptation, trust, resilience, human-AI-robot teaming.

*Director: Jamie C. Gorman Professor / [jcgorman@asu.edu](mailto:jcgorman@asu.edu)*

### **Virtual Environments and Cognitive Training Research Lab (VECToR Lab)**

Research Focus: The use of virtual/mixed environments and psychophysiological measures to study cognition and behavior at the individual and team level.

*Director: Heather C. Lim, Assistant Professor / [Heather.Lum@asu.edu](mailto:Heather.Lum@asu.edu)*

## Faculty

**Vaughn Becker**, Santa Catalina 150E, (480) 727-1151, [vaughn.becker@asu.edu](mailto:vaughn.becker@asu.edu)



Dr. Becker currently is developing a psychophysics of social perception, as well as methods to identify biases in such perception. This could facilitate selecting the right individuals for jobs in which unbiased accuracy and rapid decision-making is essential, for example, in military security or air traffic control. He also is interested in general assessments of cognitive functioning under conditions of high stress and/or fundamental motivations. He has an abiding interest in evolutionary psychology, and a background in social psychology, which has sensitized me to both ultimate and proximate sources of bias, e.g. stereotyping, self-presentation, and attribution errors. Dr. Becker's newest interest is in developing agent based models and dynamical simulations of complex social systems.

**Erin Chiou**, Santa Catalina, [erin.chiou@asu.edu](mailto:erin.chiou@asu.edu)



Dr. Chiou designs and develops simulated task environments to explore dyadic interactions between people and technology, applies systems thinking to human-automation integration problems, and uses quantitative and qualitative field research methods to improve technology integration in healthcare, security, and manufacturing. Advances in automation have led to increasingly capable machines; instead of operating remotely behind safety cages, new automation is moving into more dynamic work environments. These changes shift engineering goals in some domains from reliability to resilience, or the sustained ability to adapt to future surprises and evolving conditions. Dr. Chiou's findings indicate the importance of considering social factors in human-automation interaction and the need for human-agent cooperation to support system resilience.

**Nancy Cooke**, SANCA 150b, (480) 727-5158, [ncooke@asu.edu](mailto:ncooke@asu.edu)



Dr. Cooke studies individual and team cognition and its application to the development of cognitive and knowledge engineering methodologies, human-autonomy teams, sensor operator detection of threat, cyber security systems, remotely-operated vehicles, healthcare systems, and emergency response systems. In particular, Dr. Cooke specializes in the development, application, and evaluation of methodologies to elicit and assess individual and team cognition. Based on her empirical work in her synthetic task environments for teams over the last two decades, Dr. Cooke has proposed a theory of Interactive Team Cognition which is published in the journal, *Cognitive Science*.

**Scotty Craig**, Santa Catalina 150G, (480) 727-1006, [scotty.craig@asu.edu](mailto:scotty.craig@asu.edu)



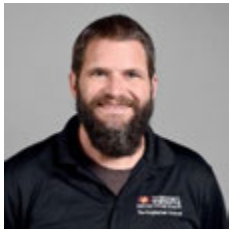
Dr. Craig investigates aspects of learning with technology in both laboratory and applied settings. His research is at the intersection of human cognition, technology, and the learning sciences. Current projects investigate 1) virtual humans for learning and training within multiple formats from video to virtual and mixed reality, 2) best practices for advanced distributed learning (online learning), and 3) the evaluation of learning technologies from a joint learning science and design science perspective.

**Jamie Gorman**, [jamie.gorman@asu.edu](mailto:jamie.gorman@asu.edu)



Dr. Gorman studies coordination and adaptation in complex sociotechnical settings including medical, military, educational, space, and sports settings. Dr. Gorman's research focuses on understanding and modeling team coordination dynamics in human and human-AI teams using dynamical systems theory, computational modeling, and real-time methods by combining communication (speech pattern analysis), perceptual-motor (eye and motion tracking), vehicle/equipment (positioning, movement, and status), and neurophysiological (EEG) data. Dr. Gorman has helped pioneer the analysis of team coordination using dynamical systems methods and has published theoretical articles related to this approach in psychology and human factors journals.

**Robert Gray**, [robgray@asu.edu](mailto:robgray@asu.edu)



Dr. Gray conducts research on the dynamics of perception, cognition, and action in skilled performance. This work addresses issues of human factors, motion perception, driving, tactile interfaces, sports, and aviation. Dr. Gray's research seeks to advance perception-action theory while directly related to applied problems. He contributes substantial expertise with simulations, including driving and baseball simulators.

**Robert Gutzwiller**, Santa Catalina 150E, [Robert.gutzwiller@asu.edu](mailto:Robert.gutzwiller@asu.edu)



Dr. Gutzwiller studies the critical role of the human in complex systems. His work scientifically applies cognitive engineering to healthcare, cyberspace, transportation, and defense. His recent research focuses on studying and engineering attention (How do humans select what task to do when they are multitasking and overwhelmed, and can models predict this behavior?), human-automation interaction (How do humans learn to interact with complex systems, particularly those which use automation, artificial intelligence, and machine learning?), and defensive cyberspace operations (How does a cyber analyst protecting networks develop awareness? Could properties of attention be used against would-be attackers to make defenses more robust?). Interested persons should contact him directly to discuss his work.

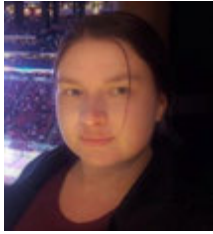
**Heejin Jeong**, Santa Catalina 150L, [heejin.jeong@asu.edu](mailto:heejin.jeong@asu.edu)



Dr. Jeong's research aims to design, implement, and evaluate human interaction systems to bridge the critical communication gap between users and system designers. His current focuses include extended reality systems, assistive robotics for occupational safety enhancement and healthcare rehabilitation training, and human-robot collaboration in Industry 4.0 and advanced manufacturing.



**Heather C. Lum**, Santa Catalina 150K, [heather.lum@asu.edu](mailto:heather.lum@asu.edu)



Dr. Lum's primary research interests focus on perceptions of technology, specifically the ways in which technology is impacting the way we interact with each other as humans. Other areas of interest include the use of psychophysiological measures such as eye tracking and vocal analyses to better determine and study the critical applied cognitive and experimental topics of interest such as spatial cognition, human-human, human-animal and human-robot team interactions. She has also turned her attention to the use of games and virtual/mixed environments for training and educational purposes.

**Rod Roscoe**, Santa Catalina 150D, (480) 727-2760, [rod.roscoe@asu.edu](mailto:rod.roscoe@asu.edu)



Dr. Roscoe investigates how the intersection of learning science, computer science, and user science can inform effective and innovative uses of educational technologies. He is also interested in how cognitive, metacognitive, and motivational learning processes can be scaffolded by educational technology. Recent work has explored engineering education with a focus on human systems engineering and applied psychology. Dr. Roscoe's interests span areas with real-world impact, such as writing proficiency, sustainability, health and wellness, and consumer behavior. He is passionate about issues of inclusion and equity, and serves on multiple related committees within the university and beyond.





## Completing a Thesis in Human Systems Engineering

The thesis is the culminating project for your Master of Science in HSE. Please note that the thesis is a project that spans your entire tenure in the MS program. See deadlines in brackets (these indicate the latest possible times to complete action). Use the **checklist** below in order to monitor your progress and complete required procedures.

