CONTENTS

1. INTRODUCTION
   1.1. Department of Systems and Information Engineering
   1.2. Diversity and Community

2. MASTER OF ENGINEERING PROGRAM
   2.1. Overview
   2.2. Admissions Criteria and Scholarships
   2.3. Engineering School Requirements
   2.4. Program Requirements
       Transfer Credit
       Coursework
       Special Circumstances
   2.5. Advising and Professional Development
   2.6. Administrative Forms

3. MASTER OF SCIENCE PROGRAM
   3.1. Overview
   3.2. Admissions Criteria
   3.3. Engineering School Requirements
   3.4. Program Requirements
       Coursework
       Special Circumstances
       Seminar Series
Training and Engagement

3.5. Administrative Forms

4. DOCTOR OF PHILOSOPHY

4.1. Overview

4.2. Admissions Criteria

4.3. Engineering School Requirements

4.4. Program Requirements and Milestones
   Coursework
   Special Circumstances
   Professional Development and Academic Engagement
   Doctoral Student Travel Grant
   Milestones
   Qualifying Exam
   Dissertation Proposal
   Final Defense

4.5. Administrative Forms

APPENDICES

A. Revision History

B. Faculty Eligibility for MS/PhD Advisor and Committees
Acronyms used in this handbook

Applied Math (APMA)
Bachelor of Science (BS)
Graduate Student Council (GSC)
Graduate Research Assistantship (GRA)
Graduate Teaching Assistantship (GTA)
Master of Engineering (ME)
Master of Science (MS)
Satisfactory/Unsatisfactory (S/U)
School of Engineering and Applied Science (SEAS)
Student Information System (SIS)
Systems and Information Engineering (SIE)
Systems Engineering (SE)
University of Virginia (UVA)
Virginia Engineering Online (VEO)
1. INTRODUCTION

1.1. Department of Systems and Information Engineering

The Engineering School’s Department of Systems and Information Engineering (SIE) at the University of Virginia (UVA) was founded in 1976.

SIE is now home to more than 30 full-time and joint-appointed faculty members with active teaching and research programs. We offer an accredited undergraduate degree: the Bachelor of Science (BS) in Systems Engineering (SE). We also offer two master’s degrees: the Master of Science (MS; with thesis) and Master of Engineering (ME; non-thesis). Finally, we also offer a PhD degree in Systems Engineering.

SIE graduate students play a critical role in our department’s research, teaching and service mission, partnering with faculty and staff to deliver excellence in education and discovery. We believe that a better future is possible for all by training the leaders of tomorrow in a collaborative academic environment that encourages excellence in the classroom and laboratory.

1.2. Diversity and Community

SIE is committed to sustaining a vibrant and inclusive environment that fully reflects the core Engineering School’s value of diversity, which is defined as “excellence expressing itself through the intersection of every individual’s perspective and lived experiences.” Faculty, staff, and students will strive for excellence in all we do, treat everyone with respect, and show gratitude and provide outstanding stewardship for the resources that support our mission, which come from tuition, the commonwealth, research sponsors, and our friends and alumni.
2. MASTER OF ENGINEERING PROGRAM

Any student enrolled in the Master of Engineering (ME) program prior to the fall 2019 semester has the option of adhering to either (a) the curriculum presented below or (b) the curriculum that was effective when the student first enrolled in the ME program.

2.1. Overview

The ME is a coursework-based graduate professional degree for those wishing to pursue careers in industry, consulting, or government. Our program is designed to provide a blend of fundamental knowledge and professional skills needed by practicing engineers.

It is an intensive, non-thesis program that may be completed on-Grounds as a full-time student; online as a student in the Virginia Engineering Online (VEO) program; or in a hybrid combination of VEO and time on Grounds.

2.2. Admissions Criteria and Scholarships

The deadlines for ME applications for U.S. citizens and permanent residents are August 1 for the Fall semester and January 5 for spring semester. The deadlines for non-U.S. citizens are April 1 for fall semester and September 29 for spring semester. We seek motivated students from diverse backgrounds who are eager to partner with us in education and discovery. Information about academic eligibility and the admissions process is available on the UVA Engineering School’s Graduate Admissions webpage. All applications are submitted online. The application fee for UVA Engineering graduate programs is $85; however, we are thrilled to share that a fee waiver for the $85 application fee will be automatically applied to your application if you are applying for 2024 admission.

Through the generosity of our friends and alumni, our department is pleased to award scholarships to select exceptionally qualified ME candidates. Recipients receive $5,000 per academic year. All candidates are evaluated by the graduate program directors on academic performance, and at their discretion, the recipients are selected. The selected recipients are notified with a letter from the department.

Accepted ME students are also eligible to serve as graders for SIE undergraduate and graduate courses. Students interested in serving as a grader should contact the SIE Graduate Program Director and ME Program Director directly. The hourly rate for ME student graders is $21/hour for up to 20 hours per week.

2.3. Engineering School Requirements

Engineering School requirements for ME degrees are described on the UVA Graduate School of Engineering’s information webpage. This page also addresses admission requirements, rules and regulations pertaining to financial assistance and outside employment, and other matters. The portion of the Engineering School’s website devoted to current graduate students contains many helpful resources, including required forms.
**Time limit:** All requirements for the ME/VEO degree must be completed within seven years after matriculation to the graduate program.

