Fall Dates to Know

Aug. 19th – First Day of School

Aug. 20th – Tuition Benefit/ Insurance Presentation and GSAC Pizza Party

Aug. 22nd – Get Involved Fair, 10am-2pm Union Patio

Aug. 30th – Add/ Drop Deadline (Tuition Due!)

Sept. 2 – Labor Day

Oct. 6-13th – Fall Break

Nov. 28-29 – Thanksgiving Break

Dec. 5th – Last Day of Classes

Dec. 9-13th – Final Exams

ROBOTICS

THE UNIVERSITY OF UTAH

New Student Orientation

Interdisciplinary Robotics program:

- Kahlert School of Computing
- The Department of Electrical and Computer Engineering
- The Department of Mechanical Engineering

Robotics Advising Team

Steve Mascaro
Director of Robotics Studies
smascaro@mech.utah.edu

Associate Professor (Lecturer)
Mechanical Engineering
Education: Ph.D. in Mechanical Engineering, MIT, 2002
Office: 1151 MEK

Kelly Pearson
Robotics Graduate Student Coordinator
kelly.pearson@utah.edu

Education: B.A. in Journalism,
Child Psychology Minor,
University of Minnesota
Office: 1550 MEK

JOHN AND MARCIA PRICE COLLEGE OF ENGINEERING
THE UNIVERSITY OF UTAH

ROBOTICS FACULTY & LABS

Jake Abbott
Magnetic & Medical Robotics Lab

Edoardo Battaglia
Human-Centered Haptics & Robotics Lab

Daniel Brown
Robot learning under uncertainty, reward inference, and AI safety

Jacob George
NeuroRobotics Lab

Laura Hallock
Human Robot Empowerment Lab

Tucker Hermans
Learning Lab for Manipulation

John Hollerbach
Locomotion and haptic interfaces

Alan Kuntz
AI & Robotics in Medicine Lab

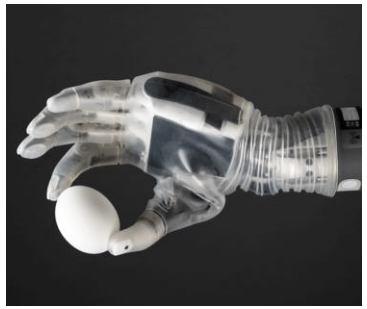
Kam Leang
Design, Automation, Robotics and Control (DARC) Lab