### Checklist

1. **Meet with your assigned faculty advisor.** Meet with your faculty advisor early in the first semester, review the recent research of the HSE faculty, and identify potential topics for your MS applied project or thesis. [SEM 1]
2. **Identify research topics.** Refine your research interests to select specific topics and questions that you will investigate further via literature reviews and studies. [SEM 1]
3. **Form a thesis committee.** In addition to your advisor, you will invite two or more other faculty members to guide your project. [SEM 2]
4. **Write the thesis proposal.** Provide a thorough review of the relevant literature and detailed description of your planned methods and analyses. [SEM 3]
5. **Schedule a proposal meeting.** Convene your committee to present your proposed research to your committee and receive their detailed feedback and recommendations. [SEM 3]
6. **Institutional Review Board (IRB) approval.** Obtain approval from the IRB prior to conducting your research. All research with human subjects must be evaluated for ethics. [SEM 4]
7. **Data collection and analysis.** Conduct the research as planned and approved by your committee. All deviations from your plan must be reapproved by your faculty advisor. [SEM 4]
8. **Write the thesis document.** Building upon your proposal, provide a detailed report of your background literature, methods, analyses, results, and conclusions. [SEM 4]
9. **Schedule the thesis defense.** Once the thesis has been read by your advisor, schedule the defense. Send your thesis to committee members two weeks in advance. [SEM 4]
10. **Submit your thesis for formatting approval.** After scheduling your defense, submit a copy of your thesis to ASU Graduate College to ensure correct formatting. [SEM 4]

11. **Defend and revise.** Prepare a professional presentation of your work to be shared with your committee. Be prepared to justify your work and revise based on feedback. [SEM 4]

12. **Present your work at a Brown Bag.** Students are encouraged to present their research at the Brown Bag talk series. This talk can be given before your defense (as practice). [SEM 4]

### *Detailed Thesis Procedures*

#### **Step 1 – Meet with your assigned faculty advisor.**

Your faculty advisor will be your supervisor and primary mentor. Thus, it is important to meet with your advisor and discuss relevant expertise and mentorship style. Learn more about your faculty advisor by studying their published work.

#### **Step 2 – Identify research topics.**

Based on a review of the literature, coursework, conference attendance, and discussions with your colleagues, develop a short list of research questions that might inform your research. As you study the background literature, focus on key unanswered questions and unsolved problems in your field. Choose questions that both interest you and contribute to the broader community.

Building upon your advisor’s past work and expertise can significantly streamline your progress compared to “starting from scratch.”

#### **Step 3 – Form a thesis committee.**

Based on suggestions from your faculty advisor and discussions with other faculty members, you will invite (at least) two other faculty members to guide your work. Your committee must have at least three members, including (a) one full-time, HSE faculty member and (b) one other ASU faculty member, who may be full-time, adjunct, and from a different program. If any committee member is a non-ASU faculty member, they will need to provide a copy of their recent CV and be approved by the program chair.

Send a description of your topic(s) and research question(s) to potential committee members and request a meeting. It is up to the faculty member whether they choose to be on your committee.

#### **Step 4 – Write a thesis proposal that includes a clear timeline.**

The thesis proposal presents your research ideas and plans to your committee. It is important that your proposal document be thorough, coherent, and well-written. Your proposal should provide:

- *A comprehensive literature review* that presents the relevant background knowledge for important concepts and principles. The reader should be able to understand the core

constructs, theories, and findings that motivate your work. More importantly, the reader should be able to understand the key problems or unanswered questions that your project will address, and appreciate why those problems or questions are valuable to study.

- *A clear statement of your research questions and hypotheses.* The reader should be able to understand exactly what questions that your project will answer. Similarly, when relevant, you should summarize the hypotheses that will be tested and your predicted outcomes. These hypotheses should logically follow from your literature review.
- *A detailed description and timeline of your proposed research methods,* including all data sources (e.g., participants, measures, and instruments) and procedures (e.g., how participants will be recruited, how tests will be administered, and what steps will be followed in the study). The more detail you provide in this section, the easier it will be for your faculty advisor and committee to help you refine and improve your methodology.
- *A detailed description of your planned analyses* (e.g., what comparisons, models, and statistics will be conducted to address your questions and hypotheses).

Work with your faculty advisor to revise multiple drafts until you have a polished proposal. Your advisor will decide when you can proceed to a proposal meeting.

#### **Step 5 – Schedule and conduct a proposal meeting.**

Schedule a date and time to present your proposal. All members of your committee must be present, but it is acceptable to have committee members attend via phone, Skype, or other arrangement. Submit your proposal to your committee one week in advance of your meeting.

Your proposal meeting must be scheduled by no later than your *third semester* in the program, not including summer semesters.

You will prepare a 15-20 minute presentation that offers an overview of the key background, questions, methods, and analyses. This presentation will be followed by an in-depth discussion of the research proposal with your committee. Your committee will suggest revisions, changes, and improvements that need to be addressed before you are approved to conduct the research.

A preproposal meeting in which a student presents their idea to the committee prior to writing the full proposal often provides more room for committee input. A full written proposal approved by the committee must follow within 30 days of the preproposal meeting. Please give the committee at least one week to review the proposal.

#### **Step 6 – Obtain Institutional Review Board approval** (if necessary).

Any project that involves collection or analysis of data with human subjects requires Institutional Review Board (IRB) approval. The IRB assesses the risks and ethical conduct of all planned

research. You will need to complete an IRB proposal form and respond to feedback from a representative of the Office of Research Integrity and Assurance.

Please visit the ORIA website for human research: <http://researchintegrity.asu.edu/humans>

In addition, all graduate students working on *any* project involving human subjects are required to complete either the Collaborative Institutional Training Initiative (CITI) or National Institutes of Health (NIH) online training course on conducting research. You will need to save a copy of your completion certificate and renew your certification periodically.

### **Step 7 – Data collection and analysis.**

Once given approval by your committee and the IRB (if necessary), begin collecting your data. This process can take much longer than you expect; do not procrastinate. Depending on your project, you may be able to collect data via the subject pool (see the HSE Subject Pool section of this document).

In addition to the measures and data you collect, document your procedures and protocols. Make note of any unexpected events or oddities that occur. Most importantly, be careful and meticulous when storing and filing your data! Backup your files often.

### **Step 8 – Write the thesis.**

Ideally, your proposal will have been thorough and polished enough that it provides a strong start to your actual thesis. For example, whereas your proposal might have been written in future tense (e.g., “We will collect data on participants’ working memory...”), your thesis may contain the same content written in past tense (e.g., “We collected data on participants’ working memory...”).

Nonetheless, you should expect to revise and expand your literature review and methodology sections to reflect your growing expertise and changes that occurred.

The new addition to your thesis will be sections that clearly present the results of your work and the interpretations and findings you obtain. Your thesis document should provide:

- *A thorough and clear reporting of the results of your analyses.* Explain the patterns that were observed in your data and measures. Explain how these results support or do not support your hypotheses and research questions. Report appropriate numerical and statistical data using accepted conventions, tables, and graphs.
- *A thoughtful discussion of the interpretation and impact of your findings.* Summarize your major findings as they relate to your hypotheses. This section will include no data, but rather your interpretations and explanations. In addition, this section should present both the limitations and flaws in your research and discuss directions for future work.

The thesis will need to be formatted in a specific manner according to the ASU Graduate College Guidelines: <https://graduate.asu.edu/current-students/completing-your-degree/formatting-your-thesis-or-dissertation>.

As with the proposal, provide a draft of the thesis to your faculty advisor for review and commentary. Your advisor should review the thesis *before* it is submitted to other committee members and *before* scheduling a defense. Work with your faculty advisor to revise multiple drafts until you have a polished thesis. Your advisor will decide when you can proceed to a thesis defense.

Use American Psychological Association guidelines for writing style, references and citations, and reporting outcomes (<http://www.apastyle.org/>).

### **Step 9 – Schedule the thesis defense.**

Schedule a date and time to present and defend your thesis. All members of your committee must be present, but it is acceptable to have committee members present via phone, Skype, or other arrangement. Submit your thesis to your committee one week in advance of your meeting.

Importantly, your thesis defense *must* also be *officially* scheduled via your iPOS under the “Defense” tab for ASU Graduate College. This scheduling must be made at least ten working days prior to the actual defense.

More information can be found here: <http://graduate.asu.edu/>

### **Step 10 – Submit your thesis for formatting approval.**

Soon after scheduling the defense, submit the thesis document to the Graduate College office ([gradformat@asu.edu](mailto:gradformat@asu.edu)) for formatting approval through the iPOS system. Their office will check your thesis to ensure it conforms to the official format. They will *not* review your work for content or accuracy.

### **Step 11 – Defend and revise.**

You will prepare a 15-20 minute professional presentation that reviews the important concepts, hypotheses, methods, and findings. This presentation will be followed by an in-depth discussion of the thesis with your committee. Your committee will ask you questions about your rationale, procedures, and findings and you should be prepared to explain and justify your work.

A defense form will be emailed directly to your supervisor. Based on the merit of the research and thesis defense, the outcome will be: *Pass*, *Pass with Major Revisions*, *Pass with Minor Revisions*, or *Fail*. All committee members will sign the form.

Your committee may suggest revisions before your thesis is approved. Complete these revisions or follow-up work promptly and provide a final, revised thesis to your advisor and committee. The advisor must sign the defense form again to indicate that revisions are complete.

