Integrated Innovation Institute
Pittsburgh/Silicon Valley School Catalog
2022-23 Academic Year
August 30, 2022 – June 30, 2023

Carnegie Mellon University
Integrated Innovation Institute
4612 Forbes Avenue
Pittsburgh, PA 15213
1-844-629-0200
https://www.cmu.edu/iii/degrees/

Branch Campus: Carnegie Mellon University - Silicon Valley
NASA AMES RESEARCH PARK, MS 23-11
Moffett Field, CA 94035
Phone: (650) 335-2886; Fax (650) 603-7032
www.cmu.edu/silicon-valley/

Carnegie Mellon University is a private, non-profit institution, approved to operate in California by the California Bureau for Private Postsecondary Education. Approval to operate means compliance with state standards as set forth in the California Private Postsecondary Education Act of 2009**.** Carnegie Mellon University is accredited through a voluntary, peer-review process coordinated by the Middle States Commission on Higher Education (MSCHE or Middle States). MSCHE is one of six regional accrediting agencies in the United States, each accrediting institutions of higher education within a specific geographic region. Middle States is recognized by the U.S. Department of Education. This recognition enables MSCHE's member institutions to establish eligibility to participate in federal financial aid programs (e.g., federal loans, grants, and work-

PITTSBURGH
4612 Forbes Ave • Pittsburgh, PA • 15213

SILICON VALLEY
NASA Ames Research Park • Bldg. 23 (MS 23-11)
Moffett Field, CA • 94035

ENGINEERING + DESIGN + BUSINESS
cmu.edu/iii

study) administered by the U.S. Department of Education. Carnegie Mellon University has been accredited by Middle States since 1921. More information regarding accreditation standards and processes and to view the University's re-accreditation reports on the Middle States Accreditation website at: http://www.cmu.edu/middlestates/.

Approval to operate means compliance with state standards as set forth in the California Private Postsecondary Education Act of 2009.

Any questions a student may have regarding this catalog that have not been satisfactorily answered by the institution may be directed to the Bureau for Private Postsecondary Education at 2535 Capitol Oaks Drive, Suite 400, Sacramento, CA 95833, www.bppe.ca.gov, toll-free telephone number (888) 370-7589 or by fax (916) 263-1897.

As a prospective student, you are encouraged to review this catalog prior to signing an enrollment agreement. You are also encouraged to review the School Performance Fact Sheet, which must be provided to you prior to signing an enrollment agreement.

A student or any member of the public may file a complaint about this institution with the Bureau for Private Postsecondary Education by calling (888) 370-7589 toll-free or by completing a complaint form, which can be obtained on the bureau's internet website, at www.bppe.ca.gov

CIP Codes: US Department of Education regulations as of July 1, 2011, require the institution to identity programs by Classification of Instructional Programs (CIP) Code, with links to the US Department of Labor/Employment and Training Administration's Occupational Information network. For more information for CIP codes please visit web site at www.nces.ed.gov/ipeds/cipcode.

SOC Codes: NACCAS accrediting agency policies as of July 1, 2011, require the institution to identify programs by Standard Occupational Classification (SOC) Codes. The SOC system is used by Federal statistical agencies to classify workers into occupational categories. . For more information regarding SOC codes please visit internet web site at www. Bls.gov/SOC/. Also visit at http://www.onecenter.org/overview.html regarding occupational title for course of study.

Program	CIP	SOC	
MSTV	52.0701	11-1011	Chief Executives
		11-1021	General and Operations Managers
		11-9199	Managers, All Other
		25-1011	Business Teachers, Postsecondary
MSSM	14.0903	11-9041	Architectural and Engineering Managers
		15-1243	Database Architects
		15-1252	Software Developers
		15-1253	Software Quality Assurance Analysts and Testers
		25-1032	Engineering Teachers, Postsecondary

Carnegie Mellon University – Mission Statement
To create a transformative educational experience for students focused on deep disciplinary knowledge; problem-solving; leadership, communication and interpersonal skills; and personal health and well-being.

To cultivate a transformative university community committed to (a) attracting and retaining diverse, world-class talent; (b) creating a collaborative environment open to the free exchange of ideas, where research, creativity, innovation and entrepreneurship can flourish; and (c) ensuring individuals can achieve their full potential.

To impact society in a transformative way - regionally, nationally and globally - by engaging with partners outside the traditional borders of the university campus.

Integrated Innovation Institute – Educational Program Objectives

Master of Science in Software Management
- Identify and develop opportunities for software product innovation in support of the needs of individuals, organizations, and society.
- Formulate and execute a software project management strategy to deliver high-quality products and services.
- Collaborate in a multidisciplinary team environment in the context of a software-intensive project.
- Communicate effectively with a variety of stakeholders through written, spoken and visual communication methods.

Master of Science in Technology Ventures
- Envision, plan, develop and implement a new technology-based venture in both a startup and established enterprise environment.
- Execute processes with applied coursework to deliver technical venture opportunities.
- Understand innovation within emerging set of new ventures that are focused on grand challenge problems.
- Practical experience within an entrepreneurial venture.

The Integrated Innovation Institute will no longer be admitting and enrolling new students to the Master of Science in Technology Ventures (MSTV) program in Silicon Valley after Spring semester 2022. Students already admitted and enrolled in the MSTV program during or before Spring semester 2022 will remain eligible to complete their degree requirements at the Silicon Valley campus through Spring semester 2023.

CLASS LOCATION

Classes offered for the Master of Science in Software Management (MS-SM) program and Master of Science in Technology Venture (MS-TV) in California are held at:

Branch Campus:
Carnegie Mellon University - Silicon Valley
NASA AMES RESEARCH PARK, MS 23-11
Moffett Field, CA 94035
Phone: (650) 335-2886; Fax (650) 603-7032
www.cmu.edu/silicon-valley/

CMU-SILICON VALLEY FACITILIES

The Silicon Valley campus is located in the historic Shenandoah Plaza on the NASA Ames Research Park. We occupy Building 23: a 20,111 sq. ft. two-story historic building and is our administrative and teaching building. It houses our academic space: 5 classrooms, 31 faculty and staff offices, 6 conference rooms, 2 kitchen/break rooms, 1 cafe lounge, and 1 multi-function lounge & event space.

Student Lounges: There are several spaces for students in Silicon Valley to use. The main student lounges can be found in B23, downstairs Room 129, upstairs Room 227, & in B24, in CMIL (the Carnegie Mellon Innovations Lounge).

Printers: Printers are for use in Building 23 (B23) Room 123 and the hallway in B23 outside of 109/110. Instructions for adding printers and policies are posted next to each printer.

Library Resources

Library and Resources CMU-SV does not operate a library on campus, but we do have specialized library resources available for students, faculty, and staff. Resources include:

1. Interlibrary Loan
2. e-book developments
3. University Libraries Quick Links

Through the Interlibrary loan, students can request books, articles from journals and conferences, technical reports, or other materials to be sent to you. The materials may be from Carnegie Mellon libraries in the U.S. or other institutions worldwide. Electronic delivery for many articles is available. ILLiad is the system that our students use to request these items. What ILLiad can be used for:

- To request to borrow a book, a tech report, a thesis, copy of an article, etc.
- Check status of requests
- Edit requests
- Cancel requests
- Update your contact information or delivery preferences
- Request to renew an interlibrary loan

The ILLiad link can be found at https://illiad.library.cmu.edu/illiad/illiad.dll.

The first time you use the link you need to provide information about yourself. You only need to do this once. When completing the form, choose these options:

- For **Mailing Address**, state: **Silicon Valley campus**
- For **Delivery Location**, state: **E&S Library**

Ebook developments can be found on our website at http://guides.library.cmu.edu/svc.

6

PITTSBURGH
4612 Forbes Ave • Pittsburgh, PA • 15213

SILICON VALLEY
NASA Ames Research Park • Bldg. 23 (MS 23-11)
Moffett Field, CA • 94035

ENGINEERING + DESIGN + BUSINESS
cmu.edu/iii

See below for an example of ebook developments:
We're building quite a collection of digital resources of interest to the Silicon Valley Campus. An eye-opening list is below:

- [AccessEngineering](#)
This is a "reference tool for professionals, academics, and students that provides seamless access to the world's best-known, most-used collection of authoritative, regularly updated engineering reference information. *AccessEngineering* also comprises dynamic online features, such as instructional, faculty made videos, calculators, interactive tables and charts, as well as personalization tools allowing users to organize crucial project information as they work." *AccessEngineering* includes the well-known Schaum's Outline series of books.

- [Knovel](#)
A digital collection of science and engineering reference books. Carnegie Mellon Users Only (including Silicon Valley Campus). Our access to their new collection on Computer Hardware Engineering is now available! You'll also find the books listed in CAMEO - our online catalog.

- [Synthesis Digital Library of Engineering and Computer Science](#)
"The basic component of the library is a 50- to 100-page 'Lecture'; a self-contained electronic book that synthesizes an important research or development topic, authored by an expert contributor to the field." You'll also find the books listed in CAMEO - our online catalog.

- [Springer e-Books Collection for Computer Science](#)
Thousands of computer science e-books from the publisher

- [Springer e-Book Collection for Engineering](#)
Thousands of engineering e-books from the publisher

7

- [Springer e-Book Collection for Mathematics & Statistics](#)
Thousands of mathematics e-books from the publisher

- [Plus - General e-Book Collecting from Many Different Publishers](#)
Since we have students, staff, and faculty in Pittsburgh, Qatar, Africa, and Silicon Valley, we're making a concerted effort to collect whatever e-Books we can so that all of our community can use them. You'll find them in CAMEO - our online catalog!

University Quick Links can also be found on the website at http://guides.library.cmu.edu/svc.

Here are examples of some quick links below:
- [Articles & Databases](#)
Alphabetical and subject listings of our available databases.

- [Cybersecurity](#)

- [e-Journals A to Z List](#)
Our automated (partially) method of finding e-Journals that we have access to - even if buried in a full-text database.

- [ECE Library Guide](#)
Library research guide for Electrical & Computer Engineering.

- [Off-Campus / Wireless Access](#)
EZ Proxy single sign on added as an option

- [University Libraries Home Page](#)
Our home page has links to the simple and advanced search functions for CAMEO - our online catalog.

For additional questions regarding library resources, please contact Matt Marsteller, Associate Dean for Faculty/Principal Librarian at matthewm@andrew.cmu.edu or by phone: 412-268-7212

OFFICIAL ACADEMIC CALENDAR
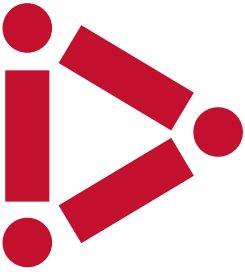The official academic calendar for Carnegie Mellon University can be viewed here: https://www.cmu.edu/hub/calendar/index.html

PROGRAMS OFFERED
The Integrated Innovation Institute offers two degrees in connection with the Carnegie Mellon University - Silicon Valley campus.

Master of Science in Software Management: teaches students how to create innovative software products and services, manage the resources to create them, and gain the business expertise that is required for a successful software enterprise. The curriculum is currently offered through two full-time tracks (12 months or 16 months) and a part-time option. This degree is offered completely from the Carnegie Mellon University - Silicon Valley campus.

Master of Science in Technology Ventures: focuses on entrepreneurial students looking to leverage deep knowledge of emerging technologies into successful business ventures. This 16-month degree connects skills in emerging technology and innovation, with business acumen needed to take an idea into a successful venture. This degree is offered between the Carnegie Mellon University Pittsburgh and Silicon Valley campuses.

The Integrated Innovation Institute will no longer be admitting and enrolling new students to the Master of Science in Technology Ventures (MSTV) program in Silicon Valley after Spring semester 2022.   Students already admitted and enrolled in the MSTV program during or before

Spring semester 2022 will remain eligible to complete their degree requirements at the Silicon Valley campus through Spring semester 2023.

For detailed outline of the requirements for completion for each program offered at the Integrated Innovation Institute, including a description of the instruction provided in each of the courses, the requirements for completion of each program, including required courses, any final tests or examinations, any required internships or externships, and the total number of credit hours, clock hours, or other increments required for completion can be found online at:

Master of Science in Software Management
o Overview – Full & Part Time Programs:
https://www.cmu.edu/iii/degrees/mssm/index.html
o Curriculum: https://www.cmu.edu/iii/degrees/mssm/curriculum.html
o Example Job Classifications for Graduates:
https://www.cmu.edu/iii/degrees/admissions/bppe/mssm_jobclassification.pdf

MSSM 16 Months, MSSM 12 Months, & MSSM Part-Time

Full-Time Status

Full-time degree requirements for the MSSM 16- and 12-month curriculum are outlined below. Full-time students must attend courses and complete the degree on campus. Some courses may be offered during evening hours. Degree unit requirements are outlined below. All students are required to maintain full-time status at 48 units per semester as set by the degree requirements. If a student is permitted to overload courses one semester for individual academic progress, the 48-unit requirement still applies in subsequent semesters.

Part-Time Status

Students registered below 36 units are considered part-time. Students can complete the program part-time in two years (six academic semesters, including summer terms). Part-time students take one 12-unit course at a time, in the evenings. If schedule permits, day-time courses could be considered by academic advisor recommendation.

Curriculum of Study for MSSM Full-Time 12-Month Degree

Fall Term

Required Course Units: 48 units
49-752 - Product Definition & Validation – 12 units
49-760 - Foundations of Software Management – 12 units
49-786 - Software Engineering Management – 12 units
Restricted Elective (placement at New Student Orientation) – 12 units

Recommended/Optional Professional Development Course(s):
These courses may be taken in addition to the maximum 48 units.
49-794 – Strategies for your Software Industry Career – 3 units

Spring Term

Required Course Units: 48 units
Maximum Course Units: 60 units

49-762 - Software Product Strategy – 12 units
49-763 - The Business of Software – 12 units
49-771 - Process and Project Management – 12 units
Elective Requirement – 12 units of approved electives

Summer Term

Required Course Units: 48 units
Maximum Course Units: 60 units

Electives Courses:
48 units of approved electives

Curriculum of Study for MSSM Full-Time 16-Month Degree

Fall Term #1

Required Course Units: 48 units
49-752 - Product Definition & Validation – 12 units
49-760 - Foundations of Software Management – 12 units
49-786 - Software Engineering Management – 12 units
Restricted Elective (placement at New Student Orientation) – 12 units

Recommended/Optional Professional Development Course(s):
These courses may be taken in addition to the maximum 48 units.
49-794 – Strategies for your Software Industry Career – 3 units

Spring Term

Required Course Units: 48 units
Maximum Course Units: 60 units

49-762 - Software Product Strategy – 12 units
49-763 - The Business of Software – 12 units
49-771 - Process and Project Management – 12 units
Elective Requirement – 12 units of approved electives

Summer Term

Required Course Units: 3 units

49-793 - Practical Training in Software Management – 3 units

Students completing an internship may also take 12 units of coursework during summer term. Students are responsible for the additional tuition costs during summer term. Additionally, students must maintain full-time student status during subsequent semesters.

Fall Term #2

Required Course Units: 48 units
Maximum Course Units: 60 units

Required Courses - One of the Following:
49-792 - Software Management Practicum – 12 units
49-807 - Integrated Innovation for Large Scale Problems – 12 units

Elective Courses:
36 units of approved electives

Curriculum of Study for MSSM Part-Time Degree

Fall Term #1

Required Course Units: 24 units
49-761 - Elements of Software Management – 12 units
Elective Requirement – 12 units of approved electives

Spring Term #1

Required Course Units: 24 units
49-771 - Process and Project Management – 12 units
Elective Requirement – 12 units of approved electives

Summer Term #1

Required Course Units: 24 units
24 units of approved electives

Fall Term #2

Required Course Units: 24 units
49-750 - Software Product Definition – 12 units
49-751 - Requirements Analysis – 12 units

Spring Term #2

Required Course Units: 24 units
49-762 - Software Product Strategy – 12 units
49-763 - The Business of Software – 12 units

Summer Term #2

Required Course Units: 24 units
24 units of approved electives

Required Degree Units

Students must complete a minimum of 144 units and successfully complete all required courses to be eligible for graduation. The average grade of 144 units applied to the degree shall be at least a B (3.0 QPA). Individual course grades below a C (2.0 QPA) are considered unsatisfactory for the degree requirement.

Master of Science in Technology Ventures

- Overview: https://www.cmu.edu/iii/degrees/mstv/index.html
- Curriculum: https://www.cmu.edu/iii/degrees/mstv/curriculum.html
- Example Job Classifications for Graduates: https://www.cmu.edu/iii/degrees/admissions/bppe/mstv_jobclassification.pdf

The Integrated Innovation Institute will no longer be admitting and enrolling new students to the Master of Science in Technology Ventures (MSTV) program in Silicon Valley after Spring semester 2022.   Students already admitted and enrolled in the MSTV program during or before Spring semester 2022 will remain eligible to complete their degree requirements at the Silicon Valley campus through Spring semester 2023.

MSTV & MSTV Dual Degree

Full-Time Status

Full-time degree requirements for the MSTV and MSTV Dual Degree curriculums are outlined below. Full-time students must attend courses and complete the degree as defined per campus location. All students are required to maintain full-time student status as defined by the University (36 units) throughout their enrollment. Total unit minimums/maximums per semester are outlined below.

Part-time Status

At this time, all students connected to the MSTV degree(s) must be registered at full-time student status.

Curriculum of Study for MSTV Degree

Spring Term #1 – Pittsburgh

Required Course Units: 48 units
49-850 - Grand Challenge Innovation – 12 units
Applied Technology/Engineering courses – 36 units

Summer Term – Silicon Valley

Required Course Units: 3 units
49-859 - Master of Science in Technology Ventures - Internship/Practicum
– 3 units

Fall Term – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
Maximum Term Units: 48 units

Required Courses:
49-802 - Innovation & Entrepreneurship –12 units
49-853 - Product Management – 6 units
49-854 - Business Models and Strategy – 6 units
49-855 - Venture Governance – 6 units
49-856 - Legal Issues in New Venture Creation – 6 units
Elective Course - 12 units of approved electives

Spring Term # 2 – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
Maximum Term Units: 60 units (with approval)

Required Courses:
49-804 – The Leadership Challenge – 6 units
49-851 – Financial Fundamentals for New Ventures – 6 units

49-852 – Agile Marketing for New Ventures – 6 units
49-857 – Dynamic Global Teams – 6 units
Elective Course – 24 units of approved electives

Curriculum of Study for MSTV Dual Degree

The MSTV degree can be completed in connection with master's degrees offered in six departments in the College of Engineering. These departments include: Biomedical Engineering (BME), Chemical Engineering (ChemE), Civil & Environmental Engineering (CEE), Electrical & Computer Engineering (ECE), Mechanical Engineering (MechE), and Materials Science & Engineering (MSE). Students admitted to the dual degree program with MSTV will follow the semester sequence outlined below.