Tommaso Lenzi
HGN Lab for Bionic Engineering

Mark Minor
Robotics Systems Lab

Haohan Zhang
Utah Wearable Robotics Lab

Student Population Fall 2024



PhD

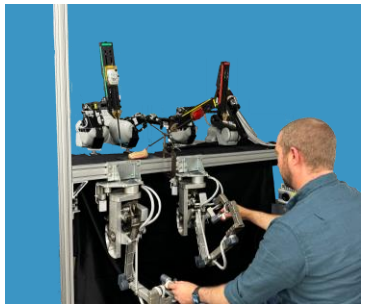
New to the U - 4

Continuing - 10

MS-Thesis

New to the U - 2

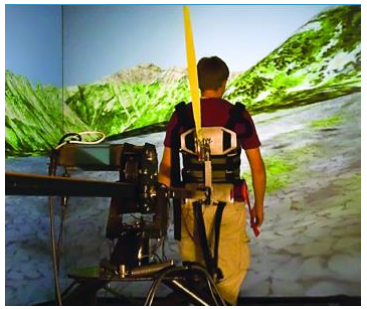
Continuing - 2



MS-Project

New to the U - 2

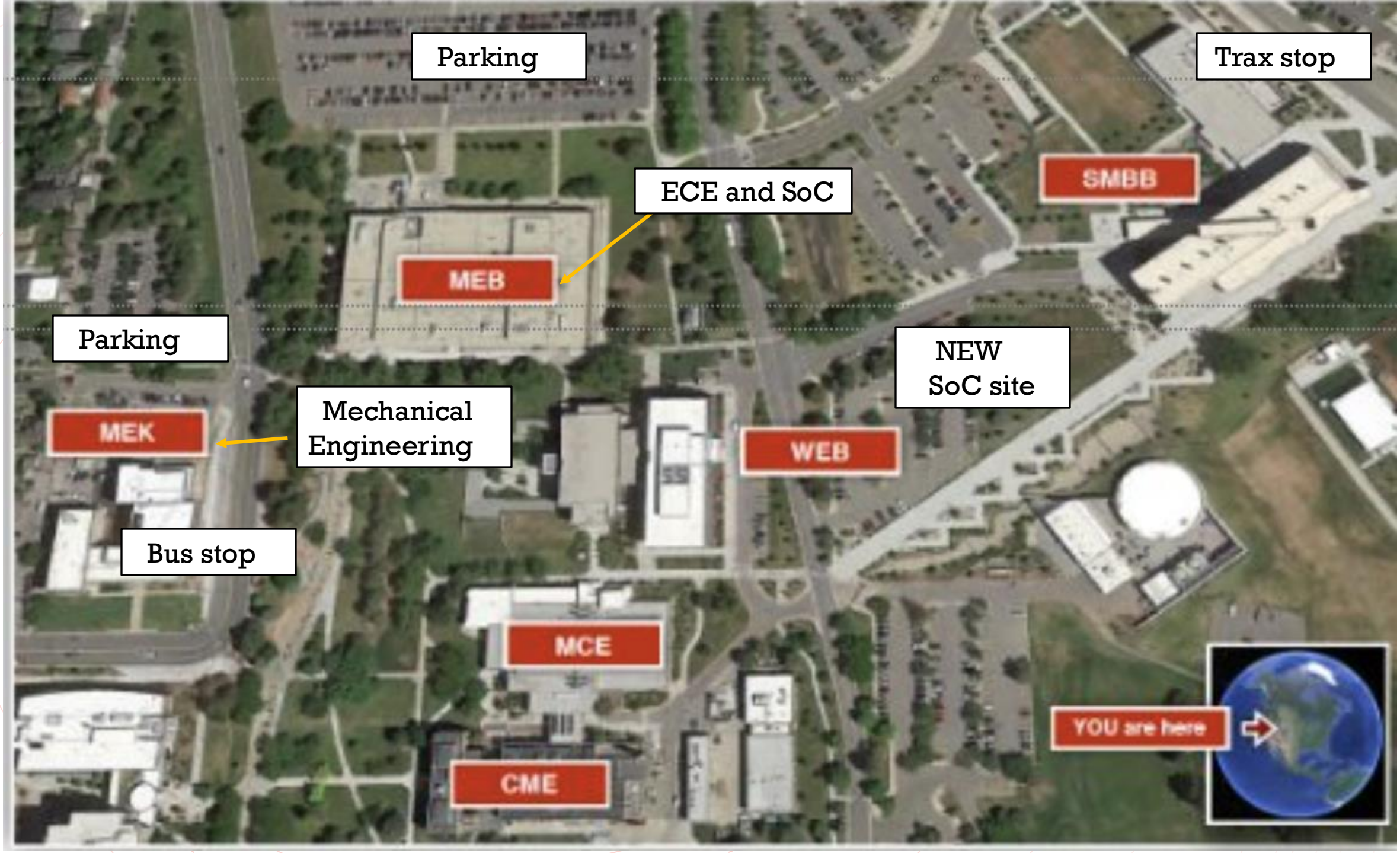
Continuing - 3



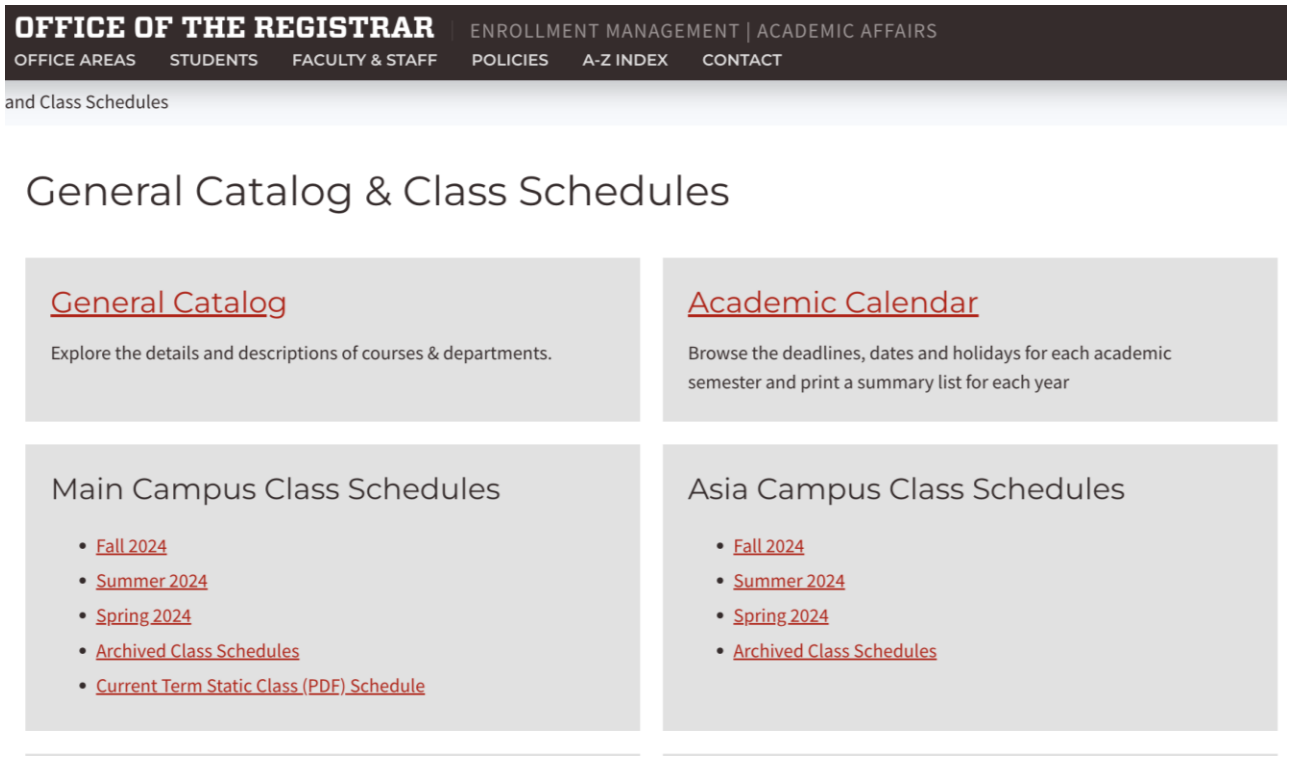
Total

PhD – 14

MS - 9


Parking
Trax stop
ECE and SoC
SMBB
MEB
Parking
NEW
SoC site
Mechanical
Engineering
MEK
WEB
Bus stop
MCE
CME
YOU are here