### 2.4. Program Requirements

A candidate for the ME degree must fulfill the general requirements of the Engineering School and complete an approved plan of study consisting of at least 30 credit hours. The plan of study must be prepared under the guidance of the faculty advisor by the end of the first semester of study. It must then be approved by the graduate program directors.

The approved plan of study may be revised if necessary but must be submitted for approval.

#### Transfer Credit

Up to 12 credit hours of graduate courses may be transferred. Only courses with a grade of B or better that have not been applied toward another degree may be transferred. The request for credit transfer must include the following documents: a completed Request Approval of Transfer Credits form, a description of course content and level, and an official transcript. The documents are provided to the SIE Student Services Coordinators to facilitate processing of the request. If the student is already admitted into a UVA program, then the request for credit transfer must be preapproved before the course is taken. All transfer credits are subject to the approval of the student's advisor and the Engineering School dean’s office.

VEO students may transfer up to 15 credits from other schools participating in the VEO program toward their UVA ME degree. The other VEO institutions are George Mason University, Old Dominion University, Virginia Commonwealth University and Virginia Polytechnic Institute and State University (Virginia Tech). Students in the on-Grounds ME program may register for up to 12 credit hours of courses offered through VEO.

#### Coursework

The ME degree in SE program is built of two components:

- **Core courses**, supplying the fundamentals of systems engineering
- **Elective courses**, focusing on techniques of analysis and application of fundamentals to a problem area

The plan of study must include at least 30 credit hours of graduate-level work and satisfy the following requirements. In addition, the plan of study should be approved by the student’s graduate advisor and SIE graduate program director.

- Nine credit hours of core courses: SYS 6001, plus six credit hours from SYS 6003, SYS 6005, SYS 6007 and SYS 6021.
- At least 21 credit hours of elective courses distributed thusly:
  - At least 12 credit hours of graduate-level systems engineering courses. (These credit hours cannot be earned through Independent Study SYS 6993 and SYS...
7993; Supervised Project Research SYS 6995 and SYS 8995; Graduate Teaching Instruction SYS 8997 and SYS 9997; Thesis SYS 8999; and Dissertation SYS 9999)

- No more than three credit hours of Independent Study SYS 6993 or SYS 7993.
- No more than three credit hours of Supervised Project Research SYS 8995.
- No more than 3 credit hours at the 5000-level from the School of Engineering and Applied Science. (The 5000-level courses in the Graduate School of Arts and Sciences are nominally equivalent to 6000-level courses in the School of Engineering and Applied Science.)

Table 2-1 shows a plan of study for completing an ME degree in two semesters.

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Fall Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS 6001</td>
<td>Introduction to Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SYS 6003/05/07/21</td>
<td>Mathematical Programming/Stochastic Systems/Human Factors/Statistical Modeling</td>
<td>3</td>
</tr>
<tr>
<td>SYS 6005/03/07/21</td>
<td>Stochastic Systems/Mathematical Programming/Human Factors/Statistical Modeling</td>
<td>3</td>
</tr>
<tr>
<td>SYS XXXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>YYY XXXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Spring Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYS XXXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>SYS XXXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>SYS XXXX</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>YYY XXX2</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td>YYY XXX3</td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**Special Circumstances**

**Prerequisites:** The student who does not have the prerequisites (e.g., calculus, linear algebra, probability and statistics, computer programming) should take articulation courses. The SE ME program advisor will work with the student to identify the required articulation courses. These courses cannot be used to satisfy the degree requirements.
**Equivalent Courses:** The student who, prior to enrolling in the SE ME program, has already taken a course equivalent to a core course may petition the ME program advisor for the substitution of the core course by an elective course.

**2.5. Advising and Professional Development**

Upon admission to the program, the student is assigned to the ME program faculty advisor. The student should meet with the ME program advisor to plan their course selection and career objectives before the start of each semester.

**Seminars:** Students are expected to attend and participate actively in scheduled SIE and UVA seminars.

**2.6. Administrative Forms**

It is important that graduate students submit administrative forms related to degree requirements in a timely manner to the SIE student services coordinators. These forms can be found on the Engineering School’s [webpage](#) for current engineering graduate students.
3. MASTER OF SCIENCE PROGRAM

3.1. Overview

Master of Science (MS) is a graduate degree for those who desire not only to acquire fundamental knowledge but also to contribute to the advancement of knowledge through independent, original research. This program provides a springboard for careers as an academician, as a researcher, as a consultant or in management/leadership within a university, institute, industry, or government setting. The SIE MS program includes three components:

- **Coursework** to gain fundamental and advanced knowledge
- **Research** conducted in a collaborative environment leading to a thesis and scholarly papers
- **Engagement** in UVA’s intellectual life

3.2. Admissions Criteria

The deadlines for MS applications with financial aid requests are January 5 for fall semester and September 29 for spring semester. All SIE faculty are eligible to advise students enrolled in the SE MS program. We accept applications from candidates with degrees from all engineering and some affiliated backgrounds. In some cases, candidates who do not have engineering or similar credentials will be offered conditional admission, which will require them to take selected undergraduate coursework in addition to the coursework required for their MS.