Submit the signed form within 10 days (<https://graduate.asu.edu/current-students/policies-forms-and-deadlines/graduation-deadlines>).

### **Step 12 – Present your work at a Brown Bag.**




All students are encouraged to give a presentation about their thesis at our Brown Bag series. This presentation can be scheduled before your defense (e.g., as practice) or after your defense (e.g., to share your success with the community). It is recommended that you use the Brown Bag as a practice opportunity to become more comfortable before your official defense.

### **Completing an Applied Project in Human Systems Engineering**

Another option for your culminating work for the Master of Science in HSE is an Applied Project. The processes and procedures are similar but not identical to those of the thesis. Please note that applied project spans your entire tenure in the MS program. See deadlines in brackets (these indicate the latest possible times to complete action). Use the **checklist** below in order to monitor your progress and complete required procedures.

#### *Checklist*

1. **Meet with your assigned faculty advisor and identify a client sponsor.** Within your area(s) of interest, review potential clients and set up meetings to discuss your plans and ideas. [SEM 1]
2. **Identify project topics.** Refine your interests to select specific topics and questions that you will investigate further via literature reviews and studies. [SEM 1]
3. **Write the project proposal.** Provide a thorough review of the relevant literature, detailed description your planned methods, development process, and/or analyses. [SEM 3]
4. **Get feedback on your proposal.** Your advisor, the HSE 593 instructor, and client will meet with you to provide feedback on your proposal. [SEM 3]
5. **Institutional Review Board (IRB) approval.** You may need to obtain approval from the IRB prior to conducting your research. All research with human subjects must be evaluated for ethics. [SEM 4]
6. **Design, Development, and Analysis.** Proceed with the project as planned and approved. All deviations from your plan must be reapproved by your advisor and client. [SEM 4]

-  **7. Write the Applied Project report.** Building upon your proposal, provide a detailed report of your background literature, methods, analyses, products, and outcomes. As applicable, develop a portfolio that includes the project. [SEM 4]
-  **8. Get report feedback and revise.** Have your advisor, HSE 593 instructor, and client review the report. Implement their recommended revisions. [SEM 4]
-  **9. Schedule report presentation** Your project can be presented as a poster at Innovation Showcase at the end of the semester. For this you will need to prepare a poster and a short elevator pitch about your work. [SEM 4]

### *Detailed Applied Project Procedures*

#### **Step 1 – Meet with your assigned faculty advisor and identify a client sponsor.**

Your faculty advisor will be your supervisor and primary mentor, and your client will guide the specific goals and needs of the project. The instructor of HSE 593 will also help guide you through the process, but your advisor and client will be the subject matter experts. Thus, it is important to meet with your advisor and discuss relevant expertise and mentorship style. Learn more about your faculty advisor by studying their published work. Learn more about advisor(s) by studying their published work.

Your advisor must be a full-time faculty member of the HSE program (see Faculty List). Although not required, it is ideal if your project aligns with your advisor's research, and your participation in funded research (e.g., as a Research Assistant) aligns with your project.

#### **Step 2 – Identify project topics.**

Based on a review of the literature, coursework, conference attendance, and discussions with your colleagues, develop a short list of concepts, questions, and problems that might inform your project. As you study the background literature, focus on unanswered questions, unsolved problems, or product needs in your area of specialization.

#### **Step 3 – Write a project proposal that includes a clear timeline.**

The project proposal presents your ideas and plans. It is important that your proposal document be thorough, coherent, and well-written. Your proposal should provide:

- *A comprehensive literature review* that presents the relevant background knowledge for important concepts and principles. The reader should be able to understand the core constructs, theories, and findings that motivate your project. More importantly, the reader should be able to understand the key problems, questions, or needs that your project will address, and appreciate why those issues are worthwhile.
- *A clear statement of your project goals and expectations.* The reader should be able to understand exactly what goals your project will seek to attain. Similarly, when relevant, you

should summarize the products or resources to be developed or other expected outcomes. These goals should logically follow from your literature review.

- *A detailed description of your proposed development process, data collection, or other methodologies*, including all procedures (e.g., design planning, observations, usability testing, efficacy trials) and a timeline. The more detail you provide in this section, the easier it will be for your committee to help you refine and improve your plan.
- *A detailed description of your planned analyses* (e.g., what comparisons, tests, models, and statistics will be conducted to address your goals and expected outcomes).

#### **Step 4 – Get feedback on your proposal.**

Provide your advisor, the instructor of HSE 593, and client with a draft of your proposal. This should occur no later than your *third semester* in the program, not including summer semesters. Arrange to meet with your advisor, HSE 593 instructor, and client (together or separately) to get feedback on the proposal. Make suggested revisions.

#### **Step 5 – Obtain Institutional Review Board approval** (if necessary).

Any project that involves collection or analysis of data with human subjects requires Institutional Review Board (IRB) approval. The IRB assesses the risks and ethical conduct of all planned research. You will need to complete an IRB proposal form and respond to feedback from a representative of the Office of Research Integrity and Assurance.

Please visit the ORIA website for human research: <http://researchintegrity.asu.edu/humans>

In addition, all graduate students working on *any* project involving human subjects are required to complete either the Collaborative Institutional Training Initiative (CITI) or National Institutes of Health (NIH) online training course on conducting research. You will need to save a copy of your completion certificate and renew your certification periodically.

#### **Step 6 – Design, Development, and Analysis.**

Proceed with the project as planned and approved. Once given approval by your committee and the IRB (if necessary), begin your design and development process, data collection, analyses, and so on. This process can take much longer than you expect; *do not procrastinate*. All deviations from your plan must be reapproved by your advisor and client.

In addition to any measures and data you collect, document your procedures and protocols. Make note of any unexpected events or oddities that occur. Most importantly, be careful and meticulous when storing and filing your data! Backup your files often.

#### **Step 7 – Write the Applied Project report.**



Building upon your proposal, provide a detailed report of your background literature, methods, analyses, products, and outcomes. As applicable, develop a portfolio that includes the project.

Ideally, your proposal will have been thorough and polished enough that it provides a strong start to your final report. For example, whereas your proposal might have been written in future tense (e.g., “We will develop a software program...”), your report may contain the same content written in past tense (e.g., “We developed a software program...”). Nonetheless, you should expect to revise and expand your literature review and methodology sections to reflect your growing expertise and changes that occurred.

The new addition to your report will be sections that clearly present the outcomes of your work and the final product(s) developed. Your report should provide:

- *A thorough and clear reporting of the outcomes* of your analyses, development process, and evaluations. Clearly describe what you have produced. As necessary, report numerical and statistical data using accepted conventions, tables, and graphs.
- *A thoughtful discussion of the interpretation and impact of your project.* Summarize your major outcomes as they relate to your goals. Clearly explain the utility, applications, and potential impact of your work. In addition, this section should present any limitations and flaws in your project and discuss directions for future work or development.

The applied project report does *not* need to be formatted in specific a manner according ASU guidelines and does *not* need to be submitted to the Graduate College office. Use American Psychological Association guidelines for writing style, references and citations, and reporting outcomes (<http://www.apastyle.org/>).

### **Step 8 – Get feedback and revise.**

Have your faculty advisor, the instructor of HSE 593, and client review the report. Make revisions as suggested by them. Be prepared to revise multiple drafts until you have a polished report. Your advisor and HSE 593 instructor will decide when you are ready to present your work.

### **Step 9 – Schedule a report presentation.**

Once the report has been reviewed by your faculty advisor, begin to prepare your poster for Innovation Showcase at the end of the semester. The poster should be a highly visual presentation of your applied project report and should cover the important concepts, methods, and outcomes of your work. Also prepare a short (3 minute) “elevator pitch” about your project that you can use as you explain your poster at Innovation Showcase. Alternatively, you may choose to give an oral presentation at a venue such as the brown bag series.

## **Completing a Portfolio in Human Systems Engineering**

The Portfolio is a culminating project option for the Master of Science in HSE and all concentrations. The point of a portfolio is to create a job application aid that highlights your skills. This project requires you to identify three projects from your time in the program that reflect skills that you have obtained. The selected items could be projects from classes that you took or related to research that you

conducted in HSE research labs. The Portfolio has several additional supporting sections beyond the project documents. The other sections with brief descriptions are provided below.