University Calendar & Deadlines



OFFICE OF THE REGISTRAR
ENROLLMENT MANAGEMENT | ACADEMIC AFFAIRS
OFFICE AREAS
STUDENTS
FACULTY & STAFF
POLICIES
A-Z INDEX
CONTACT

Semester Length Classes

Event	Date
Classes begin	Monday, August 19
Last day to add without a permission code	Friday, August 23
Last day to wait list	Friday, August 23
Last day to add, drop (delete), elect CR/NC, or audit classes	Friday, August 30
Last day to withdraw from classes	Friday, October 18
Last day to reverse CR/NC option	Friday, November 29
Classes end	Thursday, December 5
Reading day	Friday, December 6
Final exam period	Mon.-Fri., Dec. 9-13

https://registrar.utah.edu/Catalog-schedules.php

Our Website *robotics.coe.utah.edu*

HANDBOOK

Graduate Handbook Index

General Information

Academic Misconduct
Advising
Department Funding
Graduate Coursework as an Undergrad
Graduate Health Insurance
Non-Matriculated Coursework
Probation
Program of Study
Research Conduct
Student Responsibilities
Supervisory Committee

FACULTY LABS

Robotics PhD

PhD Degree Requirements
Candidacy for the PhD
Dissertation Defense (Final Exam)
Enrollment Requirement
Required PhD Milestones
Qualifying Exam
Sample Plan_PhD

Robotics MS

MS Degree Requirements
Required MS Milestones
Sample Plan_MS
Thesis Defense

The Graduate School

Continuous Registration
Course 7990 Limitation
Funding Graduate School
Graduate School Events Calendar
Graduate School Policies
Graduate School Resources
International TA Policy
ITA Dates
Leave of Absence
Thesis Office Deadlines
Travel Funding

RESOURCES

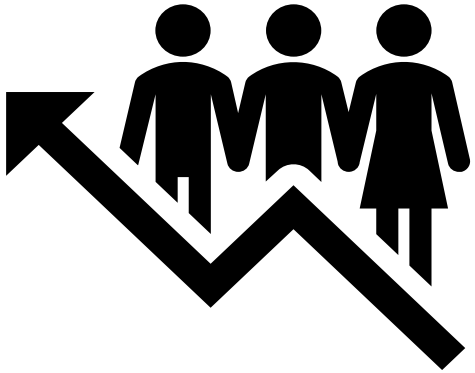
University Resources

Academic Calendar
Campus Safety
Class Schedule
Graduation Deadlines
International Student Scholar Services (ISSS)
Student Resources
University Funding
University IT Guides

Grad Sac & University Clubs/ Involvement

Graduate Student Advisory Committee (GSAC)

GSAC is run by graduate students to serve as a liaison between students and the department. They also organize events to build the graduate community and support our student



gradsac@cs.utah.edu

https://www.ece.utah.edu/grad-sac/

uofu.me.gsac@gmail.com

me-gsac.slack.com

Grad CS-Women on Slack

https://gradcswomen-utah.github.io/index.html

Program options

Introducing the First Robotics Degree Program in the Intermountain West

- Undergraduate Robotics Certificate
- Undergraduate Robotics Minor
- Graduate Robotics Certificate
- Robotics M.S. (thesis or project)
- Robotics Ph.D.

The Utah Bionic Leg, developed by Associate Professor Tommaso Lenzi, named to TIME's list of best inventions of 2023

Assistant Professor Jacob A. George was named Innovator of the Year for his work with the "LUKE Arm", a neuroprosthesis controlled by thought and endowed with a sense of touch.

Artificial Intelligence-based multi-object manipulation from the LL4MA lab directed by Associate Professor Tucker Hermans

ROBOTICS
THE UNIVERSITY OF UTAH

PhD Course Requirements

CORE COURSES
Required

MECHANICS	CONTROL	COGNITION	PERCEPTION
ROBOT 6000 Robotics I: Mechanics	**ROBOT 6100** Robotics II: Control	**ROBOT 6200** Motion Planning *or* **CS 6300** Artificial Intelligence	**CS 6640** Image Processing *or* **CS 6320** Computer Vision

SEMINARS
Required

ME EN 6890 *or* **CS 7930** *or* **ECE 6900**	**ROBOT 6800** Robotics Seminar (Enroll in 2 semesters for 1 credit each semester)

ALLIED COURSES
9-10 Cr. (as needed to reach the 30-credit hour coursework minimum requirement)

RESEARCH

ROBOT 7970
PhD Dissertation
(14 credits minimum)

ELECTIVE COURSES
Select 3 classes from two different categories:

MECHANICS	CONTROL	DESIGN	HUMAN-ROBOT INTERACTION	PERCEPTION
ROBOT 7000 Manipulation, Mobility **ROBOT 7010** System Identification for Robotics	**ME EN 6200/ ECE 6615** Classical Control Systems **ECE 6670** Control of Electric Motors **ME EN 6210/ ECE 6652/ CH EN 6203** State Space Control **ME EN 7200** Nonlinear Control **ME EN 7210** Optimal Control **ECE 6570** Adaptive Control	**ROBOT 6500** Advanced Mechatronics **ROBOT 6960** Wearable Robotics **ECE 6780/ CS 6780** Embedded System Design **ECE 6960** Robotic Millisystems **CS 6956** Medical Robotics	**CS 6360** Virtual Reality **ROBOT 7400** Haptics for VR,Tele-operation, and Physical Human-Robot Interaction **ROBOT 6400** Neural Engineering and NeuroRobotics	**CS 7640** Adv. Image Processing **CS 6353** Deep Learning for Image Analysis **ECE 6530** Digital Signal Processing
COGNITION **CS 6350** Machine Learning **CS 6958** Robot Learning				

ROBOTICS
THE UNIVERSITY OF UTAH

MS Degree Requirements

CORE COURSES

Required

MECHANICS	CONTROL	COGNITION	PERCEPTION
ROBOT 6000 Robotics I: Mechanics	**ROBOT 6100** Robotics II: Control	**ROBOT 6200** Motion Planning *or* **CS 6300** Artificial Intelligence	**CS 6640** Image Processing *or* **CS 6320** Computer Vision

ALLIED COURSES

3-4 Cr. (as needed to reach the 30-credit hour coursework minimum requirement)

ELECTIVE COURSES

Select 2 classes from two different categories:

MECHANICS

ROBOT 7000
Manipulation, Mobility
ROBOT 7010
System Identification for Robotics

COGNITION

CS 6350
Machine Learning
CS 6958
Robot Learning

CONTROL

ME EN 6200/ ECE 6615
Classical Control Systems
ECE 6670
Control of Electric Motors
ME EN 6210/ ECE 6652/ CH EN 6203
State Space Control
ME EN 7200
Nonlinear Control
ME EN 7210
Optimal Control
ECE 6570
Adaptive Control

DESIGN

ROBOT 6500
Advanced Mechatronics
ROBOT 6960
Wearable Robotics
ECE 6780/ CS 6780
Embedded System Design
ECE 6960
Robotic Millisystems
CS 6956
Medical Robotics

HUMAN-ROBOT INTERACTION

CS 6360
Virtual Reality
ROBOT 7400
Haptics for VR,Tele-operation, and Physical Human-Robot Interaction
ROBOT 6400
Neural Engineering and NeuroRobotics

PERCEPTION

CS 7640
Adv. Image Processing
CS 6353
Deep Learning for Image Analysis
ECE 6530
Digital Signal Processing

SEMINARS

ME EN 6890
or **CS 7930**
or **ECE 6900**
(Thesis option only)

ROBOT 6800
Robotics Seminar
(Enroll in 2 semesters for 1 credit each semester)

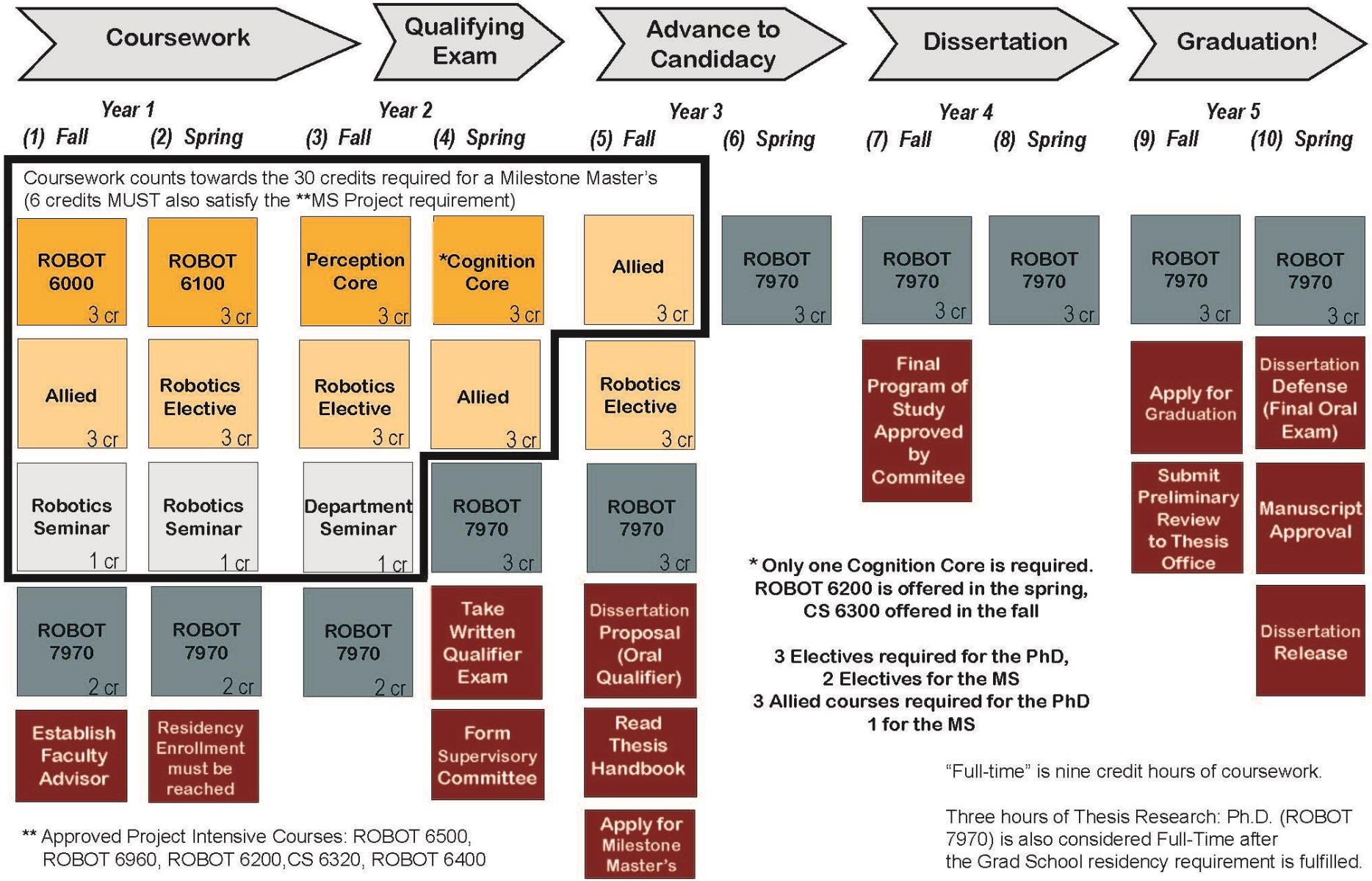
THESIS or PROJECT

ROBOT 6970 Master's Thesis
or
ROBOT 6920 Graduate Project
or
ROBOT 6920 + Approved coursework with intensive project (6 Credits)

Example Program of Study – Ph.D. (Post-B.S.) in Robotics

(for Post-B.S. students who would like to earn a Milestone Master's in Robotics on the way toward their Ph.D.)

Below is one possibility for a program of study that satisfies the M.S. degree and milestone requirements, AND the Ph.D. requirements.



** Approved Project Intensive Courses: ROBOT 6500, ROBOT 6960, ROBOT 6200,CS 6320, ROBOT 6400

*** Only one Cognition Core is required.**
ROBOT 6200 is offered in the spring,
CS 6300 offered in the fall

3 Electives required for the PhD,
2 Electives for the MS
3 Allied courses required for the PhD
1 for the MS

"Full-time" is nine credit hours of coursework.

Three hours of Thesis Research: Ph.D. (ROBOT 7970) is also considered Full-Time after the Grad School residency requirement is fulfilled.

Example Program of Study – Ph.D. (Post-M.S.) in Robotics

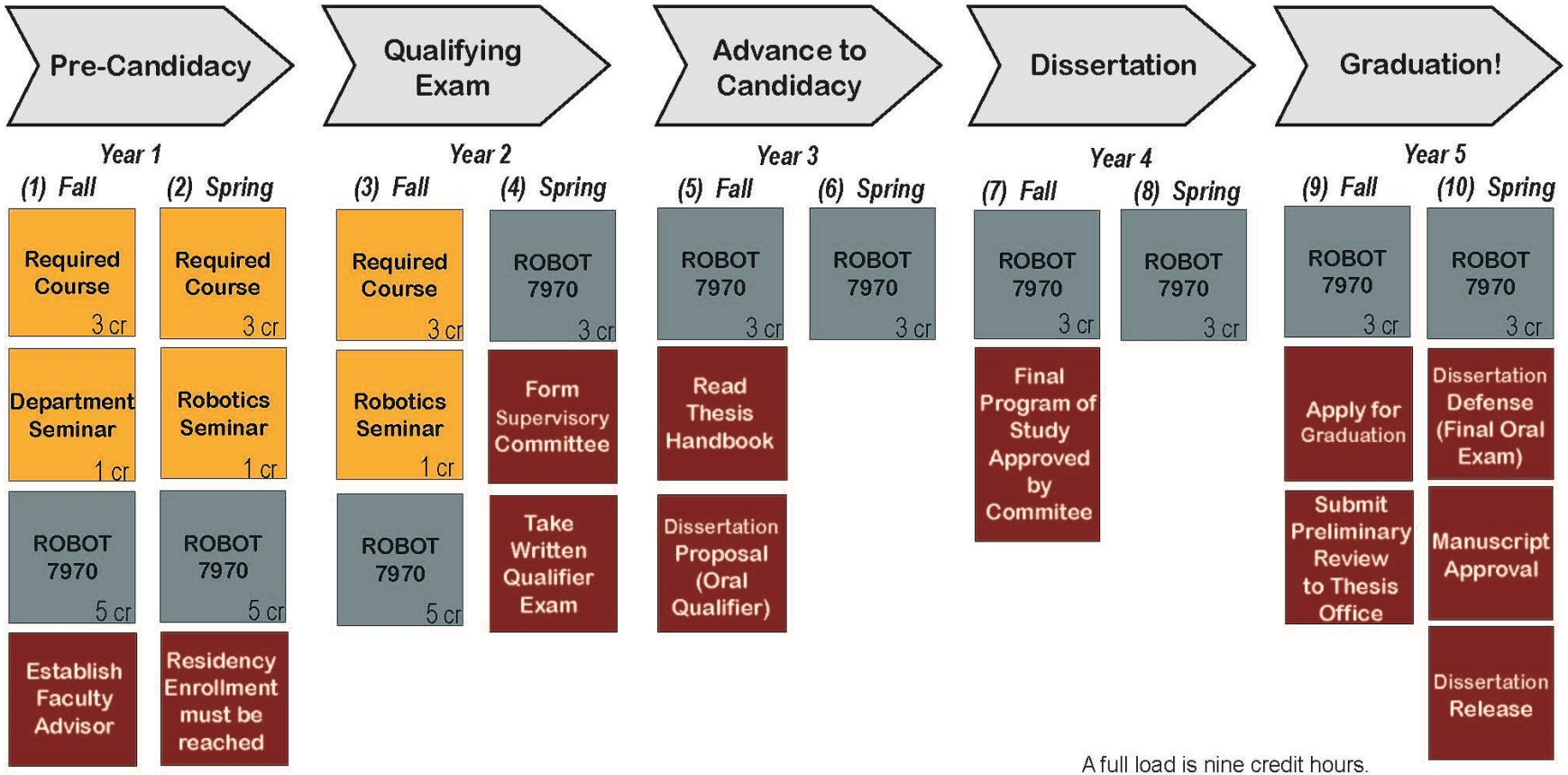
M.S. Engineering graduates from the University of Utah may *waive up to all Ph.D. courses (33 course credits). Dissertation (7970) credits required @ 14 minimum.