Most accepted MS students receive financial aid. Funding offers take the form of graduate research assistantships (GRAs), graduate teaching assistantships (GTAs) and/or various fellowships. The department’s default stipend for master’s students is $26,250 per year. Funded offers also include tuition and health insurance. Some MS students are funded by third-party entities (e.g., their employer or government or military agencies), and a small number of students are self-funded.

3.3. Engineering School Requirements

Engineering School requirements for MS degrees are described on the [UVA Graduate School of Engineering’s information webpage](https://engineering.virginia.edu/graduate/). This page also addresses admission requirements, rules and regulations pertaining to financial assistance and outside employment, and other matters. The portion of the Engineering School’s website devoted to [current graduate students](https://engineering.virginia.edu/graduate/) contains many helpful resources, including required forms.

*Time limit:* All requirements for the MS degree must be completed within five years after matriculation to the graduate program.
3.4. Program Requirements

A candidate for the MS in SE must fulfill the general requirements of the Engineering School along with the following specific requirements.

Coursework

The MS in SIE requires 30 credits of coursework and research beyond the BS program. The following requirements should be met:

- Nine credit hours of core courses: SYS 6001, plus six credit hours from SYS 6003, SYS 6005, SYS 6007, and SYS 6021.
- At least 15 credit hours of elective courses distributed thusly:
  - At least three credit hours of systems engineering courses at the 6000 or 7000 level. (These credit hours cannot be earned through Independent Study SYS 6993 and SYS 7993; Supervised Project Research SYS 6995 and SYS 8995; Graduate Teaching Instruction SYS 8997 and SYS 9997; Thesis SYS 8999; and Dissertation SYS 9999.)
  - No more than three credit hours of Independent Study SYS 6993 or SYS 7993.
  - No more than three credit hours of Supervised Project Research SYS 8995.
  - 2 courses of Systems Engineering Colloquium (SYS 7096). The student should register for one course in each semester of the first year of study.
- At least six credit hours of Thesis SYS 8999 (of which six count toward the 30-credit requirement).

Special Circumstances

Prerequisites: The student who does not have the prerequisites (i.e., calculus, linear algebra, probability and statistics, computer programming) should take articulation courses. These courses cannot be used to satisfy the degree requirements.

Equivalent Courses: The student who, prior to enrolling in our graduate program, has already taken a course equivalent to a core course may petition the graduate programs director for the substitution of the core course by an elective course.

Transfer Credit: Up to six credit hours of graduate courses may be transferred. Only courses with a grade of B or better that have not been applied toward another degree may be transferred. The request for credit transfer must include the following documents: a completed Request Approval of Transfer Credits form, a description of course content and level, and an official transcript. The documents are provided to the SIE Student Services Coordinators to facilitate processing of the request. If the student is already admitted into a UVA program, then the request for credit transfer must be preapproved before the course is taken.

Scholarship

A student must be the author or coauthor of at least one technical manuscript under review or accepted into a conference or journal before scheduling their final thesis defense.
Thesis and Committee

MS students will work with their advisor to identify a suitable master’s research topic. Up to six of the 30 credits toward the MS will typically comprise thesis research via the SYS 8999 listing. The MS candidate and their advisor will also select an MS thesis committee comprising at least three UVA faculty members. One of these three members may be from outside SIE. At least two of the three members must be faculty members with non-zero percentage appointments in SIE. The thesis committee must review and approve the student’s academic requirements report, written thesis, and oral thesis defense. MS students should check the accuracy and completeness of their academic requirement report in the Student Information System (SIS) frequently, at least at the start and end of each semester and in consultation with their faculty advisor. The Appointment of Final Examination Committee form to appoint the MS thesis committee must be submitted at least 14 days before the proposed final defense date to the SIE student services coordinators, as they will obtain graduate program director approval and submit the request form to the graduate office. Degree candidates must apply for graduation in SIS at the beginning of the semester in which they’re expected to graduate.

It is the candidate’s responsibility to email the SIE student services coordinators their announcement information which consists of the committee members list with the chair and advisor identified, the meeting date, time, and location information, and the thesis defense title and abstract at least two weeks before the final defense. The SIE student services coordinators will provide the chairperson with the relevant forms (Report on Final Examination and Thesis and Dissertation Assessment) for the final defense. In addition, after successful completion of their final defense, the candidate must submit the dissertation via Libra (see Graduation Procedure).

Seminar Series

SIE is committed to providing members of our community with the opportunity to learn from a wide range of scholars and practicing engineers through seminars. These seminars are organized as (a) our weekly Graduate Colloquium and (b) Distinguished Speakers invited by our faculty on an ad-hoc basis. As an essential component of graduate education, MS students should register for at least two semesters (preferably in their first year) of SYS 7096 with zero credit hours. Students are expected to attend and participate actively in scheduled SIE and UVA seminars and student thesis/dissertation defenses. Unless there are extenuating circumstances, it is expected that seminars and defenses are held in person at the university.

Training and Engagement

MS students are expected to be good citizens of the department by engaging in required training activities and participating in departmental activities (e.g., symposiums, workshops, social events).
3.5. Administrative Forms

It is important that graduate students submit administrative forms related to degree requirements in a timely manner to the SIE student services coordinators. These forms can be found on the Engineering School’s webpage for current engineering graduate students.
4. DOCTOR OF PHILOSOPHY

4.1. Overview

The PhD is an advanced graduate degree for students wishing to contribute to knowledge creation through independent, original, cutting-edge research.