Fall Term #1 – Pittsburgh, Home Engineering Department

Degree requirements for MS in Engineering degrees are outlined per department. Please consult home department handbook(s).

Spring Term #1 – Pittsburgh, Home Engineering Department

Required Courses Units: 48 units
49-850 - Grand Challenge Innovation – 12 units
Applied Technology/Engineering courses – 36 units

These 48 course units will double-count toward the MS in Engineering and MSTV degree requirements. There is also a 48-unit maximum that cannot be exceeded for double-counting course units. Additionally, no undergraduate courses are permitted as elective or double-counting units for degree requirements.

At the end of the spring term, students should complete all MS degree requirements within their home engineering department.

Summer Term – Silicon Valley

Required Course Units: 3 units
49-859 - Master of Science in Technology Ventures - Internship/Practicum – 3 units

Fall Term #2 – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
Maximum Term Units: 48 units

Required Courses:
49-802 - Innovation & Entrepreneurship –12 units
49-853 - Product Management – 6 units
49-854 - Business Models and Strategy – 6 units
49-855 - Venture Governance – 6 units
49-856 - Legal Issues in New Venture Creation – 6 units
Elective Course - 12 units of approved electives

Spring Term #2 – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
Maximum Term Units: 60 units (with approval)

Required Courses:
49-804 – The Leadership Challenge – 6 units
49-851 – Financial Fundamentals for New Ventures – 6 units

49-852 – Agile Marketing for New Ventures – 6 units
49-857 – Dynamic Global Teams – 6 units
Elective Course – 24 units of approved electives

Dual Degree Curriculum of Study for MSTV & University of Strathclyde

The MSTV degree can be completed in connection with master's degrees offered in three different departments at University of Strathclyde. These departments include: Design Engineering, Digital Manufacturing, & Systems Engineering Management. Students admitted to the dual degree program with MSTV will follow the semester sequence outlined below.

Fall Term #1 – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
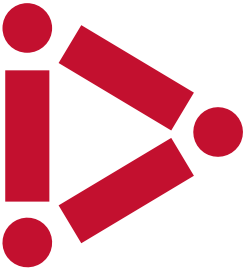Maximum Term Units: 48 units

Required Courses:
49-802 - Innovation & Entrepreneurship –12 units
49-853 - Product Management – 6 units
49-854 - Business Models and Strategy – 6 units
49-855 - Venture Governance – 6 units
49-856 - Legal Issues in New Venture Creation – 6 units
Elective Course - 12 units of approved electives

Spring Term #1 – Silicon Valley

Required Course Units: 36 units
Minimum Term Units: 48 units
Maximum Term Units: 60 units (with approval)

Required Courses:
49-804 – The Leadership Challenge – 6 units
49-850 - Grand Challenge Innovation – 12 units
49-851 – Financial Fundamentals for New Ventures – 6 units
49-852 – Agile Marketing for New Ventures – 6 units
49-857 – Dynamic Global Teams – 6 units
Elective Course – 12 units of approved electives

Summer Term #1 – Silicon Valley

Required Course Units: 3 units
49-859 - Master of Science in Technology Ventures - Internship/Practicum
– 3 units

Fall Term #2 – University of Strathclyde

Required Course work at University of Strathclyde

Spring Term #2 – University of Strathclyde

Required Course work at University of Strathclyde

Summer Term #2 – University of Strathclyde

Required Course work at University of Strathclyde

Required Degree Units

Students must complete a minimum of 147 units and successfully
complete all required courses to be eligible for graduation.

For dual-degree students, 48 units are double-counted between the MS in Engineering and MSTV degree requirements, and 99 units are unique to the MSTV degree. The average grade of 147 units applied to the MSTV degree shall be at least a B average (3.0 QPA).

For dual-degree students with the University of Strathclyde, 48 units transfer back to the MSTV degree. The average grade of 147 units applied to the MSTV degree shall be at least a B average (3.0 QPA).

Individual course grades below a C (2.0 QPA) are considered unsatisfactory for the degree requirement. Degree(s) will be certificated upon completion of the MSTV degree requirements.

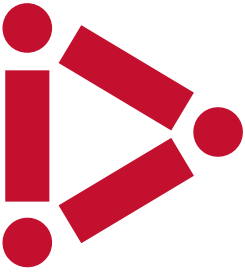## Integrated Innovation Institute - Course Descriptions

49-750, Software Product Definition – 12 units
Students develop and refine a compelling and realistic vision for a new product. They learn to understand user and customer needs, to document those needs, and to envision creative solutions.

After completing this course, students will be able to:
- Use contextual inquiry and work modeling techniques, including interviewing, to understand problems faced by individuals and organizations
- Define and apply personas, goals, and scenarios to envision a high quality user experience in a new system
- Define the 'whole product' required to provide a complete solution, systematically, from a customer's point of view
- Define a business vision that explains how product development will contribute to achieving the goals of the customers and end user

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-751, Requirements Analysis – 12 units
Project teams analyze, document, and plan the management of functional, technical, and business requirements for a software system and then create a product release strategy.

After completing this course, students will be able to:
- Derive key functional, data, technical, and business requirements from scenarios
- Analyze and document functional and nonfunctional requirements for a software system
- Identify risks inherent in potential solutions
- Estimate market size and to evaluate competitive products and services
- Formulate the features for a minimum viable product and a road map for subsequent release
- Present analyses and plans to a management audience

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-752, Product Definition and Validation - 12 units
Students learn techniques for envisioning creative solutions to real problems. They develop and refine a compelling and realistic vision for a new product. They practice techniques to understand and validate user and customer needs, and to identify market opportunities. They analyze, document, and plan the management of functional, technical, and business requirements for a software system and then develop a product release strategy.

49-753 - User-Centered Research Methods for Product Innovation – 12 units
Building great products and services begins with having a deep knowledge of the problem you are solving and the people for whom you are designing. From controlled lab studies to field research, a/b testing to participatory design, learn a host of Human-Computer Interaction research methods and analysis techniques to get you the right insights and on the path to crafting innovative ideas.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-760, Foundations of Software Management - 12 units
Students apply fundamental methods, models, and frameworks to assess real software companies from a variety of perspectives - marketing, strategy, finance, operations - to understand how businesses organize and make decisions. Working individually and in groups, students develop skills for managing teams and employee performance. Students practice personal leadership.

After completing this course students will be able to:
- Use contextual inquiry to understand user 'pain' and establish product goals
- Use the Goal-Question-Metric technique to establish strategic measures
- Characterize a software business in terms of markets and products
- Read and understand basic financial statements
- Assess a company's strategy in light of competitors, market and macro factors
- Make a presentation to an executive audience

49-761, Elements of Software Management - 12 units
Through seminar discussions and individual investigation, students assess real software businesses from marketing, business strategy, financial, and overall business perspectives, applying fundamental methods, models, and frameworks.

After completing this course students will be able to:
- Characterize a software business in terms of markets and products
- Understand basic financial statements
- Assess a company's strategy in light of competitors, market and macro factors
- Make a presentation to an executive audience

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-762, Software Product Strategy – 12 units
Students analyze market opportunities for a software product, evaluate its technical feasibility, then expand the product definition and create a product

roadmap. Prerequisites: Admission to the Silicon Valley Software Management program and Requirements Analysis (49751).

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-763, The Business of Software – 12 units
The Business of Software course is focused on the processes and the economics of bringing software products and services to market, with an emphasis on partnership and sales strategies. The previous course, Software Product Strategy (SPS), addressed the technical feasibility of implementing the product and the marketing strategy. BSW picks up where SPS leaves off, starting with teams creating a partnership plan and a sales strategy for their products. The final step involves the creation of budgets and revenue models for the proposed product as a way to determine the viability and business opportunity for the envisioned product. The course concludes with student presentations that recommend for or against continuing with product development.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-766, Agile Marketing for High Tech Innovation – 12 units
Agile Marketing for High-Tech Innovations will cover how to formulate marketing strategies that lead to successful products. It will include how marketing strategies are adapted for high tech innovations and products including addressing strategic market planning, functional expectations and tactical considerations when using marketing tools. Topics include: strategic market planning, market orientation, types of alliances needed for moving from innovation to product acceptance, understanding high-tech customers, product distribution options, technology/product management considerations for marketing effectively, pricing, marketing communications, breakthrough versus incremental innovation marketing and measuring marketing effectiveness.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-767, Organizational Behavior for High Tech Knowledge Industry – 12 units

Using innovative conceptual frameworks, students learn the fundamentals of organizational behavior as it relates to the unique challenges of high tech enterprises, concluding with a team project focused on a specific organizational problem for a selected company.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-768, Special Topics: Finance for Entrepreneurial Ventures – 12 units
The course seeks to blend finance and economics to help entrepreneurs to understand the relationship between venture finance and evaluation of business risk. It starts with a workshop on the accounting tools that are necessary for entrepreneurs to make a business case for their software start-ups. In the process students will acquire a range of business understanding and skills necessary to build a new company and plan for equity participation for founders, employees, and venture capitalists. The workshop on accounting fundamentals, is followed by some introductory finance, and then students work through the process of converting operating, human resource, capital, and marketing plans into a set of financial projections that enables a start-up to be valued and funded. Students will learn:
-    How early stage startups reduce uncertainty about the viability of their ventures by experimentation, planning, and decide under what conditions scaling early may be beneficial;
-    Understand the sources of finance for entrepreneurial activity and their role in maximizing gain while controlling personal risk;
-    How to put together a financial plan and pitch for their Start-Up in a professional manner.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-770, Metrics for Software Managers - 12 units
As members of a project team, students analyze and propose metrics initiatives for a fictional software organization with specific software management problems, aligning the initiatives with business and stakeholder goals.

After completing this course students will be able to:

- Define a metrics program at the software project level
- Define a metrics program for a product portfolio

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-771, Process and Project Management – 12 units
Students define the optimal software development method for a given project, by identifying a set of Agile, Lean and/or disciplined practices suited for the project's specific needs. They also develop project's estimates and multilevel plans based on their recommended method.   Prerequisites: Foundations of Software Engineering (18652) or Metrics for Software Managers (49770) or consent of instructor.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-774, Product Management - 12 units
While Product Manager has been a key role in the high-tech industry for over 10 years, the Product Management training in this space was relatively limited. This course connects the knowledge and skills students learned from previous Software Management courses, and guides students to leverage this learning to position, design, develop, launch, measure, and grow products, particularly in the internet/software sectors. The course covers a product managers' role and the application of product ideation & positioning, feature design and documentation, product development process, go-to-market, measurement/optimization, and growth.

49-775, The First-Time Manager - 12 units
This course is intended for experienced software developers who have newly been given management responsibilities. The course addresses management styles, managing people (reviewing, mentoring, hiring, firing), managing teams (task assignments, collaboration, conflict resolution), managing schedules and deliverables, reporting to higher management, working with other groups in the organization, and communicating with clients and partners outside the organization.

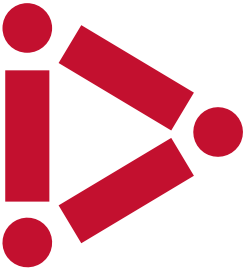**49-780, Human Computer Interaction & User Experience -** 12 units
This graduate level short course exposes Software Engineering and Management professionals to the field of Human Computer Interaction (HCI) and User Experience (UX). In the modern marketplace, the winners are those who enable real people to harness the power of technology innovations in delightful ways. Delighting customers through technology requires a strong foundation in HCI and a focus on UX. This course is primarily for those who come from a technical or business background but are interested in gaining relevant knowledge and basic skills in HCI/UX in an interactive, fast-paced, and engaging format.

The goals for the course are:
- To provide an overview across the breadth of HCI/UX disciplines to understand the relevant roles, responsibilities, processes, methodologies, concepts, tools, and deliverables expected of them.
- Through increased knowledge and understanding, establish empathy with HCI/UX practitioners in order to establish productive working relationships.
- To provide a theoretical & practical foundation for the HCI & UX practice within modern product development.
    - Understand the underlying history & theory through relevant readings, discussions, and presentations.
    - Gain practical experience through team-based project work, presentations, and critique.
    - Work together in cross-functional teams using a User-Centered Design (UCD) approach.
- To create a greater appreciation for the intellectual, emotional, and practical value of HCI & UX.

49-781, Introduction to Machine Learning – 12 units
The landscape of software products has changed over the last decade with the advent of data science as an interdisciplinary field, and its broad and deep applicability has created opportunities for delivering interesting and innovative capabilities based on deep understanding of data. This course helps current and future product managers understand the distinction between data-driven and conventional products and learn to identify new product capabilities made possible by quantitative data analysis and modeling. Regular hands-on exercises will expose them to techniques for analyzing data, developing insights, building

models, and turning the outcomes from models into end-user value. The course project will require students to go through the life cycle of a data-product and showcase their insight as a product feature. (Previously Data Analytics). Some class sessions in this course will be offered using a Flipped Classroom model where lectures will be distributed as videos for viewing offline, and class sessions are dedicated to clarifications, content review, and course assignments.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.
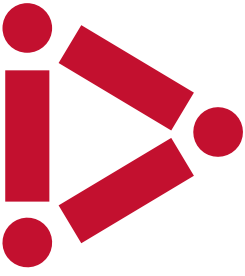
49-782, Open Source Software – 12 units

This elective is designed to yield student proficiency regarding contemporary thinking and fundamental skills regarding Open Source Software. Emphasis is on understanding the impact of open source software on the software industry, including licensing and commercialization issues, corporate software evaluation techniques, and business models. Students install and use open source software (Linux, OpenOffice, Firefox, etc.) and work in teams in a problem-based seminar/workshop format. Team projects focus on creating evaluation criteria for specific categories of software, followed by evaluating open source software components according to the Business Readiness Rating framework. Team projects will be supplemented by recommended readings and presentations by invited outside speakers.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-783, Introduction to Cloud Computing – 12 units

This class is designed to familiarize you with the state of the art in cloud computing and big data analysis. This course is suitable for both students on a technical track (engineering, science) as well as those on a management track who are passionate about big data powered products. You will study basic types of clouds, widely-used cloud computing systems and their strength and weakness, core concepts and technologies on distributed data storage, distributed processes and services, security practices, popular Big Data Analysis algorithms and machine learning use cases on cloud. You will acquire deeper understanding via both case studies from industry big players as well as a

project-based hands-on application build and deployment on cloud (no technical pre-requisite). After completing the course students will be able to:
- Build a basic product on two well-known cloud systems
- Make architectural decisions on choosing the right cloud type, core technologies and services
- Make business decisions on cloud vendors and the right level of investment on cloud
- Critique some current industry cloud-based solutions

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-786, Software Engineering Management - 12 units
In this course, you will learn the software engineering paradigms that are widely adopted in modern software industry. You will be introduced to the Software Development Life Cycles (SDLC) and its supporting process and tools in each stage. Through team based projects, you will gain firsthand experience on best practices in the art of collaboration and software engineering management. In a high-performing team environment, you will be able to build cloud based mobile applications through iterative process of requirements definition, architecture design, implementation, integration, testing, measurement and deployment. If you have already taken 18-652, Foundations in Software Engineering, you are not eligible to register for this course.

49-787, Architecture & Programming Principles - 12 units
This course teaches how to build an architecture that stands the test of time and business, how to keep your code manageable and clean, how to ensure longevity of your design, and how to build interoperable systems. You will do hands-on individual design and coding exercises addressing architectural concepts like scalability, reliability and security, development essentials like reusable code, refactoring and technical debt, and current technologies like containers, APIs and data pipelines. Examples and exercises will be provided in Java, but you can write quizzes and assignments in any equivalent major programming language with instructor approval.

49-788, Introduction to IoT (Internet of Things) – 12 units

This course provides an overview of Internet of Things (IoT), especially focusing on software layer of building mobile applications to capture and process data generated by IoT devices and providing analytical insights. Students will access health and fitness information, motion data, explore home automation technologies and beyond. Through this course, students will understand and appreciate why information technology is entering the era of digital transformation from pure Internet to IoT.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-789, Architecture Principles for Product Managers – 12 units
Software products are becoming increasingly large and complex, and the responsibility of Software Product Managers has extended beyond core product functionality into non-functional aspects like cloud platform selection, scale and reliability decisions, interoperability with other products, and future extensibility considerations. For this, they rely heavily on their development team to architect and design products that are reliable, scalable, flexible, cost-effective and "future-proof." They are surprised when the product fails to met these expectations - discovered only when the rubber meets the road - often too late to make any fundamental changes. These failures may manifest themselves in the inability of a product to scale the next million users, to integrate with other software systems, to support an international user base or to be sold through channels. This course aims to get product managers technically savvy about the non-functional aspects of a software system, and enable them to be influential in the architectural and design phase of product development. It will review a variety of architectures archetypes and analyze them for relevance to specific business requirements. It will also review some well-known products and explore their architectural characteristics. As part of the course, students will conceptually architect a product and debate its pros and cons. This course is designed for students who have some experience with product management and can relate to the challenges addressed in it. No experience with coding is necessary.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-790 / 49-796 - Software Management Independent Study – Variable Units

Working with the faculty, realize that the faculty are most interested in Independent Study projects that further their own research goals. You may not be successful on your first inquiry, so please be patient. We want you to have a good Independent Study experience, so faculty are encouraged to say "no" if they don't have the cycles to mentor a project. Once you and the faculty have agreed upon the independent study, send the independent study form to the director of your program.

49-791 - Software Management Capstone Project – Variable Units
Student teams continue work on their product or business idea. Student teams may refine or rework ideas, or continue to extend the work started in previous semesters. A plan, including milestones and deliverables, which is developed by the team must be submitted to and approved by the faculty advisor at the start of this course.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.
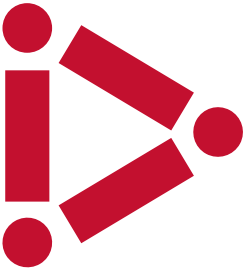
49-792 - Software Management Practicum – Variable Units
The practicum involves application of the SM program concepts in an actual business environment. Acting as consultants to one or more customers, student teams must scope a project; develop a project plan and detailed statement of work. Practicum topics are typically proposed by outside companies, which are looking to work with our students, but there are other options available as well. Students must demonstrate all deliverables to the customer(s), whose assessment of the work is a major component of the grade. More than a simple internship, the practicum involves real responsibility, teamwork, accountability, and rigor.

49-793 - Practical Training in Software Management – 3 units
This course is for SM students who are pursuing an internship. Internships work is conducted on-site at local software companies. Special permission is required to be enrolled in this course, therefore, eligible students should contact the program director.