- Cover page – This includes your name, advisors name, date, and semester of graduation
- Resume – An up-to-date resume reflecting your accomplishments to date.
- Overview – A brief description of the three notable accomplishments that you achieved during your graduate experience that will be highlighted in the portfolio along with why they have been chosen. This section is typically three or four paragraphs.
- Accomplishments summary (3) – Document each of your three chosen topics, in a professional, objective, and informative manner. It is also often helpful to have a visual representation of the skills when possible.
- Portfolio item (3) – Include the portfolio item either after the accomplishment summary for it or as an Appendix at the end of the document.
- Reflection – Reflection of your graduate training - how the accomplishments you have chosen and other skills that you show that you are competent and qualified. Use this as a chance to show that you would be the best candidate.

### *Checklist*

1. **Meet with your assigned faculty advisor.** Meet with your faculty advisor early in the first semester of your final year or before, review your goals for getting th MS degree and identify likely Portfolio items. [SEM 1-3]
2. **Identify topics.** Select final topics and refine your portfolio items. Find further information via literature reviews and studies. [SEM 3]
3. **Revise portfolio items.** Improve the quality of portfolio items by revising them. [SEM 3]
4. **Write supporting section of the Portfolio.** Supporting sections include the Opening section, summaries of each item with the skills that is highlighted. One-page visual representation for each item and a reflection/conclusion. [SEM 4]
5. **Give portfolio to faculty advisor.** Give a complete version of the document to your Advisor for review and feedback. Remember to use the Portfolio evaluation form (see Appendix A in handbook).
6. **Revise the Portfolio.** Revise the document as necessary from feedback and return to faculty advisor for review.
7. Send the final portfolio and portfolio document to the Graduate Program Chair, Scotty Craig – [scotty.craig@asu.edu](mailto:scotty.craig@asu.edu) for final review.

## Accelerated HSE Bachelor's to Master's 4+1 Program

The Polytechnic School offers an accelerated BS HSE to MS HSE program for students currently enrolled in the undergraduate program. This allows students to graduate with both degrees within five years of full-time coursework.

Students can share up to 12 credits (two 400 level and two 500 level courses) between their undergraduate and graduate degree programs.

To be eligible to participate, students must have a minimum of 3.2 GPA on a 4.0 scale at time of application and through completion of undergraduate degree requirements. Students must also have earned 75 credits to apply and 90 credits (and be admitted to the 4+1 program) before sharing classes. Students should plan to share their credits in their senior year and apply in their second semester of their junior year.

Interested students should meet with the 4+1 advisor to discuss eligibility, shareable courses, and the application process.

Once a student is admitted into 4+1, they will share up to four classes in their final year of the undergraduate program. During this timeframe, 4+1 students will meet several milestones as they prepare to move into the Master's program. Students should be meeting with the HSE faculty to discuss research ideas and culminating experience options while in their undergraduate program. By the time a student matriculates into the MS program, they should have identified a faculty advisor and have developed an idea for a thesis topic or an applied project.

### Example Plan of Study

Year	Semester	Courses	Credit Hours
<b>Final Undergraduate Year</b>			
1	Fall	HSE 542: <i>Foundations of Human Systems Engineering</i> <b>*shared</b>	3
	Spring	Elective (400 level or above) <b>*shared</b> Elective (400-level or above) <b>*shared</b>	3 3
		HSE 520: <i>Methods &amp; Tools in Applied Cognitive Science</i> <b>*shared</b>	3
<b>Graduate-Year</b>			
2	Fall	HSE 599 <i>Thesis</i> (or) HSE 593 <i>Applied Project</i> (or) Elective (500-level or above) HSE 592: <i>Research</i> (or) Elective (500-level or above)	3 3
	Spring	HSE 530: <i>Intermediate Statistics</i> HSE 599 <i>Thesis</i> (or) HSE 593 <i>Applied Project</i> (or) Elective (500-level or above) Elective (500-level)	3 3 3

## Milestones and Timeline

The following milestones and timeline will help you track your progress through the degree program, particularly for those pursuing the thesis or applied project track. The milestones assume that you will complete the degree over a period of about four semesters, though you may make faster or slower progress depending on your work. Your annual evaluations will take into account your progress toward meeting these milestones.

- Exploration Milestone:** in your **first semester** of your senior year and after admission to the 4+1 program, you should begin actively exploring topics related to your interests and those of potential faculty mentors. Begin by meeting with each of the program faculty and discussing research topics of mutual interest. Faculty can help you do a deeper dive into one or more topics. For instance, you may be asked to read a set of articles or chapters and prepare an annotated bibliography on the topic. You must meet with your assigned faculty advisor as soon as possible. By the end of the semester, you must have chosen a topic for continued investigation.
- Development Milestone:** in your **second semester** of your senior year and after admission to the 4+1 program, you will explore your chosen topic in greater depth through additional readings and discussions with your advisor. By the end of the semester, you must identify a well-defined research question to answer (Thesis) or a client-driven problem to analyze or solve (Applied Project).
- Proposal Milestone:** in your **third semester** (in which you matriculate into the graduate program), you will enroll in HSE 599 (Thesis) or HSE 593 (Applied Project). You will expand the literature review related to your project focus, and will develop a formal proposal. By the end of the semester, you must submit a proposal to your committee (and client, for Applied Projects). Completing your proposal earlier in the semester offers more time to conduct the work.
- Synthesis Milestone:** in your **fourth semester** (and beyond), you will conduct your proposed project and enroll in HSE 599 (Thesis) or HSE 593 (Applied Project). Complete the work outlined in your proposal, including data collection, analyses, and interpretation. Next, author your thesis or applied project report and revise based on committee feedback. These tasks may extend across more than one semester depending on the scope of your project and efficiency in conducting the work.

You are solely responsible your own progress through the program. Failing to complete the above milestones may delay your graduation.

Milestone	Action	Deadline (earlier is always better)
-----------	--------	-------------------------------------

Exploration	Meet with your assigned faculty advisor and identify MS topic	End of Semester 1
Development	Identify research question or applied problem	End of Semester 2
Proposal	Submit thesis or applied project proposal	End of Semester 3
Synthesis	Complete thesis or applied project	End of Semester 4

## Professional Development

An important aspect of academic and professional success is participation within a community of scholars and practitioners. For example, individuals might attend research conferences (e.g., the Human Factors and Ergonomics Society annual meeting), participate in professional student groups (e.g., the Human Factors and Ergonomics Society student chapter), attend workshops (e.g., National Science Foundation Proposal Clinic), and give research presentations.

Every semester, students are required to attend and participate in **brown bag seminars** in which students, faculty, and visitors discuss contemporary work. Students can enroll in a 1 credit course, HSE 594: *Conference and Workshop*, to receive credit for attendance.

## Additional Information

### Brown Bag Seminars

The Human Systems Engineering Program hosts a bi-weekly series of talks related to research, applications of research, and graduate education issues. The primary goals of these talks are to provide a forum for sharing and discussing diverse research with colleagues. Attending these talks offers you exposure to new and different fields and career possibilities.

These talks are typically held on *Wednesdays* at noon in the *San Tan Building Room 220*. The schedule and delivery method of talks will be announced via email. Presentations are archived online.

Importantly, attendance at the seminars is expected and mandatory for all Human Systems Engineering Master's degree students, regardless of whether you are enrolled in HSE 594: *Conference and Workshop*. Lack of attendance will reflect poorly on you and be noted in your Annual Progress Report.

### Research Beyond the Thesis and Applied Project

Although your thesis or applied project will be a primary focus of your graduate work, it is also highly recommended and encouraged that you become involved in additional research projects. Your advisor may have other research agendas that interest you, and you may wish to work with other faculty to broaden your own expertise and skill sets. Collaboration with others also creates more

opportunities for publication – publishing makes you more marketable for both academic and industry positions.

### **Funding**

All MS degree students are eligible for financial support as a Research Assistant or Teaching Assistant. However, such funding is **very competitive** and primarily awarded to doctoral degree seeking students. Please discuss your options with a faculty member and plan accordingly.

### **Conference Travel**

Another way to expand your expertise and curriculum vita (or resume) is to attend and present at academic and professional conferences. Travel support is available through several sources, including the Graduate College office and the Graduate and Professional Student Association at Arizona State University. There are also funds available through the Polytechnic School for students who are traveling to present their work at a conference.