SIE offers the PhD in SE. The PhD degree provides a springboard for careers as an academician, as a researcher, as a consultant or in management/leadership within a university, institute, industry, or government setting. The SIE doctoral program includes three components:

- **Coursework and Teaching** to gain fundamental and advanced knowledge, as both student and GTA
- **Research** conducted in a collaborative environment leading to a doctoral dissertation and scholarly papers
- **Engagement** in UVA’s intellectual life

4.2. Admissions Criteria

The deadlines for PhD applications with financial aid requests are Jan. 6 for fall semester and Sept. 30 for spring semester. All SIE faculty are eligible to advise students enrolled in the SE PhD program. We accept applications from candidates with degrees from all engineering and some affiliated backgrounds. In some cases, candidates who do not have engineering or similar credentials will be offered conditional admission, which will require them to take selected undergraduate coursework in addition to the coursework required for their PhD.

All candidates are evaluated by one or more of the SIE research subgroups. Some students are admitted directly into a specific research group with a specific advisor. Other candidates are admitted into a subgroup and are then connected with an advisor during the first year.

Most accepted PhD students receive financial aid. Funding offers take the form of GRAs, GTAs and/or various fellowships. SIE is committed to acquiring the resources to fund PhD students for five years, contingent upon satisfactory progress toward the degree. The department’s default stipend for PhD students is $35,000 per year.

Funded offers also include tuition and health insurance. Some PhD students are funded by third-party entities (e.g., their employer or government or military agencies), and a small number of students are self-funded.

4.3. Engineering School Requirements

Engineering School requirements for the PhD degree are described on the [UVA Graduate School of Engineering’s information webpage](#). The page also addresses admission requirements, rules and regulations pertaining to financial assistance and outside employment, and other matters. The portion of the Engineering School’s website devoted to [current graduate students](#) contains many helpful resources, including required forms.
Time limit: All requirements for the PhD degree must be completed within seven years after matriculation to the program.

4.4. Program Requirements and Milestones

SIE has three general classes of PhD requirements: coursework, professional development, and academic engagement. These are described below.

Coursework

The SE program require relevant coursework to help students access foundational knowledge in their discipline while striking a balance between depth and breadth. All PhD students must take at least six credits of graduate coursework at UVA beyond the master’s degree. All PhD students, including those entering with an ME/MS from another institution, must complete at least six credits of SIE coursework. Students who earn an ME or MS degree at UVA en route to a PhD in SE may use SE credits from their master’s degree to meet this requirement. A minimum of 30 credits beyond the BS program is required for all Engineering School PhDs. The following requirements should be met:

- **Mandatory Courses**: SYS 6001 and 2 semesters of SYS 7096
- Nine credit hours of *foundation courses*: 3 courses selected from SYS 6003, SYS 6005, SYS 6007, and SYS 6021.
- Twelve credit hours of *methodological courses*: Students must take four courses from at least two of the methodological areas listed [here](#). The courses listed in each of the areas are only exemplars as course offerings change from year to year. Other courses in these areas may be used to fulfill methodological requirements as approved by the student’s doctoral advisory committee. Additionally, certain courses are listed in multiple areas. In these cases, the student must decide which area the course satisfies for their plan of study. Each course may only satisfy one area for the student’s plan of study.
- Nine credit hours of *research elective courses*: These can be any 6000 and 7000 level courses that are chosen in consultation with the advisory committee to support the student’s research program.
Special Circumstances

Prerequisites: The student who does not have the prerequisites (i.e., calculus, linear algebra, probability and statistics, computer programming) should take articulation courses. These courses cannot be used to satisfy the degree requirements.

Equivalent Courses: The student who, prior to enrolling in our graduate program, has already taken a course equivalent to a core course may petition the graduate program director for the substitution of the core course by an elective course. Students that received automatic bulk transfer credits that are applied towards SEAS’s credit requirements must complete the SE Foundations Petition Form to receive credit towards their degree program requirements. The form will need to be completed to have graduate courses taken while enrolled in a previous graduate program evaluated towards SIE Foundations courses to determine if they can be used to fulfill any of your course requirements. Other transfer coursework taken in another STEM program will count towards the methodological and/or research electives.

Transfer Credit: PhD students who have earned a master’s degree in a STEM field will receive an automatic bulk transfer of 24 graduate course credits toward SEAS’s total graded coursework credit requirement. PhD students who have earned a master’s degree in a non-STEM field will receive an automatic bulk transfer of 12 graduate course credits toward SEAS’s total graded coursework credit requirement. Students who receive a bulk transfer of credit may not transfer any additional credits toward the PhD degree. PhD students, that didn’t earn a master but took graduate level course, may transfer a maximum of 6 graduate course credits into their program of study. Only courses with a grade of B or better that have not been applied toward another degree may be transferred. The request for credit transfer must include the following documents: a completed Request Approval of Transfer Credits form, a description of course content and level, and an official transcript. The documents are provided to the SIE Student Services Coordinators to facilitate processing of the request. If the student is already admitted into a UVA program, then the request for credit transfer must be preapproved before the course is taken.