M.S. Graduates from outside the University of Utah may *waive up to 21 course credits.

Course Work | Research | Required Milestone | Optional

*See Robotics Graduate Student Coordinator for initial credit evaluation. Final waivers will be ***per discretion of the Director of Robotics Studies***

Below is one possibility for a program of study that satisfies the Ph.D. degree/ milestone requirements FOR A POST-MS CANDIDATE FROM OUTSIDE THE UNIVERSITY OF UTAH WHO IS ABLE TO APPLY ALL 21 ELIGIBLE WAIVED CREDITS. Course selections may change based on faculty advisement.



** Only 1 Cognition Core option is required

A full load is nine credit hours.

Three hours of Thesis Research: Ph.D. (course number 7970) is also considered a full load after the residency requirement is fulfilled.

Example Program of Study for an M.S. in Robotics

Below is one possibility for a program of study that satisfies the M.S. degree and milestone requirements. At least 9 credits per semester is required to qualify for tuition benefit. Course selections may change based on faculty advisement.

MS Project or Mixed Option

(1) Fall	(2) Spring	(3) Fall
ROBOT 6000 3 cr	ROBOT 6100 3 cr	*Cognition Core or Elective 3 cr
Elective 3 cr	Allied 3 cr	Additional core/ allied 1 cr
Perception Core: CS 6640 or CS 6320 3 cr	*Cognition Core or Elective 3	ROBOT 6920 or Project Course 3
Robotics Seminar 1 cr	Robotics Seminar 1 cr	ROBOT 6920 or Project Course 3
Establish Faculty Advisor	Form Supervisory Committee	Apply for Graduation
	Final Program of Study	

*Only 1 Cognition Core option is required. If not completing both, substitute 1 with an elective course (2 total elective courses required).

CS 6300 is offered in the fall, ROBOT 6200 in the spring.

** Enrollment in 1 credit (minimum) is required during the semester of the defense.

Talk to Graduate Student Coordinator

MS Thesis Option

(1) Fall	(2) Spring	(3) Fall	(4) Spring
ROBOT 6000 3 cr	ROBOT 6100 3 cr	*Cognition Core or Elective 3 cr	ROBOT 6970 **1-9 cr
Elective 3 cr	Allied 3 cr	Department Seminar 1 cr	Thesis Defense (Final Oral Exam)
Perception Core: CS 6640 or CS 6320 3	*Cognition Core or Elective 3	ROBOT 6970 3 cr	Submit Defended Review to Thesis Office
Robotics Seminar 1 cr	Robotics Seminar 1 cr	ROBOT 6970 3 cr	
Establish Faculty Advisor	Form Supervisory Committee	Apply for Graduation	
	Read Thesis Handbook		
	Final Program of Study		

Course Work | Research | Required Milestone | Optional | Project

ROBOT 6920 (6 credits):
1) Faculty-advised projects,
2) Projects with a company, or
3) Projects with a student club

+ Required Presentation @ Robotics Seminar

ROBOT 6920 + Coursework

ex: 3 credits of 6920 + 3 credits ROBOT 6200: Motion Planning

ex: 2 credits of 6920 + 4 credits ROBOT 6500: Adv. Mechatronics

2 Project Approved Courses

Ex: ROBOT 6960+ROBOT 6400

Approved Project Intensive Courses include:

ROBOT 6500: Advanced Mechatronics

ROBOT 6960: Wearable Robotics

ROBOT 6200: Motion Planning

CS 6320: Computer Vision

ROBOT 6400: Neural Engineering & Neurorobotics

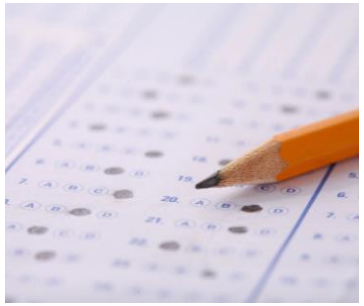
Milestones

- *See handbook for complete list of milestones*

Supervisory Committee

MS – 2nd Semester

PhD – 4th Semester



Quals

PhD only

Written Exam – 4th semester

Proposal

Dissertation Proposal

PhD only – 5th semester

Program of Study

Preliminary – 1st semester

Final – 7th semester

Oral Defense

MS – 4th Semester

PhD – 10th Semester

The qualifying exam is administered by the student's PhD supervisory committee. The qualifying exam consists of two parts that satisfy the Graduate School requirement for a "written" and an "oral" component of the qualifying exam

(1) Written Qualifier:	(2) Proposal Defense:
A written examination covering the candidate's chosen area of specialization.	An oral examination involving a defense of the candidate's written thesis proposal.

Question Format

The format of each question can be chosen by the committee members. Possibilities include (but are not limited to):

1. "Take home" question, to be researched and answered by the student

2. A "closed book sit down" examination, to be written during a fixed period without use of background materials;

3. An "open book sit down" examination, similar to (2), but permitting use of reference materials.

A student who fails their first attempt may retake the written exam once in the Fall or Spring semester following their first attempt

The "oral component" of the qualifying exam consists of a public presentation of the student's dissertation proposal, allowing time for the public to provide questions and the candidate to provide answers (Q&A).

Milestones: Qualifying Exam (PhD only)

Written Exam

Written Qualifier (Written Exam)	
Timeline	**Description**
No later than the end of the 3rd week of the 4th semester	Student should email the Coordinator to begin the process (Supervisory Committee MUST be finalized **first**)
2 weeks before the exam	Student: 2-page research summary due to committee Faculty: Given 2 weeks to write exam based off research summary
Student receives the exam: Given 7 days (max) to complete	Exam completion by student
Faculty receives exam: Given 7 days (max) for grading	Exam grading
Faculty discussion: Must happen within 7 days (max) *after* grading completion	Supervisory Committee grading discussion
Student: Receives results with 7 days *after* faculty discussion	Notification to student

Oral Proposal

Proposal Defense (Oral Exam)	Before and After (Grad School rules)
Timeline	**Description**
Early in the 5th semester (no later than one month prior to the semesters' end)	Student uploads a dissertation proposal to Supervisory Committee and suggested exam date
2 weeks before the scheduled proposal (oral exam)	Supervisory Committee reviews proposal & signs Content Approval Form
1 week before the oral exam	Student provides a proposal summary using the Public Defense Announcement form to the Coordinator
1 week after the oral exam	Student uploads final summary

Milestones: Defense

The Grad School limit for a PhD Defense is 7 years.

MS-Thesis students
4th semester

PhD students
10th semester

Defense paperwork must be completed with the Robotics Coordinator PRIOR to the defense:

- **PhD Dissertation Content Approval (required before scheduling Oral Defense)**
- **Announcement Template**
- **Oral Defense Report**
- **Defense Summary**

Milestone: Program of Study

PRELIMINARY

Preliminary Program of Study Approval

By the end of their first semester, the student must:

- Upload the Preliminary Program of Study form in the Grad Tracking System.
- Select graduate courses after consultation with their temporary or permanent advisor.
- List all taken and planned classes on the form that are to count toward the degree, including research hours.
- Approval from faculty advisor required.

FINAL

Final Program of Study Approval

Upon registering for their final course(s), the student must:

- Upload the Final Program of Study form.
- List all classes that are to count toward the degree, including research hours.
- Approval from faculty advisor and committee required.

Unsubmitted — deadline **May 15, 2023**

The progress report has not been submitted yet!

[redacted]

Active Student

PhD
Program

Fall 2023
Admitted

Edit Profile

General Profile

First Name: [redacted]

Last Name: [redacted]

UNID: [redacted]

Previous Degrees

No previous degrees!

Teaching Mentorship

No teaching mentorship!

3 SEMESTERS IN PROGRAM EXCLUDING SUMMERS

MILESTONE PROGRESS

Submit Progress Report

Unsubmitted — deadline **May 15, 2023**

The progress report has not been submitted yet!

All 18 | Due 17 | Incomplete 17 | Complete 1

ITA Training

Non-Core milestone

For International Students (who will serve as Teaching Assistants) only
Prior to 1st semester

Thursday, August 1, 2024

Mark as Incomplete

Marked Completed: Aug 1, 2024

Initial Program of Study

Poor **2 semesters** excluding summers — 05/01/2024

Core milestone

PDF Form:

Fill Form

Enrollment Residency Requirement

Acceptable **3 semesters** excluding summers — 08/01/2024

2nd Year Due Progress

Acceptable **3 semesters** excluding summers — 08/01/2024

[redacted]

Active Student

PhD — Program
Fall 2023 — Admitted
— — GPA

Open Profile

More Info

Uploaded Documents

Upload File

Milestone

[redacted]csLab Offer[7859].pdf — [redacted]

Uploaded By: [redacted]

Uploaded: 2023-05-16 16:02:50

Standalone Forms

Forms that are not part of the milestones

Can Be Started By Faculty

Robotics PhD Dissertation Proposal [Oral Qualifying Exam] Report.pdf

Supervisory Committee

Good **4 semesters** excluding summers — 01/01/2025

Core milestone

No file chosen Upload

Pick date completed

Written Qualifying Exam

Good **4 semesters** excluding summers — 01/01/2025

Core milestone

No file chosen Upload

Pick date completed

Milestone MS (optional)

Good **null semesters** excluding summers — TBD + null semesters

Non-Core milestone

Waiting for dependant milestone *"Written Qualifying Exam"* completion

3rd Year Due Progress

Good **5 semesters** excluding summers — TBD + 5 semesters

Core milestone

Waiting for dependant milestone *"Initial Program of Study"* completion

FORMS

ROBOTICS
THE UNIVERSITY OF UTAH

PhD Final Program of Study

This form is due after you complete all coursework.

NAME: _____

STUDENT ID #: _____ **UMAIL:** _____

Core Courses (12 credits)

_____ Semester X Robot Control Core (Required): ROBOT 6100 | Robotics II: Control | 3 Credits

_____ Semester X Robotics Mechanics Core (Required): ROBOT 6000 | Robotics I: Mechanics | 3 Credits

Cognition Core (Pick One):

_____ Semester ☐ ROBOT 6200 | Motion Planning | 3 Credits or

☐ CS 6300 | Artificial Intelligence | 3 Credits

Perception Core (Pick One):

_____ Semester ☐ CS 6640 / BME 6640 / ECE 6532 (cross-listed) | Image Processing | 3 Credits

☐ CS 6320 | Computer Vision | 3 Credits

Elective Courses (9 credits)

Semester	Course Name	Course Number	Cr.

Allied Courses (9 credits)

Semester	Course Name	Course Number	Cr.

3 credit hours of seminar

2 Robotics seminars + 1 departmental seminar with your advisor.

14 dissertation research credit hours

STUDENT ID#: _____ **EMAIL:** _____

Proposal Defense Date: _____

The Committee evaluated this proposal defense as follows:

Pass	**Pass with Corrections**	**Fail**
☐	☐	☐

Corrections Summary (to be completed by Chair - use additional pages, if necessary):

Committee Approval (*you are concurring with the Proposal Defense Summary and any corrections noted above*)

Chair: _____ (Name) _____ (Department)

Member: _____ (Name) _____ (Department)

Member: _____ (Name) _____ (Department)

Member: _____ (Name) _____ (Department)

Member: _____ (Name) _____ (Department)

ENGINEERING
PROGRESS TRACKER

Home Progress

3 SEMESTERS IN PROGRAM EXCLUDING SUMMERS

MILESTONE PROGRESS

Unsubmitted — deadline **May 15, 2023**

The progress report has not been submitted yet!

All 18 Due 17

[redacted]

Active Student

ITA Training

Non-Core milestone

For International Students (who will serve as Teaching Assistants) only
Prior to 1st semester

Thursday, August 1, 2024

Mark as Incomplete

Initial Program of Study

Poor **2 semesters** excluding summers — 05/01/2024

Core milestone

Uploade

Milest [redacted]

Milest

Uploc

Uploc

PDF Form:

Warning

Submitting this form will send a request to your advisor to review.
If you don't have an advisor, it will go directly to the staff.

Please make sure you have filled out all of your available information for previous years before submitting this form. Otherwise, it will be sent back to you.

Do you want to continue?

No Yes

Tuition Benefit Program

https://gradschool.utah.edu/funding/tbp/guidelines.php

- TBP is available IF you are employed by the University [TA, RA, etc]
  - Complete I-9/ hire paperwork with your faculty's department
  - Apply as a TA every semester, if applicable
  - Verify funding with your Faculty Advisor

Required Student Support

Tuition benefit-participating students must be financially supported by their academic program or faculty advisor/PI with an assistantship, traineeship, or fellowship. Eligibility for benefits requires the students being supported at a minimum threshold for each semester of support, which is as follows:

Required minimum support, AY25.

Fall Semester	Spring Semester	Summer Semester
$10,000	$10,000	$6,670

Annualized required minimum support, AY25

9-month (Fall/Spring)	12-month (Fall/Spring/Summer)
$20,000	$26,670

- Students must maintain 3.0+ GPA
- Students must be enrolled "full time" [3-9 credits]
- TBP does not last forever!
- Student health insurance is 100% covered
  - Required for International Students
  - EMI dental and eye insurance options

Tuition Benefit DOES NOT COVER

Differential Tuition

Outside Fees: Books, lab fees, course fees

Repeat Courses

Withdrawn Courses

International Surcharge

Tuition Benefit Process

Email from Coordinator prior to the semester

Complete Tuition Benefit Form *every semester*

Elect student health insurance Y or N

Form is entered by Coordinator

In CIS – Student sign Tuition Benefit document

Tuition Benefit will show on student tuition account by TUITION DUE date

Tuition is due by Aug. 30
(differential is not covered)

Robotics Community

Robotics Seminar
GradSac Formation
Social Media pages
News