- <https://graduate.asu.edu/current-students/funding-opportunities/awards-and-fellowships/travel-awards>
- <http://www.asu.edu/gpsa/funding/travel.html>

In some cases, a faculty member or your advisor may be able to cover some or all of your travel expenses via grant funding (if your travel pertains to the grant). However, you should not assume that your travel costs will be covered unless clearly indicated by a faculty sponsor.

In many cases, your faculty sponsor will expect you to seek out as many other resources for travel funding *before* requesting grant support. Be thorough and aggressive in seeking out funding sources – many of them are associated with awards and grants that further boost your curriculum vita!

### **Human Systems Engineering Subject Pool**

A potentially valuable resource for conducting research and data collection is the HSE Psychology Subject Pool. Undergraduate students who are enrolled in select classes (e.g., Introduction to Psychology) are required to participate in research studies as a learning experience. Thus, these students become a pool of potential participants in your research.

To include your study in this program you will need to contact the Subject Pool Coordinator (Dr. Scotty Craig, [scotty.craig@asu.edu](mailto:scotty.craig@asu.edu)) for instructions and approval. You will need to specify the number of participants needed, the amount of time needed for your study per participant, and a letter of approval from the Institutional Review Board (IRB). Scheduling for subject pool studies is handled online via an ASU SONA systems account (<https://asup.sona-systems.com/>).

### **How Long Should I Take to Graduate?**

A reasonable timeframe to graduate is about two years: four full-time semesters, not including any courses take during the summer semester. The maximum time to complete the Master's degree is six years as per Arizona State University policy. Use your time wisely and productively to publish, build a strong curriculum vita, and develop your portfolio.

Please refer to the **Milestones and Timeline** section for additional information.

### **Academic & Faculty Advising**

The Polytechnic School Graduate Advising Office is responsible for advising all MS in Manufacturing Engineering students with respect to progress toward the degree as well as program, school, college, and university-wide ASU Policies and Procedures. Questions involving details of academic content in courses, professional practice, and research can be discussed with faculty advisors or the Graduate Program Chair.

#### **Graduate Academic Advising**

Sutton Hall, Second Floor  
[polygrad@asu.edu](mailto:polygrad@asu.edu)

480-727-4723

#### **Graduate Program Chair**

Dr. Scotty Craig  
Associate Professor and Graduate Program  
Chair, HSE  
Santa Catalina 150G  
[scotty.craig@asu.edu](mailto:scotty.craig@asu.edu)  
480-727-1006

# Polytechnic School Overview

---

## About the Polytechnic School

The Polytechnic School is making a new higher education experience, one that focuses on learning through making things and solving real-world challenges through collaboration. At the Polytechnic School, we believe how you learn and teach is as important as what you learn and teach. We are committed and contributing to ASU's vision of the New American University – an institution that is committed to excellence, access, and impact.

The Polytechnic School is located in Mesa, which is the state's third-largest city and part of the Greater Phoenix area. The 600-acre ASU Polytechnic campus is built in a beautiful desert arboretum and is home to more than 6,000 students studying in undergraduate and graduate majors. The Polytechnic School is home to some of the most innovative engineering and technology programs in the country and some of the most advanced learning laboratories available to students on any university campus.

The programs thrive under the guidance of more than 100 outstanding faculty members with deep expertise in many of the most important challenges that society faces.

Visit the Polytechnic School website at [poly.engineering.asu.edu](http://poly.engineering.asu.edu). **For more in-depth information about the programs offered through the Polytechnic School as well as the application process and other pertinent information, you are encouraged to explore the [overview of the graduate programs](#).**

## Graduate Programs

The Polytechnic School's graduate students learn in an environment that blends management, applied sciences, and engineering and technology fields to create applications, systems, and solutions that meet real-world needs. We engage in research that matters. As part of the Polytechnic School masters programs, applied projects, theses, and research are degree components and complement students' theoretical and practical understanding. The Polytechnic School doctoral programs include separate degree components, all of which are outlined in each program's handbook.

### Masters Degrees

- Aviation Management and Human Factors, MSTech in Technology Engineering, MS
- Environmental and Resource Management, MS
- Environmental and Resource Management (Water Management), MS
- Graphic Information Technology, MS
- Human Systems Engineering, MS
- Human Systems Engineering (Aviation Human Factors), MS
- Human Systems Engineering (Health Systems), MS



Human Systems Engineering (Intelligent Systems), MS  
Human Systems Engineering (User Experience Research), MS  
Information Technology, MS  
Management of Technology, MSTech in Technology  
Robotics and Autonomous Systems (Systems Engineering), MS  
User Experience, MS

### **Doctoral Degrees**

Engineering Education Systems and Design, Ph.D.  
Human Systems Engineering, Ph.D.

### **Programs No Longer Admitting Students**

Environmental Technology Management, MSTech in Technology  
Graphic Information Technology, MSTech in Technology

## **Purpose of this Handbook**

The purpose of this handbook is to provide guidance and information related to admission, degree requirements, and general policies and procedures for graduate students in the Polytechnic School. Students must adhere to policies of both the Polytechnic School and the Graduate College. Policies and this handbook are subject to change at any time; students will be notified.

## **Student Responsibility**

Graduate students are responsible for familiarizing themselves with all university and graduate policies and procedures as well as applicable deadlines. Each student should also communicate directly with their academic unit to be clear on its expectations for degree completion. Graduate students are responsible for frequently checking their **My ASU** account and **asu.edu email** for the most up-to-date information regarding their status, holds, items to attend to, and other important information.

## **Diversity and Inclusion Initiative at the Ira A. Fulton Schools of Engineering**

In January 2019, the Ira A. Fulton Schools of Engineering launched a new initiative focusing on diversity and inclusion — core values to the Fulton Schools and ASU, as exemplified in the university charter. This initiative is called DII@FSE.

Our DII@FSE task force has articulated a vision to follow strategies and practices that support environments where individuals feel included, valued and respected and where different kinds of people can succeed.

The DII@FSE has submitted a proposal to the American Society for Engineering Education's (ASEE) Diversity Recognition Program. That proposal was awarded bronze status (the highest entry status a university can be awarded). Next steps for the initiative will be working together to realize the plan's goals.

## Goals

1. Create and maintain a student body and workforce across the Fulton Schools that is diverse in multiple dimensions and inclusive for all.
2. Empower faculty, staff, students and academic associates at the Fulton Schools to embrace the core values and practice of diversity, equity and inclusion.
3. Be a global leader in diversity, equity and inclusion in engineering.

## Facilities and Labs

The core facilities, laboratories, and centers in the Polytechnic School provide the ideal environments for teaching, research, and discovery. State-of-the-art equipment and technologies help students increase their knowledge and experience and provide support for the use-inspired research conducted by the school's faculty and students. Learn more by visiting: [Labs and Facilities](#).

## Faculty

Faculty members have significant expertise in many of the most important challenges that society faces. Many members of the faculty bring considerable industry experience to bear on their teaching and research. To learn more about the faculty, you may refer to the [Polytechnic School Directory](#).

## Graduate Advising

Graduate student advising is located on the Polytechnic campus in [Sutton Hall](#) on the second floor. For more information about the Polytechnic School graduate programs or the policies in this handbook, contact the graduate advising office at [polygrad@asu.edu](mailto:polygrad@asu.edu) or 480-727-4723.

# Accelerated Bachelor's + Master's Degree Program (4+1)

---

The Polytechnic School offers accelerated BS/MS and BSE/MS programs for students currently enrolled in an approved undergraduate program. This allows students to graduate with both degrees within five years of full-time coursework.

If you are interested to see if your program is part of the accelerated (4+1) program offerings, visit [4+1 Degree Programs](#) and contact the Polytechnic School Graduate Advising office at [polygrad@asu.edu](mailto:polygrad@asu.edu) to discuss your 4+1 options. Please note that in addition to credit hour requirements, applicants must also have a cumulative ASU GPA of 3.20\* or higher at the time of application to be considered. Admission into the accelerated programs is not guaranteed and an application is required to be considered.

## 4+1 Probation Policy

Students in the Polytechnic School accelerated bachelor/masters programs are required to have/maintain a minimum 3.2 cumulative undergraduate ASU GPA on a 4.0 scale, at the time of the 4+1 agreement, upon graduate admission, and through the completion of the undergraduate degree

requirements. In addition, students in the accelerated bachelor/masters programs are also required to maintain a 3.0 GPA for all coursework on the graduate plan of study (including shared 400-level courses) and all 500-level coursework.