Professional Development and Academic Engagement

The ultimate goal of an SE PhD is to give students the best possible preparation for their careers in research, government, or industry. The following professional training requirements help students prepare for the full spectrum of career choices:

GTAs: Students typically serve as a GTA at some point over the course of their MS or PhD. GTAs will enroll for three credits (Satisfactory/Unsatisfactory, or S/U, basis) of SYS 6097 or SYS 9997 in a section corresponding to their supervising instructor. Receipt of one or more U grades for graduate instruction may endanger a student’s eligibility to serve as a GTA in future semesters. More information about the Engineering School’s language-skills requirements for international students serving as GTAs can be found here.

Research Dissemination: Students will disseminate their research via journal and conference papers. Before scheduling the final defense, students must have at least one
first-authored paper with their research advisor published or accepted by a journal or peer-reviewed conference paper approved by their advisory committee.

To aid in supporting student travel to conferences, all SIE PhD students are able to apply to receive a travel grant if their research adviser or fellowship is unable to fund their travel, conference registration, and lodging. To receive a travel grant, the student must be the primary author presenting a peer-reviewed publication. Additionally, their advisor must write a statement that there are no research funds to support travel. See the Doctoral Student Travel Grant section below for more information.

**Seminars and Defenses:** SIE is committed to providing members of our community with the opportunity to learn from a wide range of scholars and practicing engineers through seminars. These seminars are organized as (a) our weekly Graduate Colloquium and (b) Distinguished Speakers invited by our faculty on an ad-hoc basis. As an essential component of graduate education, PhD students should register for at least two semesters (preferably in their first year) of SYS 7096 with zero credit hours. Students are expected to attend and participate actively in scheduled SIE and UVA seminars and student thesis/dissertation defenses. Unless there are extenuating circumstances, it is expected that seminars and defenses are held in person at the university.

**Academic Engagement:** Doctoral students are valued members of SIE’s community of scholars. They are expected to be good citizens by engaging in departmental and school-wide events (e.g., milestone defenses, symposiums, workshops, social events). Section 5 provides more information about the role of the Graduate Student Council and opportunities for students to be involved in departmental leadership.

**Doctoral Student Travel Grant**

Each SIE PhD student is eligible to apply for a one-time travel grant of up to $1,500 to present their research at a peer-reviewed conference once during their tenure at UVA. To receive a travel grant, the student must be the primary author presenting a peer-reviewed publication. Additionally, their advisor must write a statement that there are no research funds to support travel. The one-time grant can be requested by using the SIE PhD Student Travel Fellowship Request Form. The request should be submitted at least 6 weeks prior to the conference date.

**Milestones**

The three main milestones toward completion of an SE PhD are the qualifying exam, the dissertation proposal, and the dissertation defense. Sections 4.3 and 4.4 provide additional information on the goals, format, timing, and administration of these milestones, including policies governing committee composition.

Table 4-2 depicts a typical timeline for completion of the PhD in SIE. This timeline assumes that students enter the Ph.D. after first completing a master’s degree. However, SIE also routinely accepts students directly into the Ph.D. program without first requiring them to complete an MS. For these students, it may be valuable to extend the initial timeline by one year, in which case
students can delay the qualifying exam until the end of their second year. The rest of the timeline then proceeds as shown in Table 4-2.

Engineering School policy allows a leave of absence (an action students can take after the completion of a semester, indicating that the student plans to be away from the university for at least one semester) for parental leave or serious personal or family illness. This requires notification to and approval from the appropriate department or program and the Office of Graduate Programs. When considering these options, students are urged to talk with their advisor, their program’s graduate director, and the Engineering School’s graduate registrar. These individuals are committed to helping students find and navigate their best possible paths. Students must first obtain the approval of their advisor and the graduate director of the student’s program.

Table 4-2: Typical timeline for doctoral students entering with a master’s degree. Students entering without an MS may need one extra year before taking the qualifying exam. Different research groups offer qualifying exams at different times of year.

| Year 1 | Establish a working relationship with the faculty advisor(s)  
Begin coursework  
Identify a research area and doctoral committee  
Prepare a plan of study*  
Pass the qualifying exam (August) |
|--------|---------------------------------------------------------------|
| Year 2 | Finish coursework  
Establish research  
Present and defend dissertation proposal (March–June) |
| Year 3 | Continue research  
Continue or complete teaching requirement (as a GTA)  
Submit a paper for publication  
Attend and present at a research conference |
| Years 4-5 (as needed) | Complete research  
Continue or complete teaching requirement (as a GTA)  
Publish additional papers or proceedings  
Defend dissertation |

*The plan of study form is for departmental use only. Students should file the form with an SIE student services coordinator and maintain a copy for themselves to access it whenever they convene their committee and/or complete a requirement. Official tracking for SEAS and SIE requirements are done using the student’s academic requirements report in SIS.

Qualifying Exam

The principal objective of the qualifying exam (also referred to as the comprehensive exam and Ph.D. exam) is to assess a student’s research aptitude and confirm that they have the skills necessary to make a substantive contribution in their field. The exam also provides an
opportunity for students to receive early, individualized feedback regarding their strengths and weaknesses in research and foundational knowledge.