49-794 – Strategies for your Software Industry Career – 3 units

This workshop continues the self-assessment started in the New Student Orientation for the MS-SM program, and continues with career exploration activities. Students who are searching for their first job or internship in the software industry and those who are seeking to make a career shift will benefit from this course.   A discover of careers available in today's software industry will be conducted through student research and guest speakers (including alumni) who present a view into their typical workday. Students develop an understanding of the wide variety of companies operating in the software industry, and the various jobs available within these companies. Students also learn how they can apply their skills to non-software companies for whom software systems are a major aspect of business success.   The outcomes for students include a personal brand statement that articulates skills valued by employers, discovery of their work preferences and aptitudes, a list of target companies to engage, and a plan to develop the materials (e.g. resume, interview preparation) required to conduct a successful job or internship search based on their new awareness and understanding of specific opportunities they wish to pursue.   This course prepares students for 39-699 Career and Professional Development for Engineering Masters Students.

49-795 - Special Topics: Introduction to Artificial Intelligence – 12 units
The principles and practices around artificial intelligence (AI) is increasingly critical to unlock the value of data, and transform business and ultimately human experience. It is so pervasive today that we use it daily probably without knowing it. This course will present students AI business case studies, the most popular AI techniques, algorithms, application recipes, best practices, and offer hands-on experience in implementing them to solve real-world problems. This course covers the spectrum of real-world AI implementations from natural language processing, speech recognition, facial recognition, landmark detection, and social network analysis to technical depth of popular algorithms, neural network backpropagation methods, probabilistic and non-probabilistic methods. Students will accumulate firsthand experience on Google and Microsoft AI platforms, AI model design and training. This course is designed with the easy-to-follow approach by showing the step-by-step implementation of the core technologies. It presents recipes in major use cases to offer students a leap start on building AI solutions. With the willing-to-learn attitude, students with either technical or business background will succeed in this course.

49-800, Commercializing Intellectual Property – 12 units
The course focuses on the innovation of products based on emerging technologies that are ready for technology transfer, but have not moved past the "research lab". The course will follow a rigorous product innovation process that begins with identifying opportunities for products using these technologies, understanding the needs of the potential customer and other stakeholders, and developing concepts that illustrate the potential product. The course will include understanding new technologies, extensive customer research, product innovation methods, and initial business execution planning that includes market definition and execution planning. The results of this course may follow into 96-809, Enterprise Innovation, in the spring term, to further develop the concept and execution plan into a viable market opportunity. For this year, technologies will be based on CMU research ready for tech transfer.

49-801, Enterprise Innovation – 12 units
This course explores how business enterprises are being re-invented for today's digital era. Many firms are approaching a critical inflection point. The combined impacts of technology and globalization have revolutionized the way we operate. Software is transforming the way companies innovate; how they interact with customers and ecosystem partners, the way they collaborate and communicate, how they access and distribute information, and how they co-ordinate and control. Traditional approaches that assume "stability" have given way to "dynamic" recipes. The new imperative is to swiftly navigate changing realities. Flexibility, versatility and the capacity to quickly adapt to evolving situations have become the critical challenges. The course is based on the new edition of Prof. Evans' book "Super-Flexibility for Knowledge Enterprises" (co-authored with Prof. Bahrami from Haas School of Business, UC Berkeley). Specifically, we will focus on the new rules of "super-flexibility" needed for continuous recalibration and adaptation.

49-802, Innovation & Entrepreneurship – 12 units
This course focuses on entrepreneurship and innovation from the vantage point of high-tech companies in Silicon Valley. We will explore these topics in the context of the Creation Phase - focusing on founding a new start-up and raising seed funding; and the Scaling Phase - focusing on growing a venture where startups typically undergo B, and C rounds of funding; We will examine common mistakes and misconceptions in starting a new entrepreneurial business, and

meet entrepreneurs, angel investors, and venture capitalists from Silicon Valley to learn, first hand, the challenges of conceiving, creating, and growing a new venture.

In the second part of the IE course, our focus will be on the Consolidation Phase, when growing ventures evolve into established global corporations We will examine critical pain points facing this group of companies, the impact of organizational complexity, the challenge of managing a multi-business enterprise, and expanding the global footprint. This is the phase when technology companies find it more challenging to innovate and often shift their growth focus to searching for acquisitions. Invited guests will share their experiences and lessons learned, and give us a first-hand perspective on realities facing this critical group of innovative companies.

49-804, The Leadership Challenge – 6 units
This course studies the emerging contexts for leadership - key attributes and skills, key development points, and key actions. Leadership will be discussed in changing contexts such as agile/lean environments, emerging technology such as mobility, big data, and global issues. Other topics include decision making under uncertainty, leadership and followership, acting as a connector in an ecosystem. A leader is someone who will take you somewhere that you didn't think you could go; what does this mean for teams, businesses and you personally? There will be key readings, case studies, and a retrospective.

49-807, Exponential Innovation – 12 units
This semester course explores the new paradigms of innovation and competitiveness. This disruption is happening because technologies such as computing, sensors, artificial intelligence, and 3D printing are advancing exponentially and converging. For more than 100 years, the processing power of computers has doubled every 18 months. Now it has come to the point where our smartphones are more powerful than yesterday's supercomputers were. Faster computers are now being used to design faster computers; and computers and the information technology that they enable are absorbing other fields. In order to thrive in today's era of exponentially advancing technologies, students will need to understand the pace of change and learn to take advantage of the upheaval it will bring. Innovation has globalized; business models and technology developed in one country can easily be

exported to another there are massive opportunities for small groups of people to create an outsized positive impact on the world. This class teaches students how to watch for convergence and disruption and to think like the startups that are building the future of nearly every industry. The class combines lectures, discussions, group activities, and guest speakers to teach students this exciting rapid change to technology.

Note: Optional Distance Education Section is available for MSSM Remote Part-Time students. Remote students still attend class synchronously.

49-808, ST: Integrated Innovation for Large-Scale Problems – 12 units
This course focuses on team-based innovation across design, business, engineering and software with the potential for large-scale impact. Students working across geographic locations will take on a complex problem in an emerging field, and methodically come up with unexpected ideas and opportunities to tackle and solve it. The semester will consist of a series of four modules where students will research current signals and market indicators; identify opportunities for innovation; and formulate, prototype, integrate and resolve a solution. Students will work both individually and collaboratively and will learn and apply innovation, entrepreneurship and conceptualization skills in scaling existing products and services into new markets and in evolving new products in existing markets. Students will be supported in this exploration by regular guest talks from leading academics and industry professions who will provide their insights and guidance on developing solutions for complex problems.

49-851, Financial Fundamentals for New Ventures – 6 units
This course will aid high tech teams in their financing decisions for startup considerations and entrepreneurial management. The course will review the basics of financials such as the balance sheet, the P&L and a cash flow statement. It will then address the creation of pro forma financials to support financing for new business ventures. This will include the development of business management understanding, the relationship between venture finance and business risk evaluation, and the process of valuing of the opportunity. Teams will create a venture pitch for their startup.

49-852, Agile Marketing for New Ventures – 6 units
This course will cover how to formulate marketing strategies that lead to successful products. It will include how marketing strategies are adapted for high tech innovations and products including addressing strategic market planning, functional expectations and tactical considerations. Topics include: strategic market planning, positioning, types of alliances needed for moving from innovation to product acceptance, breakthrough versus incremental innovation marketing, and measuring marketing effectiveness.

49-853, Product Management – 6 units
The course covers a product managers role in the application of product ideation and positioning, feature design and documentation, product development process, go-to-market, measurement/optimization, and growth. The course begins with a brief overview of the product management role, and then goes step by step into managing the process of building a product. In each class, students are required to discuss the reading materials, participate in the discussion sessions, and dive into in-class practices. The course will explore the Product Managers role and responsibilities across the product life cycle; techniques to understand and validate customer needs and product success; application of the knowledge and skills needed to research, position, design, develop, launch, optimize, and grow products; new product development and delivery methodologies and their impact on product and customer; and the key attributes of a successful Product Manager (PM) through direct dialogue with Silicon Valley PMs.

49-854, Business Models and Strategy – 6 units
This course is about the development of executable strategies for entrepreneurial efforts. In order for entrepreneurs to be successful, the ability to create a business model and roadmap for execution is essential. Strategy is about making decisions and having alternatives for courses of actions. This course will focus on effective approaches and measures in order to make things happen under tight time and financial considerations. The course will explore how to apply the tools of strategy and business models in order to deliver new business creation. Topics include applying an evaluation process for the validity of a business concept, understanding the drivers for a strategic roadmap for new business execution, using a toolkit to shape a strategy with scenarios for choices of action, identifying the key measures of success. Through teams, students will

form specific approaches for selected new business concepts and share them in class discussions.

49-855, Venture Governance, 6 units

The goal of the course is to teach founders of a high-tech startup venture the requirements and process to be a director and how to manage their Board of Directors and Advisory Boards. The boardroom is where the governance of the venture occurs. The course will propose frameworks for understanding the complex dynamics among directors, executives, investors and shareholders. The key elements of the work boards do includes: strategic reviews, selecting, evaluating and compensating CEOs and other senior executives, company re-organizations, new director selection, managing top executive succession and dealing with various corporate crises. The role of the Boards is crucial in the value creation phase of a technology ventures trajectory. Conceptual frameworks will be taught to effectively manage this crucial aspect of a ventures governance in real time. This course will cover the following topics: board participation and voting rights, Board of Directors responsibilities and liabilities, advisory board mentoring duties and shareholding vesting, managing Board of Directors, Directors and Officers Insurance and Compensation of Board Members, Board of Directors role during venture scaling, fundraising, firing hiring CEOs and company officers, board members role during the Merger and Acquisitions transaction and during IPOs, and joining other boards.

49-856, Legal Issues in New Venture Creation, 6 units

A critical part of creating a new venture is to provide the legal structure for both compliance and to prepare the venture for future success. For start-ups the legal profile of the company sets up the framework for growth. The course will cover basic legal requirements of incorporation, and additional options that need to be determined by the founders including equity distribution, board structure, employee stock option vesting, triggers for contingencies such as firing or acquisition and other issues. Another critical legal issue for both startups and established enterprises surrounds protecting intellectual property to immunize the company's strategic advantage as it gains velocity in the global market and encounters competition. Students will learn about various Intellectual Property tools and strategies to protect their product innovations and to understand the competitive marketplace, both in the US and globally.

49-857, Dynamic Global Teams – 6 units
Dynamic teamwork and collaboration is a critical success factor and a major source of competitive advantage and frustration for companies worldwide. Many startups have engineering teams based in low cost parts of the world. Established companies have disturbed teams working in R&D and Engineering in different geographies. Mobile and remote communication technologies have transformed the global business landscape. Super-flexible teams drive and execute entrepreneurship and innovation. This course will focus on profiles of dynamic collaborative teams, what it takes to balance different priorities, create trust and alignment, interact with diverse stakeholders, and perform under time pressures and resource constraints, all under complex, fast-moving and unpredictable global markets. This course will study critical success factors in driving innovation and explore how super-flexibility enables rapid, real time adaptation. The course will describe practical action steps for organizing and managing super-flexible teams, study and apply fundamental findings in cognitive psychology that support adaptability and creativity of teams, introduce methods for training cross-functional teams to excel at innovation, and learn how to use practical tools and techniques that can turn ideas into action.

49-859 - Master of Science in Technology Ventures - Internship/Practical Training – 3 units
This course is for students in the MSTV program who are pursuing an internship. Internship work can be conducted on-site with a company or thru sponsored projects at the Integrated Innovation Institute. At the end of the summer, students will submit a paper reflecting on their internship experience and how it relates to the MSTV curriculum. This course is only offered during the summer.

49-881 - Start Up Creation in Practice – 12 units
For MSTV students with the goal of creating a new start up as they are enrolled in the MSTV degree, they have the option of using up to 24 units of their electives in the practice of creating a new venture (12 units per semester). Similar to an independent study, but focused specifically on new venture creation, students will work on developing their technology-focused idea into a potentially viable company through this course. Students can work individually or through a team with other MSTV students. Each student (team) must have an approved faculty advisor.

49-882 - Special Topics: Emerging Technology: Artificial Intelligence (AI) – 6 units

Artificial Intelligence (AI) is a collection of multiple technologies that enable machines to sense, comprehend and act, and learn, either on their own or to augment human activities. AI has introduced new sources of growth, changing how work is done and reinforcing the role of people to drive growth in business. It is one of the hottest technologies that students may encounter in their future jobs. The course leverages the knowledge, experience, and network of the faculty, provides students with the fundamental knowledge, analytical skills, and strategic thinking needed to assess a job opportunity, analyze an application, and discover the business opportunities in the AI applied sectors.

49-884 – Internet of Things (IoT) Leadership– 6 units

IoT is dramatically enhancing our lives by automating non-value-added activities previously performed by humans; and by significantly improving our work and living environments through the combination of smart hardware and AI applications. All aspects of modern life will eventually be affected by IoT. Given the novel combination of innovation, technologies, processes, and commercialization opportunities for IoT, product managers and engineers can benefit from comprehensive knowledge of what it takes to conceive, develop, and commercialize these solutions. Given IoT's impact on society, it is essential to learn and appreciate what has already been deployed in various industries as examples of what is possible and serve as inspiration and learning.
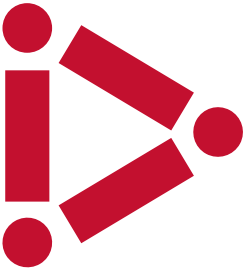
Carnegie Mellon University - Schedule of Classes
https://enr-apps.as.cmu.edu/open/SOC/SOCServlet/search

Student Affairs & Career Services Resources

Student Affairs:
Students on the Silicon Valley campus can meet with the Assistant Dean of Student Affairs, Lauren Schachar, for on-site connection to various student services resources. These resources include questions regarding public transportation, health, personal concerns, student organizations, activities and general campus information. Lauren Schachar's office is

located in B23 Room 217A, and can be reached by phone at 650-335-2844 or email at lauren.schachar@sv.cmu.edu.

Public Transportation:
Students are given a VTA clipper card (Smart Pass) during orientation, which provides them with free access to the local VTA bus system and the local light rail. If students live near a Caltrain station or require Caltrain to get to school or work, they can apply for a Caltrain Go Pass at the Student Affairs office, located in Building 23, Room 215B.

Health/Personal Concerns:
The Assistant Dean of Student Affairs is the point person for any student who is in distress or experiencing a crisis. Student Affairs consults with CMU's Counseling and Psychological Services (CaPS) in Pittsburgh to support students in these circumstances. The director also works closely with CaPS to provide training for SV faculty on identifying and supporting students in distress.

To further promote student access to physical and mental health services, the campus contracted with One Medical to provide students with local, timely access to health care. All students, staff, and faculty are now provided with a membership to One Medical, which provides same day and next day appointments at any of their locations. There are three main locations near the SV campus. The company also provides 24/7 support via their mobile app, including video consultations with a doctor. All full time students are also required to have health insurance. CMU's student health insurance department helps students to enroll, waive (if they have insurance that meets the university requirements) and navigate and use insurance.

Student Organizations and Activities:
Students are encouraged to join student organizations during orientation and welcome week by requesting information (through an online form)

and meeting the student organizations on campus. The online form is provided during the Action lab at new student orientation and can also be found on our website at http://sv.cmu.edu/student-services/student-organizations.html.

Student activities are promoted through a weekly CMU-SV Student Newsletter sent by the Assistant Dean of Student Affairs, Lauren Schachar. Students can find out about opportunities, events and activities through the newsletter, the student events calendar (which they can access once they have their school google accounts set up) and through the digital displays and posters on campus.

Career Services: The Career and Professional Development Services Center (CPDC) serves to provide students with guidance during their job and internship searches. The services available to students include resume reviews, mock interviewing, salary negotiation, career exploration consultation, internship and job consultation, workshops/events and employer relations. The CPDC is also heavily involved in organizing campus-wide job fairs and bringing employers to campus. Handshake is Carnegie Mellon's online recruiting system. Through Handshake, employers can request accounts to post jobs, request interviews and information sessions, and review student resumes. Students and alumni can apply to positions, sign up for interviews and find contact information for thousands of recruiters. Handshake can be accessed through the CPDC website.

Students in Silicon Valley can meet with Associate Director of Career Services Leigh Mason. Appointments can be made through Handshake. Career Consultants hold open office hours, which are communicated at the beginning of each semester.

Job Search Guidelines:

Departments strives to play a supportive role in the career pursuits of students, but maintains academics as a priority. It is not acceptable for students to skip classes or assignments in order to attend job interviews. Students should conduct job searched in a manner that does not impede the academic progress through their graduate program. It is also important for students to have an understanding of how to conduct a job search. When applying for jobs, students are expected to exhibit certain ethical behavior, such as arriving on time for interviews, being truthful about their qualifications, and to honor their agreements with recruiters. Further, students should not continue looking and interviewing for a position after they have accepted an offer. The CPDC reserves the right to limit access for any users that do not follow their ethical job/internship search policy. Students who do not follow such guidelines may forfeit their on campus interviewing and/or resume submission privileges.

Student Grievances:
Grievances can be brought directly to the Assistant Dean of Student Affairs or the Director of Student Affairs. For students who wish to submit a concern online, they can do so at the online Student Suggestions Box at http://goo.gl/forms/BySlZMoB6txYDKz02.

Integrated Innovation Institute - Graduate Student Handbook
Please review the link below for more information on degree requirements, student services, career services/placement resource and student achievements for graduation.
- https://www.cmu.edu/iii/current-students/cmuiii_graduate_student_handbook_current.pdf

FACULTY

2023-2022 Integrated Innovation Institute Faculty Members

Anglin, Deana
Adjunct Professor

- Doctor of Philosophy (PhD) in Human-Centered Computing
    Georgia Institute of Technology
- Master of Science in Human-Computer Interaction (IT)
    Rochester Institute of Technology
- Bachelor's in Computer Science, Math & Spanish
    Lawrence University

Bio

Dr. Deana Anglin is a Senior User Experience Researcher at Google with over 10 years of experience doing user-centered design research. As a designer of global products and services, Deana is most often found in-field learning about people across Asia, Africa, Europe and North America. Her work informs product strategy and innovation in new markets, most notably Google's food and home services delivery platform launched in India last year. She is also a UX mentor to emerging-market startups in Google's Launchpad accelerator program.

Deana received a PhD in Computing from Georgia Tech where she focused on design at the margins - designing with and for the refugee and immigrant community. Her research landed her several prestigious fellowships and awards from companies like Intel and Google. Her work is published at top venues such as CHI, Ubicomp and IFIP.

Areas of Expertise

Technology Design for International and/or Emerging Markets, Service Design, Social computing, Mobile computing, Information and Communications for Development (ICTD)

Bodily, Brandon
Adjunct Professor

- Master of Science in Aerospace Engineering
    Purdue University
- Bachelor of Science in Mechanical Engineering

Utah State University

https://www.linkedin.com/in/brandonbodily/

Bio
Brandon has spent 20+ years developing and implementing new materials and manufacturing processes for the aerospace industry. His experience includes internal research and design studies, manufacturing methods, and external customer-facing roles in the aerospace industry. Brandon has leveraged this unique experience to successfully develop solutions that satisfy the customer's design, engineering, and business needs, resulting in solutions that literally fly.

He currently works at the Arconic Technology Center, the world's premier light metals research center. The focus is on the development of aluminum alloys and manufacturing processes for large commercial aircraft. He leads a team of metallurgists, engineers, and technicians in identifying customer and technology needs and enabling the next generation of innovative materials and manufacturing processes.

When he isn't developing new products or thinking about airplanes, he is a dad and runner who likes to climb mountains.

Areas of Expertise
Aerospace Engineering, Manufacturing Methods, Aircraft Design

Dai, Xueying (Lake)
Adjunct Professor

- Master of Business Administration (MBA)
    University of Southern California, Marshall School of Business
- Bachelor of Science in Economics

Beijing International Studies University

https://www.linkedin.com/in/lakedai/

Bio
Lake Dai is an entrepreneur, venture capitalist, and a partner at the venture capital firm, LDV Partners. Here at Carnegie Mellon, she is an adjunct faculty at our Silicon Valley campus, teaching students of our Software Management and Technology Ventures programs.

For 20 years, Lake has led product and engineering teams globally at Alibaba, Apple, Yahoo!, and Overture. She is a recognized expert in Search Engine, Ad Platform, Marketplace, Analytics, and Mobile Platforms and Applications, holding several U.S. patents in search algorithm, search tokenization, mobile data analytics, and mobile monetization.

In China, Lake was employee #84 at Alibaba, launching the first generation of profitable marketplace and travel products. At Yahoo! China, her team launched the first generation of web and vertical search products, tripling Yahoo!'s market share within one quarter.

In the U.S., as a co-founder Shinect, a non-profit acceleration program designed to connect Silicon Valley's entrepreneurs to China's market, she has been helping companies build successful products and profitable businesses. She also mentors start-ups at various incubators including 500 Startups, Muckerlab, Lab360 and Shinect.

Lake is on the Advisory Board of Women In Technology International (WITI), the premiere global organization empowering women in business and technology. She is also a Board Governor and Chairwoman of the US Chapter of QianChengHui, a non-profit organization which fosters entrepreneurship for Alibaba alumni worldwide.

Dandavate, Uday

Adjunct Professor

- Master of Science in User Research
     The Ohio State University
- Master's Professional Certificate in Industrial Design
     National Institute of Design, Ahmedabad, India

https://www.linkedin.com/in/udaydandavate/

Bio

A design activist, poet, and ethnographer of social imagination, Uday Dandavate is also CEO of SonicRim Ltd., a San Francisco-based design research company specializing in co-creation. He has consulted for Fortune 100 companies such as Microsoft, Motorola, Google, AT&T, Whirlpool, Intel, Ford, Genentech, HP, Dell, Lenovo, BBCi, Honda, Samsung, and P&G translate leading-edge technologies into culturally, behaviorally, and socially relevant and meaningful experiences.
Uday has traveled extensively around the world, studying and connecting with all kinds of people and cultures, and watching and participating as they change over time.

In his professional capacity, as well as through blogging, teaching, speaking, and facilitating, Uday provokes fresh perspectives that help to humanize technologies and democratize design. Uday recently published an evocative collection of poems, "a window for a home without walls," that help communicate values and sensitivities about life, imagination and design to the readers around the world. Uday is currently involved in projects involved in application of machine learning and autonomous technologies to the future of mobility. He is also involved in helping develop innovative services for the healthcare industry.

Evans, John Stuart
Distinguished Service Professor

- Doctor of Philosophy (PhD) in Technology Policy
      Aston University
- Master of Science in Operations Research
      Aston University
- Visiting Scholar at the Graduate School of Business
      Stanford University

https://www.linkedin.com/in/stuart-evans-58857125

Bio

Dr. Stuart Evans is a board member, educator, author, and expert on dynamic high-tech ventures. As a Distinguished Service Professor, he shares his expertise by teaching related coursework for our degree programs in Silicon Valley, M.S. in Software Management and M.S. Technology Ventures. Additionally, Stuart is the Director of the CMU-Emirates iLab, a partnership between III and Emirates Airlines for innovative education and research specialized for the airline industry.

Stuart's professional career spans across many areas of entrepreneurship, featuring extensive experience within the tech ecosystem of Silicon Valley. He has conducted research for SRI International and Stanford Graduate School of Business; consulted with Bain and Company; worked in investing for Sand Hill Venture Group; and served as executive management for
Shugart Corporation, a Xerox subsidiary. Prior to his time in Silicon Valley, he taught at The Cambridge University's Judge Business School.

In addition to his experience in academia and industry, Stuart has published widely on high-tech ventures. His latest book, Super-Flexibility for Knowledge Enterprises, puts forward a practical toolkit for dynamic adaptation in high-tech ecosystems. The book is based on 28+ years of collective field research and practical experience in Silicon Valley of both

Stuart and his co-author Homa Bahrami, a professor of the University of California at Berkeley's Haas School of Business.

Areas of Expertise
High-Tech Entrepreneurship & Innovation, Dynamic Start-up Strategies, Venture Financing

Fang, Fang (Catherine)
Instructor of Integrated Innovation

- Doctor of Philosophy (PhD) in Computer Engineering
         Northwestern Polytechnic University
- Master of Science in Software Management
         Carnegie Mellon University
- Bachelor of Science in Information Management
         Peking University

https://www.linkedin.com/in/catherine-fang-008849/

Bio
Catherine Fang is an entrepreneurial product leader who is passionate about building intelligent software products powering both social networking at large-scale and enterprise platforms. She has 18 years of product management, go-to-market strategy, and software development/architect experience managing products with globally distributed resources (U.S., UK, Hungary, India, China, Japan, Brazil, etc). Catherine specializes in areas including: machine learning-based social network content recommendations, global digital audience targeting strategy for content marketing and advertising, and audience look-alike modeling.

In addition to her role at the Integrated Innovation Institute, Catherine works as a Senior Product Manager for LinkedIn and is the co-founder

and CEO of ECAdvisor, an educational platform for software product strategy consulting and personalized recommendations. Previously, she has worked in software and product roles at companies including Yahoo, BlueKai (acquired by Oracle), Sun Microsystem, and Stratify.

Areas of Expertise
Product Management, Go-to-Market Strategy, Software Development/Architecture

Kirmayer, Matt
Adjunct Professor

- Juris Doctor
  - Rutgers University School of Law
- Master of Laws
  - New York University School of Law
- Bachelor of Arts
  - State University of New York at Albany

https://www.linkedin.com/in/mkirmayer/

Bio
Matt Kirmayer represents emerging technology companies and the investors who fund them across a range of industries, including software, educational technology, digital media, social media, artificial intelligence systems and life sciences. Active in the technology and investment communities in Silicon Valley and the East Coast, Matt often works with emerging companies as their outside general counsel, managing legal, financial and operational issues, from formation and angel and capital investment through to exit, that arise when entrepreneurs enter the marketplace.

Matt has more than 25 years of experience in the emerging company and venture capital ecosystem, including numerous seed and venture

financings for technology and life science companies. Matt also has a background in guiding clients in securities offerings and mergers and acquisitions.

As part of his commitment to gender equality, Matt sits on the advisory board of Astia, which is a nonprofit organization that invests in companies with women in positions of equity and influence. Matt is a mentor at the Lester Center for Entrepreneurship at the Haas School of Business at the University of California Berkeley and a Sky Advisor to SkyDeck, the unique accelerator at UC Berkeley.

Areas of Expertise
Corporate Law, Venture Capital

Ott, Adrian
Adjunct Professor

- Master of Business Administrative (MBA), Harvard Business School
    Carnegie Mellon University
- Bachelor of Science
    University of California, Berkeley

Bio
Adrian Ott is an award-winning entrepreneur, author, and former senior-level tech executive with a proven track record for visionary business strategies that result in exponential revenue. She has led billion-dollar high technology organizations and assisted innovative ventures to identify and commercialize new product opportunity. *Consulting Magazine* called her "One of Silicon Valley's most respected strategists." As CEO and founder of a technology services business in 2001, Harvard Business School and NAWBO recognized her as one of the most inspiring leaders in Silicon Valley.

In addition to teaching technology venture classes at Carnegie Mellon Silicon Valley, she serves on the National Faculty for the NSF Innovation Corps (National Science Foundation I-Corps). As a National Adjunct, she assists cohorts of promising technology entrepreneurs to commercialize innovations they have developed at top U.S. universities. She has also served in fiduciary and advisory board roles at private for-profit corporations.

Adrian is the award-winning author of two business books that won Best Business Book of the year accolades. She has contributed thought-leading articles to Fast Company, Harvard Business Review and has been featured in national business television, radio, and publications such as Forbes on the latest trends.

Prior to founding her own company, she was an HP executive for 15 years serving in functions such as product management, new ventures, strategic alliances, marketing, and software development. She was recognized in an annual report for "infusing HP with new revenue streams, new technologies, and new business models."

Areas of Expertise
Commercializing Technology, Go-To-Market Strategy and Business Models, Venture Management/Governance, Strategic Alliances

Mercier, Gladys
Program Director, M.S. Software Management

- Master of Business Administration (MBA)
        Carnegie Mellon University
- Master of Software Engineering
        Carnegie Mellon University
- Bachelor of Science in Computer Science
        University of Pittsburgh

Bio
Gladys M. Mercier has 12 years of software engineering experience with a focus on industrial automation systems for steel manufacturing. She has been a certified professional project manager (PMP) since 2002 and has served in a variety of roles throughout her career, including analyst, developer, designer, architect, tester, trainer, and team lead. Gladys joined Carnegie Mellon in Silicon Valley in 2003 and has played an instrumental role in the growth and success of the M.S. in Software Management (MSSM) program.

In addition to her role as MSSM's Program Director, Gladys teaches related coursework as a faculty member and is the academic advisor for both the MSSM program as well as the Information Networking Institute's MSIT-SM program.
Gladys grew up in Sacramento, California and attended college in Boston and Pittsburgh, PA. After earning her undergraduate at the University of Pittsburgh, Gladys launched her software career in the city's steel manufacturing industry. Her work allowed her to travel extensively, installing systems in many cities in the U.S. and Brazil.

Gladys has been a part of the Carnegie Mellon community for nearly 20 years. After earning her master's degree at CMU, Gladys developed and taught a project management course for Heinz College. When she moved back to California, she continued her CMU career by joining the Silicon Valley campus.

Gladys spends her free time both outside and on the ice. She studies landscape architecture, urban design, and California native plants. Her favorite pastime is playing ice hockey, traveling across the U.S. as part of winning teams and leagues. After living in Pittsburgh for 16 years (and

during the Mario Lemieux era), Gladys continues to be a devoted Pittsburgh Penguins fan, despite the cheers of her San Jose Sharks-loving neighbors.

Areas of Expertise
Project Management, Software Engineering, Teamwork, Interpersonal Skills

Miller, David
Adjunct Professor

- Master of Science in Information Technology
  Carnegie Mellon University
- Bachelor of Science in Accounting
  Syracuse University

Bio
David Miller is an entrepreneur, a product team leader, an advisor and educator. David works with F500 companies as well as VC backed start ups to help find the elusive product market fit and build and manage teams of product managers, designers and developers.

Throughout his career, David has worked with companies big and small to bring game changing products to life. David has consulted or worked for companies including Comcast, Oracle, Nextel, Sprint, Prudential, GMAC Commercial Mortgage, SEI Investments, and Cushman & Wakefield. He personally founded three companies in the ad-tech, payment processing, and ride sharing industries.

Currently, with AgileEngine, an award-winning product development firm, David helps companies accelerate and hone their product development. By building hi performing on-shore/off-shore teams, David helps companies move faster and more efficiently to launch and maintain

products, reduce backlogs, build integrations, scale and gain market share.

David's focus areas include product management leadership, mentorship, organizational design and conversations that focus on how to unlock creative potential. Also, how organizations create hi performing teams through an inclusive environment that values and honors respect for differences, humility, difficult dialog, managed conflict, hard decision making, resilience, empathy and risk-taking to meet the grand challenges of tomorrow.

Areas of Expertise
Entrepreneurship, Product Development, Product Management, Hi Performing Teams, Corporate Innovation

Mohan, Shantha
Executive in Residence, iLab

- Doctor of Philosophy (PhD) in Operations Management
        Tepper Business School (GSIA), Carnegie Mellon University
- Bachelor of Engineering in Electronics and Communication Engineering
        College of Engineering, Guindy (CEG), Chennai, India

https://www.linkedin.com/in/shanthamohan/

Bio
In her current role as Executive In Residence at the Integrated Innovation Institute, Shantha co-delivers courses, contributes to curriculum design, and mentors students in their projects and practicums.

Shantha is a senior software engineering leader and entrepreneur, with proven track record of growing and mentoring technical teams and generating ROI for customers across the globe. Retail Solutions Inc., the company she co-founded, is a leader in Retail Analytics in the Consumer Packaged Goods domain. She ran product development for the company and was responsible for scaling the product development team across the world and deliver multiple analytic applications. Prior to Retail Solutions, she has over 20 years of experience focusing on mission-critical systems to support semiconductor and other high value added manufacturing. At Consilium, now part of Applied Materials, she managed development of three generations of Manufacturing Execution Systems. Such software systems are mission critical, highly scalable, and highly available systems, and companies such as Intel and Infineon depend upon them for their manufacturing.

Outside CMU, she mentors startups and provides career advice in Product Management and software development careers. Her book "Roots and Wings – Inspiring stories of Indian Engineering Women" is forthcoming.

Areas of Expertise
Software Enterprises, Entrepreneurship, Product Management, Global software development

Root, Sheryl
Program Director, M.S. Technology Ventures

- Master of Business Administration
    Stanford University
- Undergraduate Degree
    University of California

https://www.linkedin.com/in/sheryl-root-703b792/

55

Bio

Based at CMU Silicon Valley, Sheryl Root is Program Director of III's M.S. in Technology Ventures program and an Associate Professor of the Practice for the M.S. in Software Management program. In her role as director and faculty, Sheryl both develops curriculum and teaches courses that merge technology with entrepreneurship.

Outside of CMU, Sheryl is the owner of RootAnalysis, a consulting firm specializing in corporate strategy and marketing. For more than 13 years, Sheryl's firm has worked with C-level Silicon Valley executives at high-tech companies, such as HP-Compaq, Oracle/PeopleSoft, Hyperion, Philips, Novell, and many startup organizations.

Prior to joining academia, Sheryl had an extensive career in the software industry, including a 20-year tenure working for Hewlett-Packard (HP). While at HP, she excelled in a number roles, including Director of Business Strategy, Director of Marketing Operations for Services, Director of the Software Initiative, and Manager of Unix environments. Specializing in the area of software, she led internal teams of consultants for HP operations across the globe, advancing the company's process practices in software engineering and business management.

Sheryl is a leader, board member, and advocate for many world–renowned institutes and organizations. She is Chairman of the Advisory Board for Women in Technology International (WITI), a member of the Board of Advisors for the Stanford Business School Sloan Program, and board member of Netswitch Technology Management. She has coached numerous startups to achieve success in high-tech industries. Additionally, she is a frequent speaker in high-tech subject areas such as agile marketing, strategy, women in STEM, career planning, leadership, new business models, and organizational structures.

Outside of work, Sheryl is an connoisseur of wines and previously owned her own vineyard. In a previous life, she used to race cars.

Areas of Expertise
Business Models & Strategy, Leadership, Agile Marketing, Product Management, Team Dynamics

Shaikh, Karimulla
Instructor of Integrated Innovation

- Doctor of Philosophy (PhD) ABD, Computer-Aided Engineering & Management
      Carnegie Mellon University
- Master of Science in Computer-Aided Engineering
      Indian Institute of Technology, Madras
- Bachelor of Technology
      Indian Institute of Technology, Madras

https://www.linkedin.com/in/karimullashaikh

Bio
Karim has built his career over the last 20 years as a seasoned product development executive at both startups and publicly-traded companies. He currently leads product development at Virtual Power Systems, a startup focused on intelligent software-defined power for data centers. Prior to that, he was Senior Vice President of Product Development at SDL Language Technologies, a global leader in delivering machine translation and translation management systems to Fortune 100 companies. His experience leading product management and software engineering spans a wide range of domains.

While he enjoys getting into the technical guts of scalable and reliable cloud products for enterprises and professionals, Karim is also

passionate about building high-performance teams by simplifying people and process interactions.

Areas of Expertise
Cloud Software, Enterprise Product Development, Machine Learning, Solving Large Scale Problems

Steier, David
Distinguished Service Professor, Heinz College

- Doctor of Philosophy (PhD), Computer Science
    Carnegie Mellon University
- Bachelor of Science in Computer Science
    Perdue University

https://www.linkedin.com/in/davidsteier/

Bio
David Steier joined the CMU faculty as an Adjunct Professor at the Integrated Innovation Institute in 2018. He is also a Distinguished Service Professor in the Heinz College School of Information Systems and Management, where he teaches courses on data science for product management, managing analytics projects, designing smart systems and artificial intelligence.

Prior to joining CMU, David was Managing Director in Deloitte Consulting's Data Science practice. At Deloitte, David helped clients use advanced data analytics and visualization in a variety of industries including health care, banking, retail, manufacturing, telecommunications, media and the public sector. Prior to Deloitte, David was Director in the Center for Advanced Research at PwC, Senior Director of Technology and Business Development at Kanisa, and Managing Director at Scient. Beyond the general topics of data science and artificial

intelligence, David's research interests are in data-driven approaches to behavioral change, particularly in health and wellness.

In addition to his CMU affiliation, David is also a Lecturer at the University of California Berkeley's School of Information, where he co-instructs the data science capstone class in the Masters in Information and Data Science program.

Areas of Expertise

Analytics, Big Data, data visualization, data mining, health care informatics, fraud detection, anomaly detection, machine learning, human-computer interaction, artificial intelligence

Taborga, Jorge
Adjunct Professor

- Doctor of Philosophy (PhD) in Organizational Systems
  Saybrook University
- Master of Science in Computer Science
  Texas A&M University
- Bachelor of Science in Computer Science
  Texas A&M University

Bio

Jorge Taborga is an accomplished leader in organizational transformation and growth in high tech, healthcare, and cloud services. Across his career, he has led company-wide strategies; developed numerous hardware and software products, and cloud services; re-engineered company-wide business processes; implemented enterprise-wide IT systems; integrated a large number of company acquisitions; and built and mentored many engineering and IT organizations.

Jorge was recently an Executive Vice President at Omnicell, Inc., where he was responsible for product development of this medical devices company. Prior to this assignment, he was this company's Vice President of Manufacturing, Quality, and Information Technology. Before Omnicell, Jorge delivered management consulting services to large enterprises and startups in the areas of strategic planning, go-to-market strategies, business case development, organizational development, supply chain optimization, and large system implementations. He was the Senior Vice President of Technology Operations at Terraspring and fusionOne, both cloud service startups delivering innovations in cloud storage and infrastructure as a service. Jorge also was Vice President and CIO at Bay Networks. Before that, he was Director of Enabling Technologies for Quantum Corporation, leading the business and systems transformation of that company. Earlier in his career, Jorge held a number of product development and leadership positions with ROLM and IBM

In addition to his role at the Integrated Innovation Institute, Jorge is consulting with high growth companies on team and organizational adaptability. He is also lecturing Organization Development topics in the US and China.

Areas of Expertise
Hardware and software product development, organizational and team adaptability, organizational behavior, change and transformation, and M&A post-merger integration

Thomas, Ravi
Associate Professor of the Practice

- Doctor of Philosophy (PhD) in Economics
        University of California, Berkeley
- Bachelor of Science in Mathematical Economics & Econometrics
        The London School of Economics & Political Science

https://www.linkedin.com/in/ravi-thomas-8b14a65

Bio
Based at Carnegie Mellon's Silicon Valley campus, Ravi specializes in teaching entrepreneurial and new venture coursework for our M.S. in Software Management and M.S. in Technology Ventures programs. He also mentors CMU-based startups as the director of VentureBridge program, a program open to CMU students and alumni seeking to launch their own high-tech businesses.

Ravi has held senior-level executive positions at several startups. He co-founded Jareva Technologies and served as CFO and a board member. During his time with Jareva, Ravi engaged in all aspects of the company from its founding as a service business, to its repositioning as a software product company, to its revenue stage and successful exit through an acquisition by Veritas. Prior to founding Jareva, he was the CFO of PostX, a company in the secure messaging arena. As CFO, he was involved in raising over $30 million for PostX and Jareva through venture capitalist firms including Mayfield, Hummer Winblad, and Labrador. Additionally, Ravi is a Consulting Chief Financial Officer for several startups. Previously, he was CFO of University Associates, LLC (UA LLC). UA LLC was formed by the Regents of the University of California and the FHDA Community Colleges holds the master lease on 77 acres of NASA Research Park at Moffett Field.

Prior to joining his first startup, Ravi was an Assistant Professor at the Fox School of Business at Temple University, where he taught graduate and undergraduate courses in microeconomics, economics of information, and public finance. He has also taught at Swarthmore College and was a Visiting Fellow at the International Monetary Fund.
Areas of Expertise
Entrepreneurship, New Venture Strategy

Wasserman, Anthony
Professor of the Practice, Software Management

- Doctor of Philosophy (PhD) in Computer Sciences
        University of Wisconsin, Madison
- Bachelor of Arts in Mathematics and Physics
        University of California, Berkeley

https://www.linkedin.com/in/tonywasserman

Bio
Anthony I. (Tony) Wasserman has been a Professor in the Software Management program at Carnegie Mellon University's Silicon Valley campus since 2005. At CMU-SV, he created the Center for Open Source Investigation, a center that serves as a focus for his research.

Previously, Tony was the founder and CEO of Interactive Development Environments (IDE), a company that was one of the first 100 dot-coms and created the innovative multiuser platform for Software through Pictures (StP). He later served as VP of Engineering for a dot-com startup and as VP for Bluestone Software, a developer of a Java EE application server. His work at Bluestone included creating mobile web applications in 2000, as the very first smartphones were entering the marketplace. Early in his career, Tony was Professor of Medical Information Science at the University of California - San Francisco, leaving to start IDE.

Tony is a Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE) and a Fellow of the ACM, honored for his contributions to integrated software engineering environments. From 2010 to 2016, He served on the Board of Directors of the Open Source Initiative (OSI) and since 2015 has been the chair of IFIP Working Group 2.13 (Open Source Systems), a group belonging to the International Federation of

Information Processing's Technical Committee on Programming. He is an advisor to several startups, has served as a judge at numerous startup competitions, and is a frequent speaker at both research and practitioner-oriented conferences around the world.

Tony has served as a Visiting Professor at the Vrije Universiteit (Amsterdam), the Université de Genève, and the National University of Singapore. He has visited more than 70 countries. Tony enjoys photography and posts many of his photos on Flickr.

Areas of Expertise
Software Engineering, Open Source Software, Software Development Methods & Tools, Entrepreneurship, Product Marketing & Management

Additional Information about Integrated Innovation faculty and staff can be found here: https://www.cmu.edu/iii/innovators/index.html

ADMISSIONS INFORMATION
Information about Integrated Innovation Institute's Admissions requirements can be found here: https://www.cmu.edu/iii/degrees/admissions/index.html

Transfer Credits & Articulation Agreements
The Integrated Innovation Institute does not accept transfer credits from other institutions for any of its graduate degree programs. Additionally, the Integrated Innovation Institute does not have any transfer or articulation agreements.

Prior Experiential Learning Credit Policy
The Integrated Innovation Institute does not award credit for prior experiential learning experiences before starting a degree program.

International Student Resources

Carnegie Mellon's Office of International Education (OIE) advises international students and scholars regarding immigration/visa and acculturation issues, issues visa documents with which international students and scholars may apply for US visas. Visa documents are issued, per federal regulations, upon request from students who are admitted to full-time programs and who have sufficient, demonstrated financial resources. OIE complies with federal reporting requirements with respect to students/scholars on CMU visa documents and educates students with respect to their own responsibilities for maintaining legal status in the US.

All F and J students/scholars are required to attend a mandatory Orientation and Immigration Check-In upon arrival to their CMU campus or location. The OIE orientation provides legally-required information regarding maintaining status. For those students who participate in Optional Practical Training (OPT) or Curricular Practical Training (CPT), mandatory information/application sessions are provided. These sessions are presented remotely, as needed, by a Carnegie Mellon OIE Designated School Official (DSO). Individual students who have immigration questions or concerns meet with designated OIE advisor during individual, scheduled advising appointments.

For more information, students may view the website or call OIE:
https://www.cmu.edu/oie/foreign-students/index.html
By phone: 1(412) 268-5231

English Language Proficiency Information

Admission to Carnegie Mellon University graduate programs requires demonstration of completed, relevant undergraduate degree programs, as demonstrated by an original transcript from the degree-granting institution during the admission process. Domestic students who

graduate from an accredited college or university in the US have demonstrated their English language facility and skill by their success and graduation from competitive undergraduate US institutions.

TOEFL or IELTS Requirements
Applicants whose native language (mother tongue) is not English must provide TOEFL, IELTS, or DuoLingo scores. The Integrated Innovation Institute requires a minimum score of 95 for IBT (with no sub-score below a 23), a minimum score of 6.5 for IELTS, and a minimum score of 105 for DuoLingo
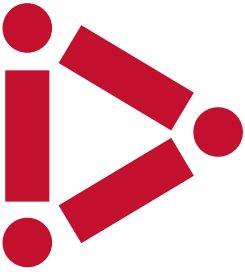
Language of Course Instruction
All instruction occurs in English.

NOTICE CONCERNING TRANSFERABILITY OF CREDITS AND CREDENTIALS EARNED AT OUR INSTITUTION

The transferability of units you earn at Carnegie Mellon University is at the complete discretion of the institution to which you may seek to transfer. Acceptance of the degree you earn in the Program is also at the complete discretion of the institution to which you may seek to transfer. If the units or degree that you earn at this institution are not accepted at the institution to which you seek to transfer, you may be required to repeat some or all of your coursework at that institution. For this reason, you should make certain that your attendance at this institution will meet your educational goals. This may include contacting an institution to which you may seek to transfer after attending Carnegie Mellon University to determine if your credits, or degree will transfer. The Integrated Innovation Institute does not accept transfer credits from other institutions for any of its graduate degree programs.

STUDENT'S RIGHT TO CANCEL (WITHDRAWAL/LEAVES OF ABSENCE)

A student has the right to cancel the student's Enrollment Agreement by either taking a leave of absence from the Program (leaving Carnegie Mellon University temporarily with the firm and stated intention of returning) or by withdrawing from the Program (leaving Carnegie Mellon University with no intention of returning). If the student withdraws or take a leave of absence from Carnegie Mellon University, the student may be eligible for a tuition adjustment or a refund of certain fees (excluding any Application Fee, Registration Fee and Enrollment Deposit).

To cancel the student's Enrollment Agreement and take a leave of absence or withdraw, the student must complete Carnegie Mellon University's Leave of Absence or Withdrawal form, as applicable, and return it to Carnegie Mellon University's Registrar's Office, at 5000 Forbes Ave., Warner Hall A12, Pittsburgh, PA 15213. The Leave of Absence and Withdrawal forms, and additional information about leaves of absence and withdrawal, can be found on Carnegie Mellon University's website at https://www.cmu.edu/hub/registrar/leaves-and-withdrawals/.

If the student notifies Carnegie Mellon University of the student's intent to withdraw or take a leave of absence, the student's official date of withdrawal or leave of absence is the earliest of:
- The date the student began the student's withdrawal or leave of absence process at Carnegie Mellon University;
- The date the student notified the student's home department at Carnegie Mellon University;
- The date the student notified the associate dean of the student's College at Carnegie Mellon University; or
- The date the student notified the Carnegie Mellon University Dean of Student Affairs.

If the student does not notify Carnegie Mellon University of the student's intent to withdraw or take a leave of absence, the student's official date of withdrawal or leave of absence is:

- The midpoint of the relevant semester in which the student withdraws or takes a leave of absence;
- The last date the student attended an academically-related activity such as an exam, tutorial or study group, or the last day the student turned in a class assignment.

REFUND POLICY

A. Refunds in General. Students who withdraw from the Program or take a leave of absence after having paid the current semester's tuition and fees or receiving financial aid are subject to the following refund and repayment policies. No other charges are refundable.

B. Exit Counseling. All borrowers of Federal student loans must complete a Federally mandated exit counseling session when graduating or dropping to less than half-time enrollment status, including by withdrawing or taking a leave of absence. Exit counseling prepares students for repayment. Students must complete an exit counseling session in its entirety, with complete and correct information; otherwise, the student's degree, diploma and official transcripts may be withheld. Information about exit counseling sessions can be found on Carnegie Mellon University's website at https://www.cmu.edu/sfs/financial-aid/exit-counseling.html.

C. Withdrawals/Leaves On or Before 10th Class Day (during the Cancellation Period). Students who withdraw or take a leave of absence on or before the 10th class day of the relevant semester will receive a refund of 100% of tuition and fees (excluding any Application Fee or Registration Fee and Enrollment Deposit).

D. Withdrawals/Leaves after 10th Class Day (after the Cancellation Period). Students who withdraw or take a leave of absence after the 10th class day of the relevant semester but before completing 60% of the semester will be assessed tuition based on the number of days completed within the semester. This includes calendar days, class and non-class days, from the first day of classes to the last day of final exams. Breaks which last five days or longer, including the preceding and subsequent weekends, are not counted. Thanksgiving and Spring Break are not counted. STRF will be adjusted accordingly with any adjustment of tuition. There is no tuition adjustment after 60% of the semester is completed. There is no refund of University fees after the 10th class day of the relevant semester.

E. Tuition Adjustment Appeals. Students may appeal to have tuition adjustments for their leave of absence or withdrawal if they feel that they have extenuating circumstances. These appeals will be reviewed in the context of Carnegie Mellon University's tuition adjustment policy, as stated above. These appeals must be made in writing to Carnegie Mellon University's Registrar using Carnegie Mellon University's Tuition Appeal Adjustment form. Information about Carnegie Mellon University's tuition adjustment policy and tuition adjustment appeals can be found on Carnegie Mellon University's website at https://www.cmu.edu/sfs/tuition/adjustment.

F. Repayment to Lenders/Third Parties. If any portion of refundable tuition and/or fees was paid from the proceeds of a loan or third party, the refund may be sent to the lender, third party or, if appropriate, to the Federal or state agency that guaranteed or reinsured the loan, as required by law

and/or Carnegie Mellon University policy. Any amount of the refund in excess of the unpaid balance of the loan shall be first used to repay any student financial aid programs from which the student received benefits, in proportion to the amount of the benefits received, and any remaining amount shall be paid to the student.

G. Responsibility for Loan. If the student obtains a loan to pay for an educational program, the student will have the responsibility to repay the full amount of the loan plus interest, less the amount of any refund. If the student has received Federal student financial aid funds, the student is entitled to a refund of moneys not paid from Federal student financial aid program funds. If the student is eligible for a loan guaranteed by the Federal or state government and the student defaults on the loan, both of the following may occur: 1) The Federal or state government or a loan guarantee agency may take action against the student, including applying any income tax refund to which the person is entitled to reduce the balance owed on the loan. 2) The student may not be eligible for any other Federal student financial aid at another institution or other government assistance until the loan is repaid.

PROBATION & DISMISSAL POLICIES
University Policy: http://www.cmu.edu/policies/student-and-student-life/suspension-required-withdrawal-policy.html

Policy Statement
University Suspension is a forced, temporary leave from the university. There are three types of suspension for students that apply to both graduate and undergraduate students:

Academic Suspension is the result of poor academic performance or violation of academic regulations and is imposed by the student's college or academic department (see university and college academic policies). *Disciplinary Suspension* is the result of serious personal misconduct and is imposed by the Office of Student Affairs (see The Word/Student Handbook).

Administrative Suspension is the result of failure to meet university financial obligations or failure to comply with federal, state or local health regulations and is imposed by Enrollment Services. (See Student Accounts Receivable Collection Policy and Procedures for financial obligations. Contact Student Health Services for information about health regulations.)

Suspended students may not:
- register for courses
- attend classes
- live in student or fraternity/sorority housing
- use campus facilities, including athletic facilities, library and computer clusters
- participate in student activities
- be members of student organizations
- have student jobs
  (Note: students on academic suspension may have a summer campus job if they accepted the job before they were suspended.)

Employment
Although suspended students may not hold student jobs, students on academic suspension may, under certain circumstances, have a non-student job with the university; students on disciplinary or administrative suspension may not.

To have a non-student job, students on academic suspension must receive approval from their associate dean (undergraduate students) or department head (graduate students) to ensure that the job will not violate their suspension terms. Students in violation of this will lose their degree student status, meaning they would have to reapply for admission to Carnegie Mellon through either Undergraduate Admission or the appropriate graduate department.

Transfer Credit
Suspended students may take courses elsewhere; however, they may receive transfer credit only if their college's and department's policies allow this.

Appeals
To appeal any action of this policy, the student may write to the following people:

Academic Suspension - associate dean (undergraduate students) or department head (graduate students);

Disciplinary Suspension - dean of student affairs;

Administrative Suspension - vice president for enrollment, vice president for business and planning, and the dean of student affairs, in consultation with the student's associate dean.

Returning from Suspension
In order to return from a suspension, a student must have the following approval:

Academic Suspension - associate dean (undergraduate students) or department head (graduate students);

Disciplinary Suspension - dean of student affairs;

Administrative Suspension - vice president for campus affairs or his designate.

ATTENDANCE & RESIDENCY POLICIES
Class Attendance
Students are expected to attend all classes outlined in a course syllabus as part of their Integrated Innovation Institute degree. All absences must be approved and arranged with the course professor on an individual basis. Please note that the Integrated Innovation Institute does not support excessive course absences for job interviewing and networking events. Excessive course absences may influence a student's ability to pass a course and/or complete their degree.

LEAVE OF ABSENCE
University Policy: https://www.cmu.edu/policies/student-and-student-life/student-leave.html

Policy Statement
Students must sometimes interrupt their studies for a variety of reasons (financial, academic or personal). Students choosing to take a leave of absence must first contact their department advisor to discuss their plans while on leave to work out any conditions that may be necessary for a smooth return to Carnegie Mellon.

A student may leave Carnegie Mellon by either withdrawing from the university (this means leaving the university with no intention of returning) or by taking a leave of absence (this means leaving the university temporarily, with the firm and stated intention of returning).

A Leave of Absence Form must be completed by all students requesting a leave of absence. A Withdrawal Form must be completed by all students who are withdrawing. Notifying instructors or no longer attending classes does not complete the process. Forms are available on The HUB website. Not completing the leave form results in tuition being charged to midpoint of the semester or the last date the student attended an academically-related activity such as an exam, tutorial or study group, or the last day a student turned in a class assignment.

Students are required to fill out all information on the form, including all comment sections relating to reasons for their leave of absence. After completion of the form, students must take it to their home department and dean's office for appropriate signatures. The process of taking a leave will not be complete until all necessary signatures are on the leave form. Under certain circumstances, students may also need the Dean of Student Affairs to sign off on the leave form. International students who are here on a F1 or J1 visa must consult the Office of International Education for information on possible visa implications prior to going on leave.

Students on leave are not permitted to live in university housing, attend classes or maintain employment as students at Carnegie Mellon while their leave is in effect.

Doctoral candidates in ABD (All But Dissertation) status who wish to take a leave of absence should refer to the Doctoral Student Status policy.

Leaves during the academic semester will take effect as of the date signed by the student's dean. After the Leave of Absence or Withdrawal Form is received by the University's Registrar's Office, it will be reviewed for the appropriate tuition refunds (see Enrollment Services: Tuition and Fees Adjustment Policy) and grade implications. The recording of student

courses and grades for taking a leave in a semester follows the deadlines for semester or mini courses, as follows:

- On or before the university deadline to drop classes with W (withdrawal) grades: all courses or grades are removed.
- After the university deadline to drop classes but before the last day of classes: W (withdrawal) grades will be assigned to all classes. (W grades apply to all undergraduate students, and graduate students in the Carnegie Institute of Technology, the Mellon College of Science or the Tepper School of Business.)
- After the last day of classes: Permanent grades assigned by the instructor will be recorded.

Procedural Steps for Student Leaves can be viewed here: https://www.cmu.edu/hub/registrar/leaves-and-withdrawals/index.html

STUDENT HOUSING
The CMU campus in Silicon Valley does not offer any on-campus housing or off-campus housing assistance. Students need to find their own housing. There is availability of housing, however, as many apartment complexes and/or room rentals are located within a commutable distance from the campus. Housing costs vary, but the average price for a 2 bedroom apartment is $3300-$3800/month. Most students choose to have roommates. While our student affairs office cannot act as a real estate agency or rental broker for you, we are happy to offer our advice or suggestions on locations that may be of interest to you. For questions, please contact the Director of Student Affairs at student-services@sv.cmu.edu

STUDENT RECORD RETENTION POLICY
University Policy: https://www.cmu.edu/es/docs/record-retention-policy.pdf

The policy of Carnegie Mellon University is to ensure the safety, accessibility, confidentiality, and good condition of the permanent record of every Carnegie Mellon student, past and present.

Carnegie Mellon University (CMU), established in 1900, holds all permanent records of our students (current and former) in the University Registrar's Office. We maintain original paper records in an offsite secure climate-controlled underground storage facility along with a microfilmed copy of each record. In addition, a copy of microfilmed records also resides in the University Registrar's Office in Pittsburgh, PA. This includes all students globally, include those students studying at our California teaching location and instructional sites. CMU has established the University Registrar's Office as the official data steward of all student records.

Historical Records 1906-1989
For every student enrolled at Carnegie Mellon University as a new or continuing student prior to the fall semester, 1989, and dating back to 1906, the University Registrar's Office of Carnegie Mellon University maintains a complete permanent record, whether the student is degree-seeking or non-degree seeking, whether enrolled for credit or not within the student's official transcript. The official transcript provides brief personal information to identify the student as unique. It contains courses, units and grades; semester and cumulative grade point averages; all degrees earned; transfer credit or advanced placement and dean's list indications.

The University Registrar's Office has established and maintains within a microfiche copy of good, readable, and reproducible quality of the student's permanent record in a secured records unit. A secondary permanent microfilm copy of all records will be maintained in good

condition in the climate-controlled, fire-proof, limited-access security at an offsite facility.

Modern Records 1989-Current

For every student enrolling at Carnegie Mellon University as a new or continuing student beginning in fall semester, 1989, the University Registrar's Office of Carnegie Mellon University will establish and maintain within an electronic data file in the University Student Services Suite (S3, our student information system) a complete permanent record, whether the student is degree-seeking or non-degree seeking, whether enrolled for credit or not. The University Registrar's Office staff will, under the direction of the University Registrar, add to the electronic record such new information as pertains to the student's demographic and academic record as it becomes available, semester-by-semester, and as the student progresses in his/her career at Carnegie Mellon University.

Daily, the Carnegie Mellon University Computing Services Division will perform a backup of all databases that have been altered during that day. Weekly, the Computing Services Division will perform a complete backup of all records within the student data file. The Computing Services Division staff will store the daily backups in the climate-controlled, fire-proof, limited-access security facility in the Computer Operations center in Cyert Hall on the Carnegie Mellon University campus. Upon successful completion of the monthly backup, the Computing Services Division staff will securely transfer the weekly and monthly backups from the preceding month to climate-controlled, fire-proof, secured vault at an offsite facility.

Cessation of Operations

In the unlikely event that CMU (which has existed for more than 100 years) ceases to exist, it will make appropriate arrangements to comply with clauses (1) and (2) for all its students consistent with the Commonwealth of Pennsylvania statutes and law. I have an informal plan and agreement with the University of Pittsburgh's University Registrar's

Office, that should either school cease, we would exchange student records.

STUDENT RIGHTS
University Policy: https://www.cmu.edu/policies/student-and-student-life/students-rights.html

Statement
The primary right of students is to pursue their education so long as they maintain their eligibility to remain a member of the community by meeting its academic standards and so long as they observe the regulations imposed by the university for the governance of the academic community.

The second right of students is to be recognized as members of the student body, with all the privileges pursuant thereto as to use of physical plant, university services and facilities.

Every student has the constitutional rights and responsibilities of any citizen under the law. Conversely, a responsibility of any student is to respect these rights of any other member of the university community.

A student has the right to expect that academic and professional processes should be flexible and periodically open to review and to participate constructively with faculty and administration in those processes by which the university community maintains the excellence of the standards of its curriculum and methods of instruction and the viability of its total educational program.

The student has the right to recourse through the procedures outlined in The Word/Student Handbook against unreasonable academic action.

Summary of Graduate Student Appeal and Grievance Procedures
University Policy: https://www.cmu.edu/graduate/policies/appeal-grievance-procedures.html

Introduction
Set forth below is a summary of the processes available to graduate students who seek review of academic and non-academic issues. Generally, graduate students are expected to seek informal resolution of all concerns within the applicable department, unit or program before invoking formal processes. When an informal resolution cannot be reached, however, a graduate student who seeks further review of the matter is to follow these formal procedures. To the extent that these processes are set forth in official University policies, links to those statements of policy and more detailed description of processes and procedures are included. Where a graduate student's concerns implicate multiple policies or processes, the University reserves the right to decide which process shall apply in order to avoid duplicative and potentially conflicting processes and decisions, or in appropriate circumstances, the order in which multiple reviews may occur.

These appeal and grievance procedures shall apply to students in all graduate programs of the University. Students should refer to the online handbooks (or hard copy handbooks if applicable) for their particular programs for more detailed information about the administration and academic policies of the program. To the extent that these policies conflict in any way with policies, processes and procedures adopted at the College, Department or Program level, the policies set forth herein shall govern.

Appealing Final Grades

Final grades will be changed only in exceptional circumstances and only with the approval of the instructor and the department, unit or program. Grading is a matter of sound discretion of the instructor and final grades are rarely changed without the consent of the instructor who assigned the grade. The following circumstances are the unusual exceptions that may warrant a grade appeal: (a) the final grade assigned for a course is based on manifest error (e.g. a clear error such as arithmetic error in computing a grade or failure to grade one of the answers on an exam), or (b) the faculty or staff member who assigned the grade did so in violation of a University policy. A graduate student who believes a final grade was assigned pursuant to (a) or (b) above should first present the case informally to the faculty or staff member responsible for the course in which the student believes an inappropriate grade has been awarded. If the student is not satisfied with the resolution at this first step, the student shall submit a formal, written appeal, with appropriate documentation, within the first fourteen (14) days of the semester following the awarding of the final grade under challenge, to the head of the department in which the course was offered. The department head (or the program head if the department head chooses to delegate the decision to him/her) will issue a written decision on the appeal within 30 days, or as soon thereafter as practical. If the student is not satisfied with the decision of the department head (or program head), the student may submit a formal, written appeal, with appropriate documentation, within seven (7) days to the Dean of the college in which the course is offered. The Dean shall render a decision within 30 days, or as soon thereafter as practical. The decision of the Dean shall be final and not appealable.

Summary of Levels of Appeal for Final Grades:
- Informal discussion with the faculty member
- Formal written appeal to the department head (or the program head if the department head chooses to delegate the decision to him/her)

- Formal written appeal to the Dean
- Dean issues final non-appealable decision

See also [Carnegie Mellon University Grading Policies](#)

Appeal of Academic Actions

An "Academic Action" is an action by a program, unit or department based on a graduate student's academic performance or failure to satisfy academic program requirements. Examples of Academic Actions include, but are not limited to, academic probation, academic suspension, and dismissal/drop. Each college, department, or program may set its own academic requirements and standards for acceptable academic performance. These standards and benchmarks for performance are set forth in the online and/or hard copy handbooks for individual graduate programs.

Graduate students will be notified of an academic action in writing by the applicable department, unit, or program head or director, or designated committee. Graduate students are encouraged to seek informal resolution of any concerns related to academic actions informally within the department, unit or program before filing a formal appeal.

Graduate students who wish to appeal an Academic Action must submit a formal, written appeal, with appropriate documentation, to the Dean of the College within seven (7) calendar days after receipt of written notice of the academic action by the department, unit, or program head or director, or designated committee. The Dean may delegate review of the matter to another individual or committee, including but not limited to one of the Associate Deans, the College Council or a specially constituted grievance committee who shall make a recommendation to the Dean. The Dean shall render a decision on the appeal within thirty (30) days or as soon thereafter as practical.

Graduate students who wish to appeal the written decision of the Dean must submit a formal written appeal, with appropriate documentation, to the Provost within fourteen (14) calendar days after receipt of the Dean's decision. A copy of the appeal must also be submitted to the Assistant Vice Provost for Graduate Education and to the Dean. The Provost may delegate review of the matter to another individual or committee, including but not limited to the Vice Provost for Education who shall make a recommendation to the Provost. The Provost shall render a decision on the appeal within thirty (30) days or as soon thereafter as practical. Decisions by the Provost are final and not appealable.

Generally, sanctions resulting from an Academic Action (e.g. probation, suspension, or dismissal /drop) take effect immediately, regardless of whether an appeal is filed. In exceptional circumstances, however, the appropriate Dean or the Provost may elect to hold sanctions in abeyance pending the resolution of an appeal.

Summary of Levels of Appeal for Academic Actions:
- Seek informal resolution within department, unit, or program
- Formal written appeal to the Dean
- Decision rendered by the Dean
- Formal written appeal to the Provost
- Provost issues final non-appealable decision

Appeal from Academic Disciplinary Actions
"Academic Disciplinary Action" refers to penalties or sanctions imposed for violation of academic policies against cheating, plagiarism or unauthorized assistance as defined by the University's official Policy on Academic Integrity.

The procedures for appeal from an Academic Disciplinary Action are set forth in the University's official policy on Academic Disciplinary Actions for Graduate Students. Graduate students who wish to appeal an

Academic Disciplinary Action must state in writing to the Provost their intention to do so within seven (7) calendar days after the date on which the penalty is communicated to the student (the "penalty date"), and then must present their written appeal with appropriate documentation to the Provost no later than fourteen (14) calendar days after said penalty date. The Provost will then take action on the appeal. Graduate students who wish to appeal the Provost's decision must state in writing to the President their intention to do so within seven (7) calendar days of the decision of the Provost. For more details, please review the policy and procedures on [Academic Disciplinary Actions for Graduate Students](#).

Generally, sanctions resulting from an Academic Disciplinary Action take effect immediately, regardless of whether an appeal is filed. In exceptional circumstances, however, the appropriate Dean or the Provost may elect to hold sanctions in abeyance pending the resolution of an appeal.

Summary of Levels of Appeal for Academic Disciplinary Actions:
- Academic disciplinary penalty imposed by faculty and/or department
- Formal written appeal to the Provost
  o Provost issues decision
- Formal written appeal to the President (when policy permits)
  o President issues final non-appealable decision

Community Standards Violations
As members of the University community, Carnegie Mellon students are expected to respect the rights of all students, faculty and staff and adhere to the policies outlined in the Student Handbook contained in [The Word](#), the [University Policies website](#), and any applicable college, department or graduate program handbooks.

If a student has observed a violation of university policy or law, or feels harmed by another student's misconduct (e.g. affecting his/her welfare,

property, safety or security) he/she should file a report with the Dean of Student Affairs and/or University Police as appropriate.

The procedures for adjudicating community standards violations and for appealing the results are available in [The Word](#) under [Community Standards](#).

For more information about community standards and disciplinary procedures, please visit the [Community Standards website](#).

Summary of Levels of Appeal for Community Standards Violations:

Harassment
Carnegie Mellon is firmly committed to intellectual honesty, freedom of inquiry and expression and respect for the dignity of each individual. Acts of harassment or intimidation by a student toward any member of the campus community will not be tolerated. Graduate students with concerns or grievances related to harassment or intimidation by another student should contact the Dean of Student Affairs for resolution. Acts of harassment or intimidation by a student may be referred to the University Committee on Discipline. Graduate Students with concerns or grievances related to alleged harassment or intimidation by a staff member, faculty member or other member of the campus community should contact the University Ombudsman and Assistant Vice President for Diversity and Equal Opportunity Services (412) 268-1018 for resolution.

Sexual Harassment and Sexual Assault
Graduate student grievances or concerns relating to sexual harassment will be handled according to the University's Policy against Sexual Harassment and Sexual Assault. Any member of the university community, whether faculty member, student, or staff member, who believes she or he has been the victim of sexual harassment and/or

sexual assault or is aware of such conduct, is encouraged to make contact with any of the individuals identified in the Policy against Sexual Harassment and Sexual Assault under Resources: People Who Handle Complaints and Oversee Compliance with this Policy and in the appendices. They will make certain that your complaint is communicated to the appropriate resource for handling.

Intellectual Property Disputes
Disputes concerning rights to intellectual property must be resolved according to the procedures set forth in the University's Intellectual Property Policy.
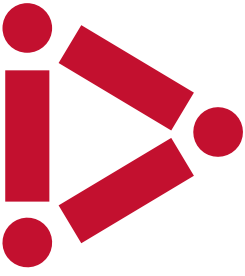
Research Misconduct
Carnegie Mellon University is responsible for the integrity of research conducted at the University. As a community of scholars, in which truth and integrity are fundamental, the University has established procedures for the investigation of allegations of misconduct of research with due care to protect the rights of those accused, those making the allegations, and the University. The procedures for handling allegations of research misconduct are set forth in the Policy for Handling Alleged Misconduct in Research at Carnegie Mellon University.
For graduate students found responsible for research misconduct, the President of the University may impose specific sanctions up to and including expulsion. The imposition of sanctions is subject to the procedures for approval and/or appeal prescribed for community standards violations, available at https://www.cmu.edu/student-affairs/theword/community-standards/index.html

Return from Leave of Absence
Graduate students who wish to return to Carnegie Mellon following a leave of absence must follow the procedures set forth in the Student Return Policy.

Generally, graduate students must negotiate their return to the University with their home academic department and follow any applicable departmental policies. If a department chooses to deny a student's return from a leave of absence, the student may appeal to the Dean of the College.

Suspension/Required Withdrawal
A University Suspension is a forced, temporary leave from the university. There are three types of suspension for students that apply to both graduate and undergraduate students:

- Academic Suspension is the result of poor academic performance or violation of academic regulations and is imposed by the student's college or academic department (see university and college academic policies).
- Disciplinary Suspension is the result of serious personal misconduct and is imposed by the Dean of Student Affairs (see The Word/Student Handbook).
- Administrative Suspension is the result of failure to meet university financial obligations or failure to comply with federal, state or local health regulations and is imposed by Enrollment Services. (See Student Accounts Receivable Collection Policy and Procedures for financial obligations. Contact Student Health Services for information about health regulations.)

Graduate students who wish to appeal a suspension or required withdrawal may write to the following individuals depending on the type of suspension:

- Academic Suspension – The applicable department, unit, or program head;
- Disciplinary Suspension – Dean of Student Affairs
- Administrative Suspension –Vice President for Enrollment, Vice President for Business and Planning, and the Dean of Student Affairs, in consultation with the student's Associate Dean

For more details see the [Student Suspension / Required Withdrawal Policy](#).

General Grievances

The following grievance procedures are to be used for graduate student problems or concerns that are not covered by any of the policies or procedures set forth above. As such, these grievance procedures may not be used as a substitute for procedures contemplated under any other policy, including but not limited to, policies regarding academic actions; academic disciplinary actions; community standards; harassment; sexual harassment; intellectual property; research misconduct or any other policy.

Graduate students are expected to discuss any concerns or grievances initially with the faculty or staff member(s) involved. Students are strongly encouraged to seek informal resolution of grievances through consultations within the academic unit, department or program. Students may also seek assistance with the informal resolution of a grievance through the designated college ombudsperson or the Assistant Vice Provost for Graduate Education.

If a grievance cannot be resolved informally with the faculty or staff member involved within the academic department, a student may submit a formal, written grievance to the head of the department, unit or program. If there is more than one student with a grievance on a particular matter, each student must submit a separate grievance. The department, unit, or program head, or director or designated committee will issue a written decision on the grievance within thirty (30) days or as soon thereafter as practical.

Graduate students who wish to appeal from the decision rendered at the department, unit or program level must submit a formal, written appeal to the Dean of the College within seven (7) calendar days after receipt of

written notice of the decision by the department, unit, or program head, or director or designated committee. The Dean may delegate review of the matter to another individual or committee, including but not limited to one of the Associate Deans, the College Council or a specially constituted grievance committee who shall make a recommendation to the Dean. The Dean shall render a decision on the appeal within thirty (30) days or as soon thereafter as practical.
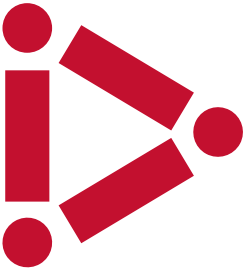
Graduate students who wish to appeal the written decision of the Dean must submit a formal written appeal to the Provost within seven (7) calendar days after receipt of the Dean's decision. A copy of the appeal must also be submitted to the Assistant Vice Provost for Graduate Education and to the Dean. The Provost may delegate review of the matter to another individual or committee, including but not limited to the Vice Provost for Education who shall make a recommendation to the Provost. The Provost shall render a decision on the appeal within thirty (30) days or as soon thereafter as practical. Decisions by the Provost are final and not appealable.

Summary of Levels of Appeal for General Grievances:
- Seek informal resolution within department, unit, or program
- Formal review by the appropriate department, unit, or program head, or director or designated committee.
- Formal written appeal to the Dean
- Formal written appeal to the Provost
- Provost issues final non-appealable decision

DEGREE & DIPLOMA DISTRIBUTION PROCESS
Based on the graduating semester, final diplomas are distributed to students through two channels – in person or direct mail. The full outline for this process and timeline for distribution can be reviewed here:

https://www.cmu.edu/hub/registrar/graduation/diplomas/deadlines-and-distribution.html

COST OF ATTENDANCE

	# of Semesters	Entire Program	First Semester
MSSM (full time-12 month)	3	$82,669	$27,761
MSSM (full time- 16 month)	3	$86,695	$27,686
MSSM (part time local)	6	$85,730	$14,083
MSSM (part time remote)	6	$84,748	$13,843
MSTV	2	$57,541	$2,413*
MSTV (Dual Degree with University of Strathclyde)	3	$57,541	$27,686
* Students complete 3-unit internship in first semester			

Additional details regarding cost of attendance per degree can viewed here: https://www.cmu.edu/iii/degrees/admissions/cost.html

FINANCIAL ASSISTANCE
There is no university funding provided for students at the Integrated Innovation Institute. Teaching or research assistantships are available to Ph.D. students only. All enrolled students, or their employers, are responsible for payment in full for tuition and expenses. Some students do secure external funding. You are welcome to explore the HUB website for information about graduate student financial aid, the Office of Graduate Education and the College of Engineering websites for external funding opportunities.

Meeting the cost of a graduate education is a significant investment. Carnegie Mellon University is committed to making it financially possible for graduate students to enhance educational development and reach

their career goals. There are many financial aid resources available to students pursuing graduate studies at Carnegie Mellon University.   Carnegie Mellon University participates in a number of Federal and state financial aid programs.   Information about these financial aid programs can be found on Carnegie Mellon University's website, at http://www.cmu.edu/finaid/index.html

If you obtain a loan to pay for the MS in Software Management or MS in Technology Ventures programs, you will have the responsibility to repay the full amount of the loan plus interest, less the amount of any refund. If you have received federal student financial aid funds, you are entitled to a refund of moneys not paid from federal student financial aid program funds.

Carnegie Mellon University does not have a pending petition in bankruptcy, is not operating as a debtor in possession, and has not filed a petition in bankruptcy within the preceding 5 years, nor has Carnegie Mellon had a petition in bankruptcy filed against it within the preceding 5 years that resulted in re-organization under Chapter 11 of the United States Bankruptcy Code.

Carnegie Mellon University Consumer Information

Below is a summary of consumer information made available to all Carnegie Mellon University prospective and current students as required by the Higher Education Act of 1965, as amended. Required Disclosure have been categorized into five topics. Each disclosure gives a brief description of information that is required to be disclosed and explains how it can be obtained. This information may be changed from time to time as required.

If you need assistance or would like a paper copy, contact the Student Financial Aid Office, 5000 Forbes Avenue, Warner Hall, Pittsburgh, PA. If you wish to speak with a representative about the information contained here, please contact Associate Director Catherine Demchak at (412) 268-1353.

Information about the Institution:

Accreditation Information

Carnegie Mellon University is accredited by the Middle States Commission on Higher Education (MSCHE), 3624 Market Street, 2nd Floor West, Philadelphia, PA 19104 (www.msche.org). The Commission may be contacted by telephone at 267-284-5000 or via email at info@msche.org or espanolinfo@msche.org (Spanish/Español). The university's current "Statement of Accreditation Status" can be found at, https://www.msche.org/institution/.

State Approvals

Carnegie Mellon University is licensed to operate in the states listed below. Individuals may contact the relevant agency for more information or information about how to file a complaint.

California
Bureau for Private Postsecondary Education
P.O. Box 980818
West Sacramento, CA 95798-0818
Telephone: 888-370-7589
Email: bppe@dca.ca.gov
Website: www.bppe.ca.gov

New York
New York State Education Department
Office of Higher Education
Room 977 Education Building Annex

Albany, NY 12234
Telephone: 518-486-3633
Email: hedepcom@nysed.gov
Website: www.highered.nysed.gov

Pennsylvania
Pennsylvania Department of Education
Office of Postsecondary and Higher Education
333 Market Street, 12th Floor
Harrisburg, PA 17126-0333
Telephone: 717-783-8228
Email: ra-collunivseminfo@pa.gov
Website: www.education.state.pa.us

Washington, D.C.
Office of the State Superintendent of Education
Government of the District of Columbia
810 First Street NE 9th Floor
Washington, DC 20002
Telephone: 202-727-6436
Email: osse@dc.gov
Website: osse.dc.gov

Inquiries regarding the university's accreditation status or authorization to operate in any of the above states may be directed to: Associate Vice President / Director of Enrollment Services, Carnegie Mellon University, 5000 Forbes Avenue, Pittsburgh PA 15213, telephone: 412-268-5399, email: krieg@andrew.cmu.edu.

Distance Education, State Authorization and Reciprocity Agreement (SARA)
The State Authorization Reciprocity Agreement (SARA) is an agreement among member states, districts, and territories in the United States,

which establishes national standards for interstate offering of postsecondary distance education courses and programs. It is intended to standardize the process of offering online courses and programs by postsecondary institutions located in states other than the state in which the enrolled student(s) are residing. SARA is overseen by a national council (NC-SARA) and administered by four regional education compacts.

Carnegie Mellon University has been approved by the Commonwealth of Pennsylvania to participate in NC-SARA and was accepted as a SARA institution on May 2, 2017; additionally, Carnegie Mellon secured approval through NC-SARA on May 18, 2017. Carnegie Mellon University is listed as an approved, participating institution on the NC-SARA website (http://www.nc-sara.org/). At this time, 49 of the 50 United States are SARA members. California is not a member of SARA; however, Carnegie Mellon is able to offer online education to California residents.
Except where prohibited by applicable law, students who reside outside of the United States generally are not restricted from enrolling in our online programs. Some online programs do require in-person attendance at one of Carnegie Mellon's teaching locations (e.g., Carnegie Mellon's Pittsburgh, Pennsylvania campus) for short portions of the program. Students interested in enrolling in a specific online program are encouraged to contact the person designated by the online program for questions about the program's requirements or enrollment.

Copyright Infringement Policies
Carnegie Mellon University takes copyright violation seriously. Besides raising awareness about copyright law, it takes appropriate action in support of enforcement as required by policy and law. United States copyright law (http://www.copyright.gov/) "protects the original works of authorship fixed in any tangible medium of expression, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device".

The University's Fair Use Policy (http://www.cmu.edu/policies/administrative-and-governance/fair-use.html) states that all members of the University must comply with US copyright law and it explains the fair use standards for using and duplicating copyrighted material. In addition, the policy prohibits the duplication of software for multiple uses, meeting the Digital Millennium Copyright Act (DMCA) (http://www.copyright.gov/legislation/dmca.pdf) requirements. The DMCA criminalizes the development or use of software that enables users to access material that is copyright protected. Furthermore, the Computing Policy (http://www.cmu.edu/policies/information-technology/computing.html) prohibits the distribution of copyright protected material via the University network or computer systems, unless the copyright owner grants permission.

The Higher Education Opportunity Act of 2008 (Public Law 110-315) Section 488, requires institutions of higher education to annually inform students that "unauthorized distribution of copyrighted material, including unauthorized peer-to-peer file sharing, may subject the students to civil and criminal liabilities". Carnegie Mellon does this by publication of a news article on Computing Services' website or via mass mail communication each semester. The law goes on to require institutions "to provide a summary of penalties for violation of Federal copyright laws, including disciplinary actions that are taken against students who engage in unauthorized distribution of copyrighted materials using the institution's information system." Copyright protected materials can include, but are not necessarily limited to:

- Music
- Movies or other videos
- Literary works
- Software
- Digital images or libraries

Cost of Attending the University
Actual tuition and fee charges can be found on the Student Financial Services' website at https://www.cmu.edu/sfs/tuition/index.html. For estimated books and supplies, room and board, and personal/miscellaneous expenses view the cost of attendance for, Graduate program at https://www.cmu.edu/sfs/tuition/graduate/index.html.

Descriptions of Academic Programs
Information on the university's graduate academic programs and degree offerings is available from the various schools/colleges and admitting offices. Links to those programs can be found at https://www.cmu.edu/academics/index.html.

Faculty
Information on the university's faculty and instructional personnel is available from individual schools/colleges. This information can be found on the university's academics website at https://www.cmu.edu/academics/index.html.

Facilities & Services for Disabled Students
The Office of Disability Resources provides responsive and reasonable accommodations to students who self-identify as having a disability, including physical, sensory, cognitive and emotional disabilities. If you would like to learn more about the services and accommodations provided by the Office of Disability Resources, visit their website at https://www.cmu.edu/disability-resources/students/. To discuss your accommodation needs, please email us at access@andrew.cmu.edu or call us at 412-268-6121 to set up an appointment.

Student Privacy & FERPA
One of the most significant changes a parent or guardian experiences in sending a student to college is the difference in privacy standards for

educational records. Carnegie Mellon values the student's right to privacy. The university adheres to a federal law called the Family Educational Rights and Privacy Act (also called FERPA or the Buckley Amendment) that sets privacy standards for student educational records and requires institutions to publish a compliance statement, including a statement of related institutional policies. For more detailed information, view the university's brochure at https://www.cmu.edu/hub/privacy/ferpa-brochure.pdf.

Return to Title IV Funds Policy and Procedural Statement

Policy Reason
The U. S. Department of Education requires that the university determine the amount of Federal Title IV aid earned by a student who withdrawals of fails to complete the period of enrollment. The university must determine the earned and unearned portions of Title IV aid as of the date the student ceased attendance based on the amount of time the student spent in attendance. Up through the 60% point in the period of enrollment, a pro rata schedule is used to determine the amount of Title IV funds the student has earned at the time of withdrawal. After the 60% point in the period of enrollment, a student has earned 100% of the Title IV funds he or she was scheduled to receive. For a student who withdraws after the 60% point-in-time, there are no unearned funds. Federal regulations can be found at:
    Federal Student Aid Handbook, Volume 5
    Chapter 1 Withdrawals and the Return of Title IV Funds 34 CFR 668.22

Policy and Procedural Statement
At Carnegie Mellon Title IV funds are awarded to a student under the assumption that the student will attend school for the entire period for which the assistance is awarded. When a student withdraws, the student

may no longer be eligible for the full amount of Title IV funds that the student was originally scheduled to receive.

If a recipient of Title IV grant or loan funds withdraws from a school after beginning attendance, the amount of Title IV grant or loan assistance earned by the student must be determined. If the amount disbursed to the student is greater than the amount the student earned, the unearned funds must be returned. If the amount disbursed to the student is less than the amount the student earned, and for which the student is otherwise eligible, he or she is eligible to receive a Post-withdrawal disbursement of the earned aid that was not received.

Carnegie Mellon determines the Withdrawal Date and Date of Determination to complete the return calculation. A student's withdrawal date and date of determination varies depending on the type of withdrawal. When a student provides official notification to Carnegie Mellon through the Student Leave of Absence and Withdrawal Process, the withdrawal is defined as official withdrawal. When the student does not complete the Student Leave of Absence and Withdrawal Process and no official notification is provided by the student it is considered an unofficial withdrawal.

Leave of Absence/Withdrawal Process
A student may leave Carnegie Mellon by either taking a leave of absence (leaving the university temporarily with the firm and stated intention of returning) or by withdrawing from the university (leaving the university with no intention of returning). Students choosing to take a leave of absence should first contact their academic advisor to discuss their plans while on leave and to work out any conditions that may be necessary for a smooth return to Carnegie Mellon. A student deciding to leave the university should take the following steps:
- Complete a Leave of Absence or Withdrawal Form.

- The form must include **all** necessary signatures or the process will not be completed.
- Return the completed form to the University Registrar's Office, 5000 Forbes Ave., Warner Hall A12, Pittsburgh, PA 15213.

Determination of Withdrawal Date

Official Withdrawals (Notification Provided by the Student)
Those withdrawals defined as official are processed in accordance with federal regulations. The Office of the Registrar provides information that identifies which students have processed a Student Leave of Absence and Withdrawal Form for each semester. This information includes the Date of Withdrawal, the Date of Determination, Withdrawal/Leave Status (LA, LS, & W2) and the semester of attendance. This information is maintained in the student's academic file and in the university's Student Information System.

For students who notify the university of their intent to withdraw or take a leave of absence, the official date of withdrawal or leave of absence is the earliest of:
- Date the student began the withdrawal or leave of absence process;
- Date the student notified his or her home department;
- Date the student notified the associate dean of his or her college; or
- Date the student notified the dean of students.

Unofficial Withdrawal (No Official Notification Provided by the Student)
For a student who withdraws without providing notification to Carnegie Mellon, the institution determines the withdrawal date using defined criteria. This category of withdrawals includes students that drop out and students that do not earn a passing grade.

To identify the unofficial withdrawals the Registrar develops a preliminary list of students that did not complete the semester by reviewing the final student grade reports. The list includes all students with: a) semester units carried, b) 0 semester units passed, c) 0 quality points earned, and d) 0.0 QPA. The Registrar contacts the academic divisions about each student to determine if the student actually completed the semester and earned the grades (0.0) or failed to complete the semester and did not notify the university of their status.

For students who do not notify the university of their intent to withdraw or take a leave of absence, the official date of withdrawal or leave of absence is:

- The midpoint of the semester;
- The last date the student attended an academically-related activity such as an exam, Tutorial or study group, or the last day a student turned in a class assignment.

Date of Determination that the Student Withdrew
Carnegie Mellon is not required to take attendance and the Date of Determination that a student withdrew varies depending upon the type of withdrawal: Official or Unofficial.

1. For withdrawals where the student **provided *Official Notification*** the Date of Determination is: The student's withdrawal date, or the date of notification, whichever is later.
2. For withdrawals where the student **did not provide *Official Notification*** the Date of Determination is: The date the institution becomes aware the student has ceased attendance.

For a student who withdrawals without providing notification to the institution, the institution must determine the withdrawal date no later than 30 days after the end of the enrollment period.

Calculation of Earned Title IV Assistance

The withdrawal date is used to determine the point in time that the student is considered to have withdrawn so the percentage of the period of enrollment completed by the student can be determined. The percentage of Title IV aid earned is equal to the percentage of the period of enrollment completed.

The amount of Title IV federal aid earned by the student is determined on a pro-rata basis up to the end of 60% of the semester. If the student completed 30% of a term, 30% of the aid originally scheduled to be received would have been earned. Once a student has completed more than 60% of a term, all awarded aid (100%) has been earned. The percentage of federal aid earned and the order in which the unearned aid is returned are defined by federal regulatory requirements.

The calculation of earned Title IV funds includes the following grant and loan funds if they were disbursed or could have been disbursed to the student for the period of enrollment for which the Return calculation is being performed:

- Pell Grant
- Iraq and Afghanistan Service Grant
- TEACH Grant (not available at Carnegie Mellon)
- FSEOG Grant
- Federal Direct Loan

Institutional Charges

Institutional charges are used to determine the portion of unearned Title IV aid that the school is responsible for returning. Carnegie Mellon ensures that all charges for tuition, fees, room and board, as well as all other applicable institutional charges are included in the return calculation. Institutional charges do not affect the amount of Title IV aid that a student earns when he or she withdraws.

The institutional charges used in the calculation usually are the charges that were initially assessed the student for the period of enrollment. Initial charges are only adjusted by those changes the institution made prior to the student's withdrawal (for example, for a change in enrollment status unrelated to the withdrawal). If, after a student withdraws, the institution changes the amount of institutional charges it is assessing a student, or decides to eliminate all institutional charges, those changes affect neither the charges nor aid earned in the calculation.

Return of Unearned Funds to Title IV
If the total amount of Title IV grant and/or loan assistance that was earned as of the withdrawal date is less than the amount that was disbursed to the student, the difference between the two amounts will be returned to the Title IV program(s) and no further disbursements will be made.

If a student has received excess funds, the College must return a portion of the excess equal to the lesser of the student's institutional charges multiplied by the unearned percentage of funds, or the entire amount of the excess funds.

The funds will be returned in the order below as prescribed by federal regulations, within 45 days from the date of determination that a student withdrew.
- Unsubsidized Federal Stafford Loans
- Subsidized Federal Stafford Loans
- Federal PLUS loans
- Federal Pell Grants
- Federal Supplemental Educational Opportunity Grants (FSEOG)

Post-Withdrawal Disbursements
If the total amounts of the Title IV grant and/or loan assistance earned as of the withdrawal date is more than the amount that was disbursed to

the student, the difference between the two amounts will be treated as a post-withdrawal disbursement. In the event that there are outstanding charges on the student's account, Carnegie Mellon will credit the student's account for all or part of the amount of the post-withdrawal disbursement up to the amount of the allowable charges.

Any amount of a post-withdrawal disbursement that is not credited to a student's account will be offered to the student within 30 days of the date that the institution determined that the student withdrew. Upon receipt of a timely response from the student, the College will disburse the funds within 90 days of the date of determination of the student's withdrawal date.

Return of Title IV Funds – Withdrawals for Programs Offered in Modules
The return of Title IV funds for programs offered in modules is defined in a separate policy statement at Carnegie Mellon. This document is included as an addendum to the Carnegie Mellon University Return to Title IV Funds Policy and Procedural Statement (see below).

Policies and Procedures
        Federal Student Aid Handbook, Volume 5, Chapter 2 Withdrawals
        and the Return of Title IV Funds
        CFR 668.22 (a), (f) and (l)
        Dear Colleague Letter GEN-11-14 July 2011

For all programs offered in modules, a student is a withdrawal for Title IV purposes if the student ceases attendance at any point prior to completing the payment period or period of enrollment (unless the institution has written confirmation from the student that that they will attend a module that begins later in the enrollment period).

The regulations require the institution to determine whether Title IV funds must be returned based on the number of days actually completed versus the number of days the student was scheduled to attend in the payment period. The regulations prevent students from enrolling in modules or compressed courses spanning the period, completing a portion of the period, and retaining all aid for the period.

A program is considered to be offered in modules if a course or courses in the program do not span the entire length of the payment period or period of enrollment. The rule impacts all programs offering courses shorter than an entire semester, including semester-based programs with a summer term consisting of two consecutive summer sessions.

The Student Financial Aid Office has established the following procedures associated with handling withdrawals from programs offered in modules. An Associate Director of Student Financial Aid has the primary responsibility for compliance and implementation of these regulatory requirements.

1. The institution will identify students enrolled for the summer session that are eligible for Title IV Aid.
   - Pell eligible students are identified
   - Students with summer loans are identified
   - The period of enrollment and enrollment status will be identified for each student
2. All Leave/ Withdrawal Forms processed by the University Registrar's Office will be reviewed for the summer sessions to record the Withdrawal Date and Date of Determination to identify any student receiving federal funding.
3. The Student Financial Aid Office will identify any students that drop courses in the summer sessions.
   - During Summer I this is standard procedure
   - During Summer II this is reviewed after 10th day reporting

- Any additional dropped courses will be reviewed through the 60% enrollment period
4. Students who are identified as official withdrawals or that officially drop all courses in a session will be reviewed to determine the amount of federal financial aid earned. If a Return of Title IV aid is required, existing institutional procedures will be followed.
5. At the end of the enrollment period the institution will determine if any students are identified as 'unofficial withdrawals.' If a Return of Title IV aid is required, existing institutional procedures will be followed.
6. If a student does not begin courses in all sessions, a Return of Title IV aid may not be required, but other regulatory provisions concerning recalculation may apply.
   - If a student completes both courses in module one, but officially drops courses in module two while attending module one the student is not a withdrawal.
   - Since the enrollment is less than half time, the student is no longer eligible for the loan and the funds must be returned.

The following information obtained from the Federal Student Aid Handbook, Chapter 2, Withdrawals and the Return of Title IV Funds, will be used to determine whether a student enrolled in a series of modules is a withdrawal.

How to determine whether a student in a program offered in modules has withdrawn

Schools can determine whether a student enrolled in a series of modules is a withdrawal by asking the following questions.

1. ***After beginning attendance in the payment period or period of enrollment, did the student cease to attend or fail to begin attendance in a course he or she was scheduled to attend?***
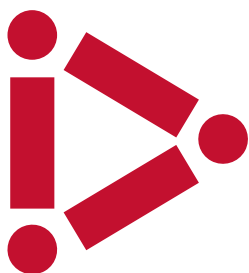
- If the answer is no, this is not a withdrawal.
- If the answer is yes, go to question 2.

2. ***When the student ceased to attend or failed to begin attendance in a course he or she was scheduled to attend, was the student still attending any other courses?***

- If the answer is yes, this is not a withdrawal; however other regulatory provisions concerning recalculation may apply.
- If the answer is no, go to question 3.

3. ***Did the student confirm attendance in a course in a module beginning later in the period (for non-term and nonstandard term programs, this must be no later than 45 calendar days after the end of the module the student ceased attending)?***

- If the answer is yes, this is not a withdrawal, unless the student does not return.
- If the answer is no, this is a withdrawal and the Return of Title IV Funds requirements apply.

Contact
Questions regarding this policy or its intent should be directed to the Student Financial Aid Office at 412-268-1353.

Satisfactory Academic Progress Policy and Procedural Statement
To be eligible for federal, state, and institutional financial aid, all students are required to maintain Satisfactory Academic Progress toward the completion of a degree. Each university determines its own policy in accordance with federal regulations set forth by the U. S. Department of Education regarding satisfactory progress standards to ensure student success. To maintain Satisfactory Academic Progress at Carnegie Mellon

University, students must meet the following minimum standards for both of the qualitative (QPA) and quantitative (completion rate) measures:

Student Type	QPA (Qualitative)	Completion Rate (Quantitative)*
First Year Undergraduate	1.75	80%
Undergraduate Upper-class	2.00	80%
Heinz Graduate	3.00	80%
Other Graduate (excluding Tepper)	2.00	80%

To calculate the completion rate, the cumulative number of completed units is divided by the cumulative number of units attempted. Advance Placement credits are excluded from both figures.

In addition to the above mentioned Financial Aid Satisfactory Academic Progress standards, federal regulations require a student to complete their degree within a specified amount of time. The maximum timeframe cannot exceed 150 percent of the time published as needed for completion of the program.

Scope:

This policy applies to Federal aid including Federal Pell Grants, Federal Supplemental Educational Opportunity Grants, Federal Work-Study, Federal Direct Loans, and Federal Direct PLUS Loan programs; state grant aid; and Carnegie Mellon institutional aid including grants, loans, and scholarships.

Federal regulations can be found at,
Federal Student Aid Handbook, Volume 1
Chapter 1 School Determined Requirements

34 CFR 668.16(e)
34 CFR 668.32(f)
34 CFR 668.34

Evaluation:
Carnegie Mellon evaluates all students for Financial Aid Satisfactory Academic Progress annually, at the end of the spring semester. Students that are included in the review are undergraduates, graduates, both full-time and part-time.

Courses that do not count toward a student's degree cannot be used to determine enrollment status for financial aid purposes. Carnegie Mellon will count transfer credit hours that are accepted toward a student's educational program as both attempted hours and completed hours. Advanced Placement Non-Degree and Non-Credit courses are not counted as units passed or attempted. When a course is repeated, all grades will be recorded on the official academic transcript and will be calculated in the student's QPA. For financial aid eligibility, only one repeat per course is permitted in the determination of enrollment status for courses previously passed.

If the student withdraws and is not assigned a W grade, then it will not be counted in the number of units attempted or completed. If the W grade is assigned, the units will be counted in the number of units attempted and will be counted as zero in the number of units completed.

If the student has incomplete units, the units will be counted as attempted and will be counted as zero in the number of units completed.

The Financial Aid Satisfactory Academic Progress evaluation is a cumulative review of all semesters, regardless of whether or not the student received financial aid during the academic year.

If the minimum requirements are not achieved, the student is ineligible to receive financial aid. In such a case, the student is notified and given an option to appeal their financial aid status. More information about the appeal process can be found at https://www.cmu.edu/sfs/financial-aid/special-circumstances/policies.html

A financial aid package will not be completed unless an appeal is received, approved and processed accordingly. If by chance a financial aid package is processed and released to the student, it is conditional and subjected to financial aid removal until an appeal is received, approved and processed accordingly.

Contact:
Accountable Department: Enrollment Services, Student Financial Aid. Questions regarding this policy or its intent should be directed to the Student Financial Aid Office, phone: 412-268-1353.

Student Body Diversity
For Information about the diversity of the university student body, contact the Institutional Research and Analysis Office, https://www.cmu.edu/ira/index.html.

For information about the University's Diversity, Equity and Inclusion initiative, visit the Center for Student Diversity and Inclusion's website at https://www.cmu.edu/student-diversity/.

Written Arrangement Information
A U.S. Department of Education regulation requires disclosure of specific information to prospective and current students regarding written arrangements between Carnegie Mellon University (CMU) and any institution(s) that provides a portion of an educational program to students enrolled at CMU. CMU enters into such arrangements to enrich the educational experiences offered to its students. In accordance with

the regulation, CMU provides this information at http://www.cmu.edu/hub/consumer-information/docs/written-arrangement.pdf.

Student Complaints & Consumer Information by State
As required for compliance with U.S. Federal Program Integrity Regulations, state official/agency contact information for each U.S. state/territory that could handle a student's complaint is provided at https://www.cmu.edu/hub/consumer-information/docs/complaints.pdf.

Gainful Employment Disclosures
As required by U.S. Department of Education regulations Gainful Employment Disclosures (Disclosures about CMU certificate programs that prepare students for specific occupations) can be found at https://www.cmu.edu/hub/consumer-information/.

Information about Student Financial Aid:
Meeting the cost of higher education is a significant investment. We are committed to providing a comprehensive financial aid program that makes it possible for admitted students to attend Carnegie Mellon.

Application Process & Timeline:
Graduate Students: To apply for financial aid for the 2018-2019 academic year, follow the steps below.

1.   Free Application for Federal Student Aid (FAFSA)
The FAFSA is required if applying for federal financial aid programs. There are now two ways to complete the *Free Application for Federal Student Aid (FAFSA)* form: a redesigned https://studentaid.ed.gov/sa/fafsa website or a mobile app (available through Google Play, https://play.google.com/store/apps/details?id=com.fsa.mystudentaid or the Apple App Store, https://itunes.apple.com/us/app/mystudentaid/id1414539145).

We recommend using the IRS Data Retrieval Tool (DRT) (https://studentaid.ed.gov/sa/resources/irs-drt-text) to complete the FAFSA. The DRT transfer process has been improved to include stronger security and privacy protections; therefore, tax information transferred will not display on the form or Student Aid Report. Instead, the phrase "Transferred from the IRS" will appear in the fields.

Those selected for federal verification after FAFSA completion or those unable to use the IRS DRT will need to request an IRS Tax Return Transcript (https://www.irs.gov/individuals/get-transcript).

Additional information:
- Apply as soon as possible after October 1.
- Carnegie Mellon's federal code is 003242.
- Use 2017 tax information to complete the FAFSA.
- A Department of Education Federal Student Aid (FSA) ID is required. View FSA ID instructions at https://fsaid.ed.gov/npas/index.htm.
- Students must complete the FAFSA's electronic signature requirement.

2. MPN & Entrance Counseling

All first-time Federal Direct Loan borrowers are required to complete entrance counseling. The entrance counseling session provides information about borrower rights and responsibilities. CMU will be notified when a student has completed online entrance counseling. Funds will not be disbursed until the entrance counseling session has been completed. Students who completed a federal entrance counseling session while at CMU, do not have to complete another session.

Additional information:

- View entrance counseling instructions (https://www.cmu.edu/sfs/financial-aid/types/federal-loans/direct/mpn-entrance-counseling.html).
- Complete entrance counseling session at https://studentloans.gov.

3. Grad PLUS Loan

If you plan on borrowing a Federal Direct Graduate PLUS Loan, this is a two-part process and both parts must be completed in order for your loan to be originated. If you borrowed a Grad PLUS Loan last academic year, you are only required to complete the application portion of the process. The application portion of the process cannot be completed before June 1.

Additional information:

- View detailed Grad PLUS Loan instructions at https://www.cmu.edu/sfs/financial-aid/types/federal-loans/plus/instructions.html.
- The two-part process may be completed at https://studentloans.gov.

Financial Aid Eligibility Notification

Once a student completes all of the steps above, a financial aid package will be determined. The Student Financial Aid Office will notify the student by email that a financial aid award letter has been posted to SIO (https://s3.andrew.cmu.edu/sio/index.html#finances-home). The letter contains information and further instructions regarding the student's eligibility and awards. If a student's circumstances change, then financial aid eligibility will be re-evaluated and the student will receive notification that a revised award letter is available in SIO.

Missing Documents

If we are unable to process a student's financial aid package due to missing documents, a Financial Aid Alert email will be sent to the student requesting the required documents by a specified date. Until the entire application process is completed and all required documents are submitted, our office may be unable to complete a student's financial aid package. Students may log in to SIO (https://s3.andrew.cmu.edu/sio/index.html#finances-home) to view documents that have been received by our office. View instructions for

submitting missing documents at https://www.cmu.edu/sfs/financial-aid/missing-documents/index.html.

Teacher Certification
Teacher certification students at the graduate level should be aware that federal regulations classify them as a grade level 5 undergraduate student for Federal Direct Student Loan purposes. Teacher certification students are, however, considered a graduate student by Carnegie Mellon for academic purposes.

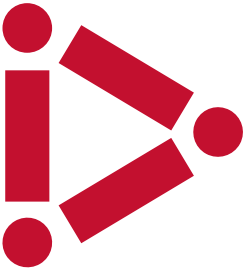Available Financial Aid
Scholarships & Grants

Graduate Students:
Graduate students interested in scholarships and grants may contact their program of interest or department. View more information on the Graduate Education Office website, http://www.cmu.edu/graduate/prospective-students/index.html. In addition, the Fellowships & Scholarships Office (http://www.cmu.edu/fso/) provides support to graduate students interesting in pursing certain external scholarships, like Fullbright and UK Awards.

Federal Work-Study
Federal Work-Study (FWS) is a need-based self-help award. If a student has been awarded FWS, the FWS award is the total that can be earned during the academic year as a work-study student.

Federal Loans
For many students and families, educational loans are a necessary part of the process of paying for college. Student Financial Aid certifies loans for students, as well as Federal Direct Parent PLUS Loans for parents of

undergraduates and Federal Direct Grad PLUS Loans for graduate students.

Federal Direct Student Loan
The Federal Direct Student Loan is the most widely-used loan for college students and is available to both undergraduate and graduate students. There are two types of Federal Direct Student Loans, subsidized and unsubsidized, and eligibility for both is determined by completing the FAFSA.

Grad PLUS Loan
Eligible graduate students may borrow a Federal Direct Grad PLUS Loan to assist with educational expenses. Students may borrow any amount up to their calculated cost of attendance minus any other aid received.

Private Loans
Private loan programs offer competitive interest rates and borrower benefits. To increase chances of approval and possibly improve the rate you receive, students are strongly recommended to apply with a creditworthy co-signer.

Student Outcomes
Retention and Graduation Rates
Institutional Research and Analysis Office offers up-to-date data on degrees conferred, enrollment reports, freshmen retention rates and race and ethnicity reports for annual degrees. Retention and Graduation rates can be found at https://www.cmu.edu/ira/retentiongradrates.html.

Intercollegiate Athletic Program Participation Rates and Financial Support Data (Equity in Athletics Disclosure Act)

Please visit the U.S. Department of Education's site, The Equity in Athletics Data Analysis (http://ope.ed.gov/athletics/#/) and select the "Get

data for one schools" option. Enter "Carnegie Mellon University" in the "Name" field and select the "Continue" button at the bottom of the page. A printed copy of the report can be requested by calling the Department of Athletics, Physical Education, and Recreation at 412-268-8054 or by sending an email to Josh Centor, Associate Vice President for Student Affairs and Director of Athletics, Physical Education & Recreation, at jcentor@andrew.cmu.edu.

Health and Safety

Drug and Alcohol Abuse Prevention Program
Under the Drug Free Workplace Act of 1988 and the Drug Free Schools and Campuses Act of 1989, the Carnegie Mellon University is required to have an alcohol and other drug policy outlining prevention, education and intervention efforts and consequences for policy violations. The policy can be found at https://www.cmu.edu/policies/administrative-and-governance/alcohol-and-drug-policy.html.

CMU Annual Security and Fire Safety Report
- A printed copy of the report can be requested by contacting University Police at 412-268-6232 or campuspd@andrew.cmu.edu.
- The annual security and fire safety report (Carnegie Mellon University Police Department Annual Reports) is also available online at http://www.cmu.edu/police/security-fire-reports/index.html.

Vaccination Policies
- CMU-SV Prematriculation Immunization Policy can be found at https://www.sv.cmu.edu/student-services/student-health.html.

- CMU University Health Services Health Requirements for Incoming Students can be found at https://www.cmu.edu/health-services/new-students/.

Other Information

Voter Registration
Please visit https://www.usa.gov/register-to-vote
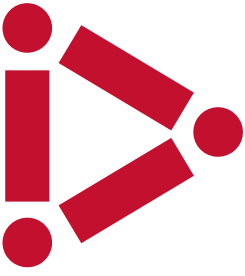
Carnegie Mellon Ethics Hotline
The health, safety and well-being of the university community are top priorities at Carnegie Mellon University. CMU provides a hotline that all members of the university community should use to confidentially report suspected unethical activity relating to financial matters, academic and student life, human relations, health and campus safety or research. Students, faculty and staff can anonymously file a report by calling 877-700-7050 or visiting www.reportit.net (user name: tartans; password: plaid). All submissions will be reported to appropriate university personnel.
The hotline is NOT an emergency service. For emergencies, call University Police at 412-268-2323.

Statement of Assurance
Carnegie Mellon University does not discriminate in admission, employment or administration of its programs or activities on the basis of race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state or local laws or executive orders.

Inquiries concerning the application of and compliance with this statement should be directed to the university ombudsman, Carnegie

Mellon University, 5000 Forbes Avenue, Pittsburgh, PA 15213, telephone 412-268-1018. Obtain general information about Carnegie Mellon University by calling 412-268-2000.

Carnegie Mellon University publishes an annual campus security and fire safety report describing the university's security, alcohol and drug, sexual assault and fire safety policies, and containing statistics about the number and type of crimes committed on the campus, and the number and cause of fires in campus residence facilities during the preceding three years. You can obtain a copy by contacting the Carnegie Mellon Police Department at 412-268-2323. The annual security and fire safety report also is available online at www.cmu.edu/police/annualreports.

Information regarding the application of Title IX, including to admission and employment decisions, the sexual misconduct grievance procedures and process, including how to file a report or a complaint of sex discrimination, how to file a report of sexual harassment, and how the university responds to such reports is available at www.cmu.edu/title-ix. The Title IX coordinator may be reached at 5000 Forbes Ave., 140 Cyert Hall, Pittsburgh, PA 15213; 412-268-7125; or tix@cmu.edu.

Safeguarding Educational Equity / Sexual Misconduct Policy
The University prohibits sex-based discrimination, sexual harassment, sexual assault, dating/ domestic violence and stalking. The University also prohibits retaliation against individuals who bring forward such concerns or allegations in good faith.   The University's Sexual Misconduct Policy is available at https://www.cmu.edu/policies/administrative-and-governance/sexual-misconduct/index.html. The University's Policy Against Retaliation is available at https://www.cmu.edu/policies/administrative-and-governance/whistleblower.html. If you have been impacted by any of these issues, you are encouraged to make contact with any of the following resources:

- Office of Title IX Initiatives, https://www.cmu.edu/title-ix/   412-268-7125, tix@cmu.edu
- University Police, 412-268-2323

STUDENT TUITION RECOVERY FUND

The State of California established the Student Tuition Recovery Fund (STRF) to relieve or mitigate economic loss suffered by a student in an educational program at a qualifying institution, who is or was a California resident while enrolled, or was enrolled in a residency program, if the student enrolled in the institution, prepaid tuition, and suffered an economic loss. Unless relieved of the obligation to do so, you must pay the state-imposed assessment for the STRF, or it must be paid on your behalf, if you are a student in an educational program, who is a California resident, or are enrolled in a residency program, and prepay all or part of your tuition.

You are not eligible for protection from the STRF and you are not required to pay the STRF assessment, if you are not a California resident, or are not enrolled in a residency program.

It is important that you keep copies of your enrollment agreement, financial aid documents, receipts, or any other information that documents the amount paid to the school. Questions regarding the STRF may be directed to the Bureau for Private Postsecondary Education, 2535 Capitol Oaks Drive, Suite 400, Sacramento, CA 95833, (916) 431-6959 or (888) 370-7589.

To be eligible for STRF, you must be a California resident or are enrolled in a residency program, prepaid tuition, paid or deemed to have paid the STRF assessment, and suffered an economic loss as a result of any of the following:

1. The institution, a location of the institution, or an educational program offered by the institution was closed or discontinued, and you did not choose to participate in a teach-out plan approved by the Bureau or did not complete a chosen teach-out plan approved by the Bureau.
2. You were enrolled at an institution or a location of the institution within the 120 day period before the closure of the institution or location of the institution, or were enrolled in an educational program within the 120 day period before the program was discontinued.
3. You were enrolled at an institution or a location of the institution more than 120 days before the closure of the institution or location of the institution, in an educational program offered by the institution as to which the Bureau determined there was a significant decline in the quality or value of the program more than 120 days before closure.
4. The institution has been ordered to pay a refund by the Bureau but has failed to do so.
5. The institution has failed to pay or reimburse loan proceeds under a federal student loan program as required by law, or has failed to pay or reimburse proceeds received by the institution in excess of tuition and other costs.
6. You have been awarded restitution, a refund, or other monetary award by an arbitrator or court, based on a violation of this chapter by an institution or representative of an institution, but have been unable to collect the award from the institution.
7. You sought legal counsel that resulted in the cancellation of one or more of your student loans and have an invoice for services rendered and evidence of the cancellation of the student loan or loans.

To qualify for STRF reimbursement, the application must be received within four (4) years from the date of the action or event that made the student eligible for recovery from STRF.

A student whose loan is revived by a loan holder or debt collector after a period of noncollection may, at any time, file a written application for recovery from STRF for the debt that would have otherwise been eligible for recovery. If it has been more than four (4) years since the action or event that made the student eligible, the student must have filed a written application for recovery within the original four (4) year period, unless the period has been extended by another act of law.
However, no claim can be paid to any student without a social security number or a taxpayer identification number.

Updated: 8/9/2022