Shared coursework is defined as the courses being applied toward the bachelors degree and also being utilized for credit in the masters program. Shared courses are identified on the 4+1 Agreement that must be completed prior to starting the 4+1 program.

Students in the accelerated program who, upon their undergraduate graduation date, do not maintain a minimum 3.2 cumulative undergraduate ASU GPA on a 4.0 scale are allowed to continue into the graduate portion of the accelerated program, but cannot share the credits from their undergraduate degree. Students in this situation must still complete the full requirements of their respective graduate degree.

Students in the accelerated program who do not maintain a 3.0 minimum GPA in their shared coursework will be placed on graduate probation upon entering the masters degree program. Students in this situation will be notified of their probation status and the steps needed to lift the probation.

Students who do not satisfy either GPA requirement are placed on graduate academic probation upon entering the masters program and cannot share the credits from their undergraduate degree. Students in this situation must still complete the full requirements of their respective graduate degree and will be notified of their probation status and the steps needed to lift the probation.

## Academic Standards and Policy

---

### Grades

To be eligible for graduation and the completion of a graduate degree, a student must achieve a cumulative grade point average (GPA) of 3.0 or better in three different grade point average calculations. The three different grade point averages that are considered by Graduate College and the Polytechnic School are as follows: **(1)** the grade point average in all courses numbered 500 or higher that appear on the transcript, except those that were listed as deficiencies in the original letter of admission, **(2)** the grade point average in all coursework that appears on the approved program of study, and **(3)** the grade point average in all coursework taken at ASU post baccalaureate.

Transfer credits are not calculated on the Plan of Study (iPOS) GPA or the Graduate GPA. Courses with grades of “D” (1.00) and “E” (0.00) cannot appear on the iPOS but will be included when calculating the Graduate GPA. Courses with an “I” grade cannot appear on the iPOS.

A student who is not progressing satisfactorily toward a degree will be withdrawn from the program by the Dean of the Graduate College upon recommendation by the Fulton Schools of Engineering Dean’s office. The policy of the Polytechnic School for academic probation and dismissal of graduate students is outlined below.

Satisfactory progress is defined by the quality of the student’s work, that it does not have any academic and progress probationary issues, and that the student is meeting all requirements and/or

milestones applicable to their program. Specifically for Doctoral students, this also includes the successful completion of the qualifying and comprehensive exams, as determined by their program. In addition to the probationary rules, satisfactory progress includes appropriate communication each semester with the student's Committee Chair regarding their progress, if applicable.

Students in the accelerated degree programs (4+1) will have separate requirements to meet while completing their undergraduate degree. See accelerated bachelor's + master's degree program (4+1) section above for more information. Once students are in the graduate portion of the program (and have completed their undergraduate degree), they must meet the graduate academic expectations outlined in this section.

## Academic Performance Standards

To meet the Polytechnic School academic performance requirements, all students admitted to a graduate degree program in the Polytechnic School must adhere to all of the following:

All students admitted to a graduate degree program in the Polytechnic School, either on a regular or provisional admission status, must maintain a 3.0 or higher grade point average (GPA) in:

1. All work taken for graduate credit (courses numbered 500 or higher),
2. Coursework in the student's approved plan of study (iPOS), **and**
3. All course work taken at ASU (overall GPA) post baccalaureate.

Earn a "C" or better in all iPOS (plan of study) courses. Grades of "W" and "I" are not acceptable on the iPOS and may be considered lack of satisfactory progress if more than one occurrence during the students' graduate program of study. Programs may invoke a higher standard, e.g., no courses with a C may be included on the iPOS.

Meet the terms of the ASU Graduate College satisfactory progress policies as outlined at: **ASU Graduate Policies and Procedures**.

## Evaluation of Academic Performance Requirements

After each semester, the academic unit reviews students' files for satisfactory progress towards completion of the degree. All students are placed under one of the three categories:

- **Satisfactory Progress** means that the student does not have any academic and progress probationary issues. In addition to the probationary rules, satisfactory progress includes appropriate communication each semester with the student's Committee Chair regarding their progress, if applicable.
- **Academic Probation** pertains to grades that fall below those required by Program and University policies, including graduation requirements. The following are notices/letters the student will receive if one of these pertains to their academics:

### Grade Point Average

- > GPA below 3.0 in approved iPOS courses

- > Overall post baccalaureate GPA below 3.0
- > Overall graduate (500 level or above) GPA below 3.0

Students placed on academic probation will have nine (9) credits or one year, whichever comes first, to meet GPA requirements as outlined above. Students placed on academic probation for Satisfactory Academic Progress will be provided a deadline within their probationary notice in which the requirements are to be met.

- A student will be recommended for **Withdrawal** from the program if they fail to meet the probationary standards outlined in their probationary letter. The student will receive a letter from the Polytechnic School explaining the reasons for recommendation for withdrawal. The student will have five (5) business days from the date of the letter to appeal the decision. The department's Graduate Affairs Committee (GAC) will review the appeal and will make the necessary recommendation. The GAC Chair, on behalf of the GAC, will provide a written explanation of the outcome of the appeal.
  - If the outcome is favorable, the student will have to meet all the outlined requirements at the end of the specified period. The student will be required to sign an agreement acknowledging the recommendations of the GAC and the consequences if the agreements are not met.
  - If the GAC recommends that the appeal is not granted in favor of the student, the GAC Chair, on behalf of the GAC, will recommend to the Fulton Schools of Engineering (FSE) Dean's Office to withdraw the student from the graduate program. The student's appeal will then be reviewed by the FSE Academic Standards Committee, which reviews the student's case and makes the final recommendation on behalf of the FSE Dean's Office and the department. If the appeal is not granted in favor of the student, the Fulton Schools of Engineering Dean's Office will recommend to the Graduate College to withdraw the student from the graduate program. Please refer to the Graduate College catalog for policies and procedures or contact the graduate advisor in the Polytechnic School with further questions.
- A student will be recommended for **Withdrawal** from the program if they fail to meet the provisional admission requires outlined within their admission letter. The student will receive a notice from the Polytechnic School explaining the reasons for recommendation for withdrawal. The withdrawal notice will be submitted to the ASU Graduate College for processing. Provisional admits are unable to appeal if they fail to meet requirements outlined within the standards of their admission.
- A student will be recommended for **Withdrawal** from the program if they fail to meet the deficiency admission requires outlined within their admission letter. The student will receive a letter from the School of Manufacturing Systems and Networks explaining the reasons for recommendation for withdrawal. The withdrawal notice will be submitted to the ASU Graduate College for processing. Students not meeting the admission requirements of their deficiency as outlined in their admission letter are granted the ability to appeal and follow

the process noted above. If appeal is unsuccessful, the withdrawal notice will be submitted to the ASU Graduate College for processing.

- **Deficiency Course(s)**
  - Lack of progress toward completion of required deficiencies as listed on the admission letter
  - Received a “D” or “E” in a required deficiency course or in a course at the 400 level or above
  - Deficiency GPA below 3.0

### **Plan of Study (iPOS)**

The Plan of Study (iPOS) functions as a contract between the student, the academic unit, and the Graduate College. The iPOS contains certain degree requirements such as core and elective coursework as well as a culminating experience, which must be included in the iPOS before it can be approved. Students should submit an iPOS after registering for their second semester in the program. Students **must** submit an iPOS before the beginning of their second semester of their degree program. A student is not eligible to schedule the comprehensive examination without an approved iPOS. Students may not register for applied project (593), thesis (599), internship (584), or dissertation credit (799) until their iPOS is submitted and approved.

A student can access the iPOS by visiting [My ASU](#) > My Programs > iPOS > Graduate Interactive Plan of Study (iPOS). Please reference our [iPOS Overview](#) for in-depth information on what must be included on the iPOS.

### **Time Limit for Degree Completion**

All work toward a master’s degree must be completed within six consecutive years. Doctoral students must complete all program requirements within a ten-year period. The time period begins with the semester and year of admission to the program. Graduate courses taken prior to admission that are included on the Plan of Study must have been completed within three years of the semester and year of admission to the program. See the [ASU Graduate Policies and Procedures](#) for more information.