The goal of the qualifying exam is not to directly assess any content in required courses but to provide a comprehensive use of the foundational principles and methods in research. Thus, students must have already specified the required coursework they will take for their program before taking the qualifying exam. Required coursework varies by concentration, the student’s anticipated dissertation topic, and the recommendation of the student’s committee members.

Successful students will demonstrate that they can:

a) Understand, interpret, and critically evaluate relevant literature.
b) Analyze data (via experiments, observations, surveys, simulation, etc.) and draw meaningful conclusions.
c) Apply technical/engineering tools, concepts, coursework and/or approaches to gain insight on real-world problems.
d) Effectively communicate results in both oral and written formats.
e) Answer questions and respond to critical feedback when sharing, defending and revising their ideas.

The examination consists of two parts, written and oral. The following guidelines apply.

**Committee Composition**

The examining committee will include three to five members. At least two of the committee members must be from the candidate’s main research area. At least three of the members must be faculty members with non-zero percentage appointments in SIE. External (non-SIE) or courtesy faculty may be a part of the committee but do not count toward the program requirement. In most instances, the qualifying committee contains many of the same members as the student’s dissertation advisory committee. However, this is not mandatory.

The chair of the qualifying exam committee should be from the student’s home program but cannot be the student’s advisor. The chair will be responsible for collecting and delivering feedback to the student, as explained below.

**Committee Creation and Preliminary Scheduling**

Students should work with their advisor to identify a qualifying exam committee and schedule their exam to take place no later than the end of their second year in the SIE department. Some students may be ready earlier, and if the committee is amenable, they may take the exam after completion of the required coursework for their program. The student should send a completed Recommendation and Certification of Doctoral Advisory Committee form to SIE student services coordinators by the end of the semester preceding the examination. The form should be submitted no later than two weeks prior to the date of the written exam component.

The faculty recognizes that preparing for and taking the qualifying exam can be one of the more
stressful periods of the Ph.D. program. However, framing the exam as a research aptitude assessment is intended to make it such that “preparing for the exam” and “doing research” can be one and the same. Students should meet with each of their committee members prior to beginning their exam preparations so they can discuss how the candidate can best make use of their time.

**Structure and Format of Exam**

Students will work with their individual examination committees to identify dates for the written and oral components of the exam. They should then work backward from those dates to complete the activities summarized below. Table 4-3 provides a hypothetical sample timeline for completing the exam.

Once the written exam date has been selected, students should prepare a two-page document that (i) outlines their research area and explains how it will advance knowledge in their PhD discipline and (ii) provides a preliminary reading list (e.g., research papers, book chapters, policy briefs) organized by topic to be used in their qualifying exam. They should circulate these materials to their committee members no later than one month before their scheduled exam date. Committee members will have one week to respond to the student with suggested modifications to their proposed reading list. The student will then circulate the final reading list to the whole committee no later than two weeks before the scheduled exam date. It is recommended that students start this process early so they can have a thoughtful, engaged dialogue with the committee and prepare a comprehensive reading list.

The student’s examination committee will then prepare their questions based upon the research overview and finalized reading list. They will forward the questions to the advisor and other committee members before the exam with adequate time for everyone to evaluate the exam as a whole before it begins.

The student will work on the exam for up to seven days; however, individual faculty may specify time limits for their own individual questions. Students will submit their solutions to the examination committee at the end of the exam period. Each committee member will score their own questions using the a-e criteria of the SIE Qualifying Exam Assessment Form (see Table 4-4). Each committee member should complete their own scoring prior to the oral exam.

The oral exam will consist of two parts: 1) a brief prepared presentation summarizing the questions and the student’s responses to the questions and 2) follow-up questions from the committee. There is no stipulated duration for the oral exam. However, a one-hour oral exam period is recommended with approximately 30 minutes devoted to presentation and 30 minutes allotted for questions. Once the oral exam has concluded, each committee member will re-score their question, again using the a-e criteria and the SIE Qualifying Exam Assessment Form (see Table 4-4). The chair is responsible for collecting and organizing feedback from the committee and then communicating it to the student after the exam. A key objective for the exam is to give students individualized feedback on their unique strengths and weaknesses.
Exam Outcomes

The outcome of the exam is determined collectively by the examination committee choosing from four options: pass with distinction, pass, pass with remediation, or fail. The committee weighs both parts of the exam (written and oral) at its discretion when determining the outcome. The chair is responsible for communicating the outcome of the exam and delivering feedback from the committee to the student after the exam.

Students who do not pass, or pass with remediation, can retake the examination within six months. After two unsuccessful attempts, the student is dismissed from the Ph.D. program.

Forms

- **Engineering School’s Recommendation and Certification of Doctoral Advisory Committee**: This form is due to an SIE student services coordinator at least two weeks before the scheduled examination.
- **Engineering School’s Report on Ph.D. Exam** and **SIE Ph.D. Qualifying Exam Assessment**: These forms are sent to the chairperson of the committee by the SIE student services coordinator to be completed and returned to them after the exam.
- **Academic Requirements Report from SIS**: The student brings one copy for each committee member to the oral exam.

Note: A student must have approval from the academic advisor for forming their committee.

Table 4-3: Hypothetical timeline for an SIE qualifying exam for an Aug. 1 exam date.

<table>
<thead>
<tr>
<th>Date</th>
<th>Task(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 1</td>
<td>Student forms examination committee and files committee composition form</td>
</tr>
<tr>
<td>February</td>
<td>Candidate circulates research overview and preliminary reading list to examination committee</td>
</tr>
<tr>
<td>May, June</td>
<td>Candidate and committee finalize reading list; committee members formulate and review questions</td>
</tr>
<tr>
<td>Aug. 1</td>
<td>Questions delivered to candidate</td>
</tr>
<tr>
<td>Aug. 8</td>
<td>Candidate submits written responses to examination committee and graduate coordinator</td>
</tr>
<tr>
<td>Aug. 9</td>
<td>Committee members score written responses to their questions</td>
</tr>
<tr>
<td>Aug. 16</td>
<td>Oral examination takes place; committee rescores candidate responses and chair collects feedback and reports outcome (pass with distinction, pass, pass with remediation, fail) to candidate</td>
</tr>
<tr>
<td>Aug. 17</td>
<td>Follow-up email/interaction with chair if necessary</td>
</tr>
</tbody>
</table>
Table 4-4: SIE Qualifying Exam Assessment. Committees may comprise three to five members, but at least two members must be from the student’s main research area and three must have non-zero appointments in SIE. (Rating scale: 5 = superior/outstanding, 4 = very good, 3 = acceptable, 2 = marginal/needs attention, 1 = unacceptable for PhD student.)

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Member 1 Initials:</th>
<th>Member 2 Initials:</th>
<th>Member 3 Initials:</th>
<th>Member 4 Initials:</th>
<th>Member 5 Initials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Understand, interpret, and critically evaluate relevant literature.</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
</tr>
<tr>
<td>b. Analyze data and draw meaningful conclusions.</td>
<td>1 2 3 4 5 NA</td>
<td>1 2 3 4 5 NA</td>
<td>1 2 3 4 5 NA</td>
<td>1 2 3 4 5 NA</td>
<td>1 2 3 4 5 NA</td>
</tr>
<tr>
<td>c. Apply technical/engineering tools, concepts, and/or approaches to gain insight on real-world problems.</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
</tr>
<tr>
<td>d. Effectively communicate results in both oral and written formats.</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
</tr>
<tr>
<td>e. Answer questions and respond to critical feedback when defending his/her ideas.</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
<td>WRITTEN 1 2 3 4 5 NA ORAL 1 2 3 4 5 NA</td>
</tr>
<tr>
<td>Overall assessment (circle):</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Recommended outcome (circle):</td>
<td>Pass with Distinction</td>
<td>Pass</td>
<td>Pass with Remediation</td>
<td>Fail</td>
<td></td>
</tr>
</tbody>
</table>

Specific Strengths and Weaknesses:

Dissertation Proposal

Formulation of a dissertation proposal is a key step toward completion of the Ph.D. This milestone allows a student’s committee to make three important determinations:

1. To assess whether the student’s knowledge of their chosen area and their understanding of relevant literature is adequate to complete a Ph.D.

2. To recommend coursework, approaches/techniques and other resources that would facilitate or enhance the proposed work.

3. To evaluate whether or not the proposed work, if completed, would constitute an acceptable basis for a doctoral dissertation.

Selection of a Ph.D. committee is an important component of the dissertation proposal process, insofar as the committee is responsible for helping the candidate navigate their path to the Ph.D. The Ph.D. committee approves a candidate’s plan of study, including coursework, teaching, dissertation proposal and the final dissertation. SIE faculty place high value on interdisciplinarity and crosscutting collaborative research. Accordingly, we are firmly committed to letting each student work with their research adviser to select a committee that best supports their scholarly
and professional development. Ph.D. candidates must adhere to both the committee composition rules set by SEAS as well as by the department. The requirements are outlined below:

- **SEAS Requirements:** The final dissertation committee must include a minimum of three Engineering School faculty with a minimum of four UVA faculty and a minimum of five total members; one of the UVA members (the external member) must be from outside SIE. At least three of the dissertation committee members must have non-zero appointments in SIE.

- **SIE Courtesy faculty member policy:** Courtesy faculty members appointed by SIE may serve as the primary adviser of a PhD student. Courtesy faculty members that are not the primary adviser can count towards either an internal or external member.

- **SIE Committee composition rules:** Final committee composition should consist of no fewer two SIE faculty members with greater than 50% appointment. The committee chair should also have a primary appointment in SIE.

Finally, it is strongly recommended that the dissertation proposal committee consist of all five faculty members that would be on the final defense; however, it is acceptable for a dissertation proposal committee to have four instead of five members, in which case the fifth person is added before the final defense.

The dissertation proposal consists of both a written document and an oral presentation. The written document should discuss the proposed work, contributions, preliminary results to date, and research timeline in a concise manner. Proposal documents should not exceed 15 single-spaced pages (or 30 double-spaced pages). The bibliography and any appendices (appendices are not required to be read by the student’s committee) are not included in this page limit. Significant departures from these guidelines must be approved in advance by the student’s proposal committee. The written proposal document must be submitted to the committee at least two weeks in advance of the proposal presentation.