### **Continuous Enrollment Policy**

Once admitted to a graduate degree program, students must be registered for a minimum of one credit hour of graduate-level coursework (not audit) during each fall and spring semester of their graduate education. Summer registration is required for students taking examinations, completing culminating experiences, conducting a doctoral prospectus, defending theses or dissertations, or graduating from the degree program in that semester. This credit must appear on the Plan of Study **or** must be an appropriate graduate-level course (e.g. 595, Continuing Registration). Courses with grades of “W” and “X” are not considered valid registration for continuous enrollment purposes.

Students who have completed all necessary coursework but still need to complete their culminating experience can [request an override](#) for 595 Continuing Registration for 1 credit hour to maintain

active status in their program. First term requests are sent to the student's committee chair to approve and verify that the student is making adequate progress. If a second term request is necessary, along with the override request the student must submit a timeline of remaining requirements to verify how they plan to complete the program in that semester. Below is an example timeline:

Completion of on Introduction, Literature Review, Methodology - August 31

Distribution of survey - September 1 - 30

Analysis of data and write up of Data Analysis and Conclusion chapters- October 1-31

Defense of thesis – November

### **Leave of Absence Policy**

Students planning to discontinue enrollment for a semester or more must request approval for a leave of absence through the Plan of Study (iPOS) petition titled *Request to Maintain Continuous Enrollment*. The Graduate College allows for a leave of absence for a maximum of two semesters during a student's entire program. A petition for a leave of absence may be submitted through a student's interactive plan of study and must be approved by the Graduate College. This request must be submitted and approved **before** the start of the semester of the anticipated absence.

An approved leave of absence will enable students to re-enter their program without reapplying to the university and the graduate program. Students who do not enroll for a fall or spring semester and do not have an approved Request to Maintain Continuous Enrollment are considered withdrawn from the university under the assumption that they have decided to discontinue their program. A student removed for this reason may reapply for admission to resume their degree program; the application will be considered along with all other new applications to the degree program.

A student with a Graduate College-approved Request to Maintain Continuous Enrollment is not required to pay tuition and/or fees, but in turn is not permitted to place any demands on university faculty or use any university resources. See the **ASU Graduate Policies and Procedures** for more information.

### **Graduate College Policies and Procedures**

All graduate students are expected to read, understand and meet the terms of the ASU Graduate College Policies and Procedures handbook as outlined at: **ASU Graduate Policies and Procedures**.

### **Policy on Maximum Course Load**

Registration in nine (9) credits is considered a full-time load for graduate students at ASU, and graduate students in the Ira A. Fulton Schools of Engineering are restricted to a maximum of 12 credits per semester. Overrides to register for more than 12 credits require the approval of the student's committee chair and Graduate Program Chair and will be granted only in exceptional cases. Requests to register for more than 15 credits will not be supported.

## Internships

Polytechnic School graduate students can request to take internship as a 584 course option for academic credit if an approved and eligible internship is obtained. Internship is not a requirement for graduate programs within The Polytechnic School, but can be added as a planned option to the graduate plan of study. International students can apply for curricular practical training (CPT) if eligible to do so. No more than 3 credits of internship coursework can be used. The 3 credits can be divided between a maximum of two semesters for two different internship opportunities. For more information on internships, policies, and the application process, please visit:

<https://poly.engineering.asu.edu/advising/internships/>.

## Applying for Graduation

Graduate students should become familiar with the process of applying for graduation to ensure the **graduation application** is submitted by the deadline of the graduating semester. The University has specific deadlines each semester for submitting the Graduation application. To view the specific deadlines for future terms, log into MyASU and click on the Graduation tab. Please also be sure to review the Graduate College **graduation deadlines and procedures** as well. All students must have an approved and up-to-date iPOS on file in order to apply for graduation.

## Culminating Experience Definitions – Master’s Degrees

Below is an overview of the culminating experience options offered within the Polytechnic School’s graduate programs. Culminating experience options vary by program.

### Portfolio

The portfolio is a highlight of three major accomplishments from the master's program, and may include projects, papers, exams. Portfolio submission includes resume, reflection of graduate program accomplishments with the supporting assignments/ projects included. Reviewed by program chair for consistency in grading. There are specific submission timeframes (Spring - March/ Summer - June/ Fall - October) noted in the program section for eligible programs.

A cover page needs to be included describing what courses the projects were carried out in, and why they were selected for inclusion in the Portfolio by the student. The Committee Chair and/or the Graduate Program Chair will be solely responsible for judging the quality of the portfolio and determining if it is satisfactory to serve as the required culminating event for the degree.

### Written Comprehensive Exam

The written comprehensive exam is coordinated by the Graduate Program Chair and leads the administration of the comprehensive exam to the students in their final semester. Support is available from advising if on-campus comprehensive exam is required. The exam takes place in the last six weeks of the semester. Grading is pass/fail. If a student fails, the student may petition to take the comprehensive exam one more time in a future term.

### Capstone

The capstone is the only culminating experience option that has a class time/date associated with it.



Within the course, students will follow the syllabus and requirements outlined by the professor.

### **Applied Project**

The applied project is carried out under the supervision of a faculty member, typically a member of the program's graduate faculty. Students are not assigned a faculty advisor. Students must take initiative to contact a faculty member working in their area of interest. Students desiring to conduct an applied project must first obtain the approval of a faculty member to work with them on the project. This is recommended to be done before the end of the second semester (by +1 year for accelerated students). Enrolment in the applied project is in the last semester of the graduate program. And exception to this is for MS Human Systems Engineering as six credits/two semesters of enrollment are required. Applied projects are not required to be connected with industry. Applied Projects are not eligible for CPT.

At completion of the applied project, a written document is required. Document is less involved than a thesis and is not expected to be published. More generalizable in comparison to thesis, flexibility in final format. In all cases, the student must prepare and present the applied project to the faculty advisor and discuss the implementation and results of their project. This presentation will be open to all graduate students.

Credit is earned when the faculty advisor approves the written report and oral presentation and a grade of B or better is awarded. For students carrying out an applied project, the faculty chair is the faculty advisor for the project. The applied project committee consists only of the faculty chair. A grade of 'Y' is not considered satisfactory completion of the course by ASU Graduate College.

### **Thesis**

Thesis is a large research commitment, recommended for those wanting to pursue a PhD or a career focused in research. Work involves a new research area or extension of previous research, taking a new approach to a topic. The thesis topic can be initiated by either the student or the faculty advisor. Students must adhere to Graduate College (GC) policies, formatting requirements, and deadlines. Final document is published through ProQuest through the GC processes.

Students are not assigned a faculty advisor. Student must take initiative to contact a faculty member working in their area of interest. This should be done as soon as possible, but no later than the second semester of study. For 4+1 students, the faculty advisor should be identified by the end of the last semester of the bachelor's degree completion. Enrollment in 599 must be in the last two semesters of the program.

Thesis grading is pass/fail. Students may receive 'Pass with minor or major revisions' post-defense, but ultimate grade will be pass/fail. Students must have pass/fail form submitted to Graduate College within 10 days of defense, and as soon as any required revisions are accepted by committee. **GC deadlines** should be adhered to closely. The committee must consist of three faculty (one chair, two members or two co-chairs, one member) approved by the Graduate Program Chair and Graduate College and must consist of no less than 50% of faculty from the department, including the chair or one co-chair. The thesis defense will be open to all graduate students and faculty.

# General ASU Information

---

## Academic Calendar

Students are responsible for meeting all deadlines set within the ASU Academic Calendar. The calendar can be found at [students.asu.edu/academic-calendar](https://students.asu.edu/academic-calendar).

## Student Code of Conduct

The aim of education is the intellectual, personal, social, and ethical development of the individual. The educational process is ideally conducted in an environment that encourages reasoned discourse, intellectual honesty, openness to constructive change, and respect for the rights of all individuals. Self-discipline and a respect for the rights of others in the university community are necessary for the fulfillment of such goals. The Student Code of Conduct is designed to promote this environment at Arizona State University.

The Student Code of Conduct sets forth the standards of conduct expected of students who choose to join the university community. Students who violate these standards will be subject to disciplinary sanctions in order to promote their own personal development, to protect the university community, and to maintain order and stability on campus.

All students are expected to adhere to the [ABOR Student Code of Conduct](#).

## Prohibition Against Discrimination, Harassment, and Retaliation

ASU prohibits all forms of discrimination, harassment and retaliation. To view ASU's policy please see <https://www.asu.edu/aad/manuals/acd/acd401.html>.

Title IX protects individuals from discrimination based on sex in any educational program or activity operated by recipients of federal financial assistance. As required by Title IX, ASU does not discriminate on the basis of sex in the education programs or activities that we operate, including in admission and employment. Inquiries concerning the application of Title IX may be referred to the Title IX Coordinator or to the U.S. Department of Education, Assistant Secretary, or both. Contact [titleixcoordinator@asu.edu](mailto:titleixcoordinator@asu.edu) or 480-965-0696 for more information. Office located at 1120 S. Cady Mall, INTDSB 284. For information on making a report please go to [www.asu.edu/reportit/](http://www.asu.edu/reportit/).

## Academic Integrity

The highest standards of [academic integrity](#) and compliance with the university's Student Code of Conduct are expected of all graduate students in academic coursework and research activities. The failure of any graduate student to uphold these standards may result in serious consequences, including suspension or expulsion from the university and/or other sanctions as specified in the academic integrity policies of the Polytechnic School as well as the University.

Violations of academic integrity include, but are not limited to: cheating, fabrication of data,

tampering, plagiarism, or aiding and/or facilitating such activities. At the graduate level, it is expected that students are familiar with these issues and take personal responsibility in their work. It is the student's responsibility to become familiar with the academic integrity policies of the university and Graduate College.

## Department and University Resources

- Academics and Professional Development
  - [Academic Integrity Policy](#)
  - [ASU libraries](#)
  - Career Centers (both [ASU](#) and [Fulton Schools of Engineering](#))
  - [Graduate and Professional Student Association](#)
  - [FSE student resources](#)
  - [Professional development](#)
  - [Writing Center](#)
  
- Student Support Services
  - [Counseling](#)
  - [Student Accessibility and Inclusive Learning](#)
  - [Graduate Wellness Resources](#)
    - [10 Best Practices in Graduate Student Wellbeing](#)
  - [Health](#)
  - [Housing](#)
  - [International Student Services](#)
    - [FSE International Student Resources](#)
  - [Veterans](#)
  
- Business and Finance Services
  - [ASU ID cards](#)
  - [ASU bookstore](#)
  - [Parking and Transit](#)
  - [Student accounts](#)

## Contact Information

For more information about the Polytechnic School graduate programs or the policies in this handbook, contact the graduate advising office at [polygrad@asu.edu](mailto:polygrad@asu.edu) or 480-727-4723.

## **Appendix A**

### **Instructions for the Master of Science in Human Systems Engineering Portfolio**

# Instructions for the Master of Science in Human Systems Engineering Portfolio

## Introduction

Masters students in Human Systems Engineering (HSE) have the option to develop and deliver a professional portfolio rather than a thesis or applied project. Rather than completing six thesis or applied project and three research credits, portfolio students would substitute nine credits of additional elective classes.

## Purpose of the Portfolio

The portfolio demonstrates a high level of mastery of the principles and practice of human systems engineering through a compilation of work that you have completed throughout the course of your graduate study. Although the details will depend on your specialization, all portfolios must describe three (3) notable projects or academic accomplishments that you have completed during your time in the graduate program that illustrate the evolution and advancement of your technical expertise and mastery of the field of human systems engineering.

## Portfolio Format

The portfolio is a professional document written in APA style, and will be reviewed and evaluated for technical content and the quality of writing and presentation. An alternative to APA format might be appropriate in some cases, for example when displaying design projects. These exceptions should be agreed to by your advisor before submitting the portfolio. The format of the portfolio must be as follows:

1. **Cover page** – This includes your name, advisors name, date, and semester of graduation
2. **Resume** – An up-to-date resume reflecting your accomplishments to date.
3. **Overview** – A brief description of the three notable accomplishments that you achieved during your graduate experience that will be highlighted in the portfolio along with why they have been chosen. This section is typically three or four paragraphs.
4. **Accomplishments** – Document each of your three chosen topics, in a professional, objective, and informative manner, as follows:
  - a. Title of Topic.
  - b. An explanation of the accomplishments that the topic is illustrating.
  - c. A reflection on why you consider this to be significant.
  - d. Evidence of accomplishment. In this section, include materials such as project reports, results of exams and homework, or other related materials.
  - e. A summary that demonstrates your mastery of the subject by referring to the evidence presented in section 4d. (The summary is typically a few paragraphs in length.) This summary should demonstrate mastery of HSE and should connect to primary literature in the three submitted projects. Please include citations and references to relevant research, reports, and other scholarly materials that have influenced your knowledge and work.

*\*If a specific class had multiple noteworthy projects, two of these projects can be used, but at least two classes must be represented in the portfolio.*

- f. A “Cited Works” or “Bibliography” section. Projects that fail to include these elements will not be recommended by the contracting faculty member or accepted by the advisor.
- 5. **Reflections** – A short reflection on your graduate experiences and how the accomplishments you have chosen to highlight in your portfolio illustrate the level of achievement that you attained as you progressed through the program. This section is typically about one page.

### **Qualified Projects**

Projects can be substantial research papers, data analyses, literature reviews, product designs, and other deliverables as agreed to by your advisor. To qualify a project for inclusion in the portfolio, the student must meet with their advisor to review the project for approval.

### **Submission Instructions**

Submit the portfolio electronically to your advisor who will evaluate it as a single PDF along with a copy of the Record of Evaluation of the MS Human Systems Engineering Graduate Portfolio that includes your name, ASU ID number, submission date, and the attempt number. When this requirement is satisfied your advisor will notify the graduate advising office of completion of the culminating requirement.

### **Deadlines for Submission**

<b>Graduation Semester</b>	<b>Submission window</b>	<b>Resubmission (if required)</b>
Spring	March 1 to 30	Before April 30
Summer	June 1 to 30	Before July 20
Fall	October 1 to 30	Before December 7

### **Evaluation**

The evaluation rubric for the portfolio is shown below. The portfolio is complete only when *all* sections reflected on this rubric are deemed satisfactory. Your faculty advisor is responsible for evaluation of the portfolio and will notify you of the result within two weeks of submission of the document.

There are four possible outcomes of the evaluation:

1. The portfolio is accepted as submitted.
2. The portfolio is returned to you for minor corrections as specified by the graduate program chair or their representative, followed by resubmission.

3. The portfolio is returned to you for major changes. In this case, the graduate program chair or their representative will meet with you and specific instructions will be communicated regarding the steps that will necessary for the portfolio to be accepted.
4. The portfolio is returned without critical evaluation because of errors in spelling, grammar, or format.

### **Completion**

Completion of the graduate portfolio is formally recognized when your faculty advisor acknowledges the achievement by signing the Record of Evaluation of the MS Human Systems Engineering Graduate Portfolio form and the signed form is transmitted to the graduate advising office at the Polytechnic campus. Upon receipt of the signed form, the graduate advising office will update your records to indicate completion of the culminating experience and eligibility for graduation. If you do not complete the graduate portfolio by the end of the semester in which you complete all other requirements for the degree, your degree will not be posted until the program chair signs the form.

### **Process for Appeal**

In the event that you disagree with the evaluation of your portfolio, you may request a second evaluation by faculty that were not previously involved in the process. To initiate the appeal process, a formal request for a second review must be submitted via email to the graduate advising office to be reviewed by the Graduate Affairs Committee along with a copy of the same portfolio that was submitted earlier to the graduate program chair. If the Graduate Affairs Committee recommend that it be accepted, the graduate program chair will accept that recommendation. If the Graduate Affairs Committee does not recommend that the portfolio be accepted, you must modify the portfolio and resubmit it based on the earlier communication from the graduate program chair.

# Record of Evaluation of MS Human Systems Engineering Graduate Portfolio

The Polytechnic School



Student Name \_\_\_\_\_ ID number \_\_\_\_\_

Semester/Year \_\_\_\_\_ Attempt Number \_\_\_\_\_ Submission Date \_\_\_\_\_

Topic	Satisfactory	Unsatisfactory
Spelling, Grammar and Presentation		
Format		
Required Elements:		
Cover Page		
Resume		
Overview		
Project 1		
Project 2		
Project 3		
Reflections		

If applicable, explanation of unsatisfactory marks:

RESULT <input type="checkbox"/> PASS <input type="checkbox"/> FAIL	EVALUATOR NAME AND SIGNATURE	DATE
RESULT <input type="checkbox"/> PASS <input type="checkbox"/> FAIL	PROGRAM CHAIR NAME AND SIGNATURE <b>Dr. Scotty Craig</b>	DATE