All members of the committee evaluate the proposal and generate a preliminary assessment of the candidate’s achievement of the following research skills: a) identifying relevant problems of interest, b) interpreting existing literature, c) generating hypotheses, d) collecting data (via experiment, observation, modeling and/or simulation), e) interpreting results and drawing conclusions, f) communicating results (in oral and written formats), g) answering questions and defending their work, and h) commenting/critiquing on the work of others.

The oral defense of a dissertation proposal is advertised within SIE and Engineering School. All interested parties are welcome to attend. The candidate gives a brief overview (20 to 30 minutes) of their proposed dissertation research, then takes questions from the audience and their committee. The committee then deliberates and decides whether the candidate has passed. The committee also reviews the student’s transcript and plan of study to recommend additional coursework or other relevant training if necessary. In this way, the emphasis of the dissertation proposal will be on supporting student growth, rather than just deciding who passes/fails. Candidates who fail the exam must take it again within six months. The chair of the candidate’s committee takes the lead in identifying an appropriate format and timeline for the second-chance defense. Students who do not pass on their second attempt are dismissed from the PhD program.
It is the candidate’s responsibility to email the SIE student services coordinators their announcement information which consists of the committee members list with the chair and advisor identified, the meeting date, time, and location information, and the dissertation proposal title and abstract at least two weeks before the proposal. The SIE student services coordinators will provide the chairperson with the relevant forms (Dissertation Proposal and Admission to Candidacy and Dissertation Proposal Assessment) for the proposal defense. It is the candidate’s responsibility to bring their transcripts and plan of study. Each committee member is responsible for completing a research skills assessment and submitting it to the committee chair. The chair collates the feedback, submits an aggregated assessment form to the SIE student services coordinators (who sends it to the Engineering School register) and circulates the feedback to the candidate and their advisor within two weeks of the proposal.

Finally, reiterating from Section 4.4 and Table 4-2, SIE students typically complete their proposal milestone at the end of Year 2, or the end of Year 3 if they enter the Ph.D. without an MS. A revised Recommendation and Certification of Doctoral Advisory Committee form should be submitted to the SIE student services coordinators no later than two weeks before the scheduled proposal if the student has revised their committee since their qualifying exam and/or have added the fourth committee member. Proposal defenses are typically scheduled from March through June.

**Final Defense**

The final dissertation defense is the culminating step of the Ph.D. process. The main objective of this milestone is to confirm that the completed research constitutes a meaningful contribution to the body of knowledge in the student’s field of study. A secondary objective is to ensure that the written quality of the final document is adequate to highlight the value of the work and make it accessible for an educated audience. Often, there are intermediate meetings with the committee between the proposal and the defense to discuss various, dissertation-related topics.

Students are eligible to defend their dissertation once they have completed all other requirements, including the publication requirement. The final defense committee must have five members (see Section 4.4.3). There is no required format for the dissertation. Rather, the candidate should work with their committee to prepare a satisfactory document. The candidate should circulate the final dissertation to their committee no later than two weeks before the oral defense date. Final defenses are advertised within the SIE and Engineering School. All interested parties are welcome to attend. The candidate gives a brief overview (30 to 35 minutes) of their dissertation research. The candidate then takes questions from the audience and their committee. The committee deliberates and decides about whether the candidate has passed.

It is the candidate’s responsibility to email the SIE student services coordinators their announcement information which consists of the committee members list with the chair and advisor identified, the meeting date, time, and location information, and the dissertation defense title and abstract at least two weeks before the final defense. The SIE student services coordinators will provide the chairperson with the relevant forms (Report on Final Examination and Thesis and Dissertation Assessment) for the final defense. The chairperson will return the completed forms back to them after the final defense.
Ph.D. candidates must apply for graduation in SIS at the beginning of the semester in which they’re expected to graduate. In addition, after successful completion of the final defense, the candidate must submit the dissertation via Libra (see Graduation Procedure) and complete the Survey of Earned Doctorates.

4.5. Administrative Forms

It is important that graduate students submit administrative forms related to degree requirements in a timely manner to the SIE student services coordinators. These forms can be found on the Engineering School’s webpage for current engineering graduate students.
APPENDICES

A. Revision History
B. Faculty Eligibility for MS/PhD Advisor and Committees

Faculty eligible to be on MS/PhD committees

- General Faculty (AGF: research, teaching, practice; all ranks [with a PhD])
- Tenure Track Faculty (all ranks)
- Research Scientists (all levels with a PhD)
- Special cases not listed above must be approved by the appropriate Program Chair.

Faculty eligible to be a MS/PhD Advisor

- Any faculty with a joint appointment in SIE (at any % > 0).
- Special cases not listed above must be approved by the appropriate Program Chair.

NOTES

1. The advisor must be UVA faculty, so for example not a member of the Professional Research Staff (research scientists, senior scientists, principle scientists, etc.), not a Lecturer, and not a visiting faculty.

2. “Faculty” for all committees includes any faculty status and includes faculty-qualified SIE research and teaching members (e.g., research scientists and lecturers that hold a Ph.D.).

3. All committees must follow UVA and SEAS guidelines, see:
   http://records.ureg.virginia.edu/content.php?catoid=57&navoid=5188#committee-requirements.

4. AGF must follow AGF policy guidelines, see: