Graduate Studies in MSE

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Who is MSE GSC?

MSE Graduate Student Council (GSC)

Official graduate student organization for the MSE Department

Our mission is to improve your graduate student experience!

I. Communicate with the department
II. Plan networking events
III. Plan social events

Create an inclusive and supportive environment for the MSE graduate community

Represent the MSE Department in the Graduate Assembly (GA) and the Associated Students of the University of California (ASUC)

Website: http://msegsc.berkeley.edu

MSE GSC

Silvers, H., & Dictionary.com. (2019, April 12). What Does impostor syndrome Mean? Retrieved from https://www.dictionary.com/e/pop-culture/impostor-syndrome/

Transitioning to Grad School

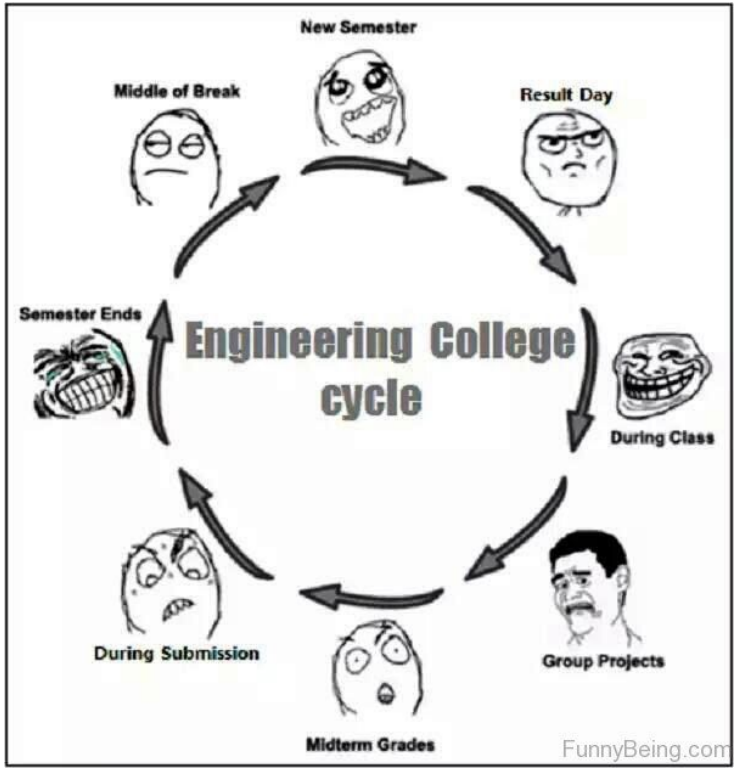
Undergrad vs. Grad Program

Undergraduate Framework

Problem sets + lab reports + midterms + finals

Purpose: keep you on track and motivated to learn the material

Reality: cramming and learning everything at the last minute



100 Amazing Engineering Memes. (2017, May 15). Retrieved from http://www.funnybeing.com/100-amazing-engineering-memes/

Undergrad vs. Grad Program

Graduate Framework

Graduate studies and research is all about you being **PROACTIVE** to specialize in your field!

Our Recommendations to Make the Most of Grad School

Take classes that are both interesting to you and helpful to your research

- Majority of your work in grad school will revolve around your research, but you also have to take classes

If you are unsure, talk to your PI and/or senior students in your lab!

Mandatory seminars for 1st and 2nd years to receive greater exposure to the field:

- MSE Seminars usually every Thursday
  - Coffee and snacks ~30 min before

Optional, but interesting, seminar series:

- Nano Seminars every Friday
- CoE Seminars
  - Predominantly in the spring semester

Respectful Seminar Etiquette

Our Recommendations to Make the Most of Grad School

Stay current on literature

- Journal websites
- Twitter!

Don’t be afraid to go back to a textbook!

- UC Berkeley has 17 libraries!
- A lot of content is electronic, but sometimes you have to still check out a book :)

Map of All UC Berkeley Libraries:
http://www.lib.berkeley.edu/sites/default/files/librarymap.pdf

J. Am. Chem. Soc. (2019, July 30). J. Am. Chem. Soc. (@J_A_C_S). Retrieved from https://twitter.com/j_a_c_s
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Twitter. (2019). [Official Twitter Logo]. Retrieved from https://about.twitter.com/

BE PROACTIVE! 🤓

Path through a Grad Program

Youshaei, J. (2018, August 30). 16 Tips Every College Graduate Needs To Hear In 2018. Retrieved from https://www.forbes.com/sites/jonyoushaei/2018/08/02/16-tips-every-college-graduate-needs-to-hear-in-2018/#1a08797c319d

Path through a Grad Program

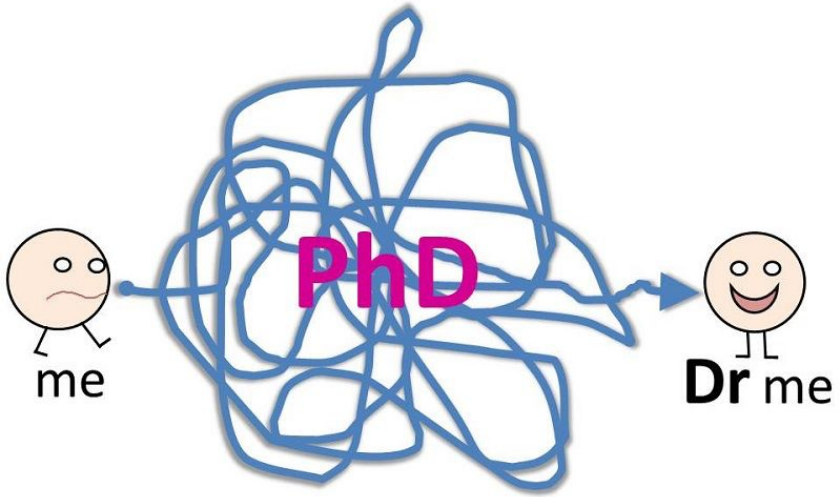
The biggest piece of advice we can give you:

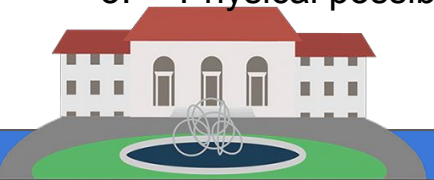
Do not compare yourself to other grad students

- In your lab
- In your year in the department

Everyone has a different path through grad school that is dependent on:

1. The type of research you do
2. Your advisor's expectations
3. Prior experience
4. Equipment being broken or not
5. Physical possibility of doing something





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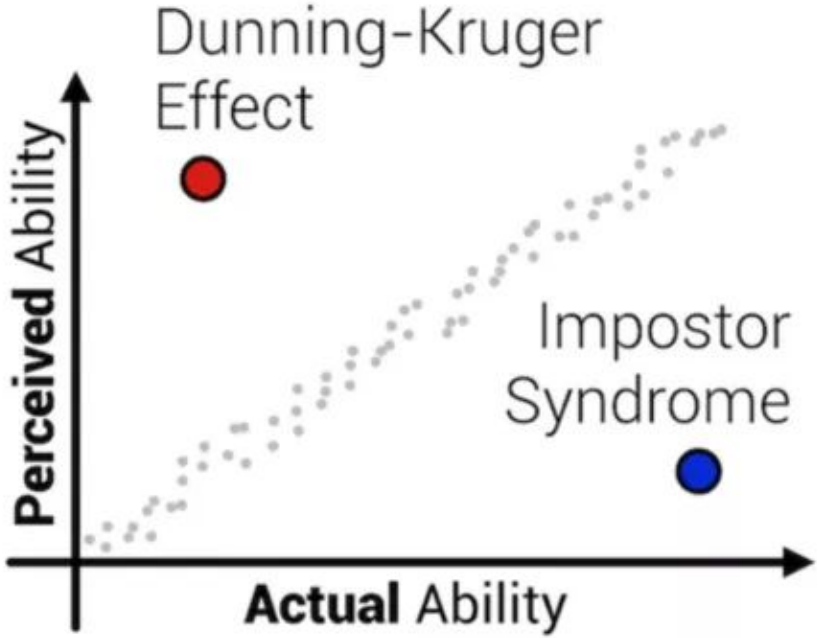
Path through a Grad Program

Imposter Syndrome

“Imposter syndrome is a psychological pattern in which an individual doubts their accomplishments and has a persistent internalized fear of being exposed as a ‘fraud.’” -Wikipedia

“...believing that one’s accomplishments came about not through genuine ability, but as a result of having been lucky, having worked harder than others, or having manipulated other people’s impressions…” [1].



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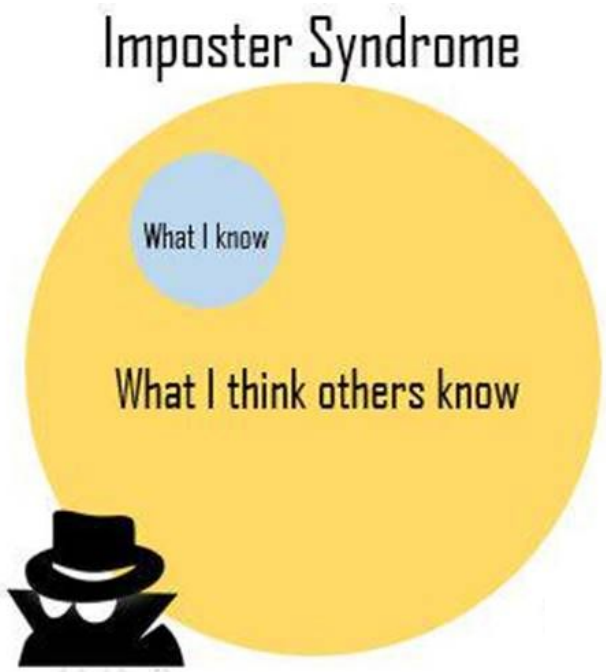
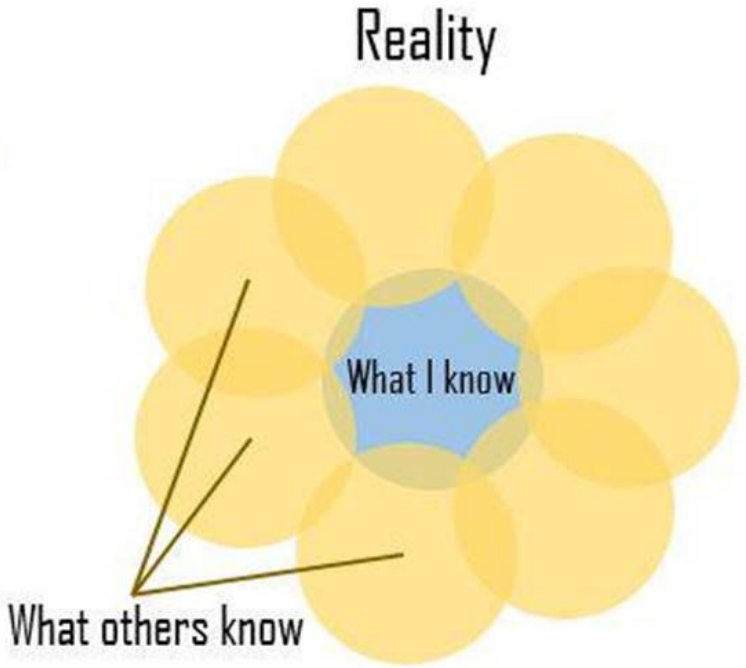
Langford, J., & Clance, P. R. (1993). The imposter phenomenon: Recent research findings regarding dynamics, personality and family patterns and their implications for treatment. *Psychotherapy: Theory, Research, Practice, Training,30*(3), 495-501. doi:10.1037/0033-3204.30.3.495

Imposter Syndrome. (2019, April 16). Retrieved from http://humanpotentialrunning.com/uncategorized/imposter-syndrome/

Path through a Grad Program





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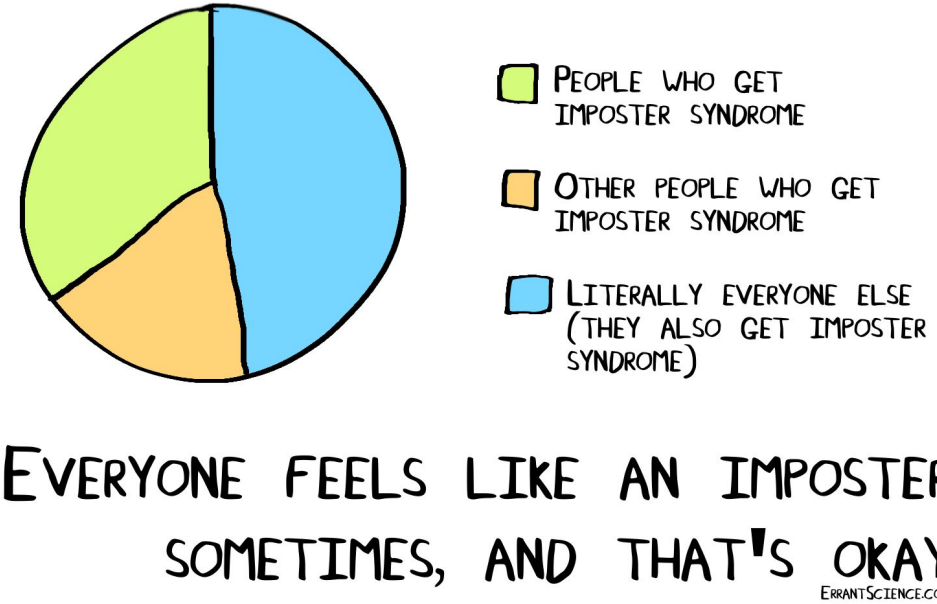
Path through a Grad Program



Preliminary Exam

Exam Format

I. Thermodynamics

II. Phase Transformations

III. Structure and Bonding

IV. Mechanical Properties

V. Electrical Properties

VI. Materials Characterization

6 sections x

15 minutes per section =

90 minutes total testing

You will receive which professors are testing via email in late October/early November

You will receive your testing schedule (randomly assigned) via email in early December

Exam Format

Group 1

Room 1

Thermodynamics & Phase Transformations

Room 2

Mechanical Properties & Structure and Bonding

Room 3

Materials Characterization & Electrical Properties

Group 2

Room 1

Thermodynamics & Phase Transformations

Room 2

Mechanical Properties & Structure and Bonding

Room 3

Materials Characterization & Electrical Properties

Exam Format

Sample Schedule 1

Room 1
Room 2
Room 3
Break!

Sample Schedule 2

Room 1
Break!
Room 2
Room 3

Sample Schedule 3

Room 1
Room 2
Break!
Room 3

Exam Logistics

Email or meet with the testing professors to discuss studying resources

Most professors will recommend a certain textbook or 2 to study from to prepare for their section

READ THOSE TEXTBOOKS!

Everyone studies at their own pace, so you should start studying whenever you feel comfortable to do so

- From experience, we would recommend to start studying by December **at the latest**

Exam Logistics

Individual and group studying is very important in this process

It is also very important to practice speaking!

In study sessions, practice asking mock test questions and practice answering out loud

- Also practice writing notes or drawings while you speak

We HIGHLY recommend you do a mock prelim exam before you get to the actual test

Upperclassmen are here to help!

We are happy to schedule mock prelim exams with you in exchange for lunch :)

The studying aspect is obviously very important, but the verbalization aspect is just as important

→ That is most of the exam!

Exam Scoring

Each of the 6 sections is graded on a scale of 0-4

1. 3.1-4.0 = A
2. 2.1-3.0 = B
3. 1.1-2.0 = C
4. 0.1-1.0 = D
5. 0.0 = F

You must meet 3 requirements in order to pass the exam:

1. Score **>** 3.0 in 4 out of 6 sections
2. Score **>** 2.0 is all 6 sections
3. Average score **>** 3.0 across all 6 sections

Exam Scoring

Thermo	Phase	Structure	Electrical	Mechanical	Charac.	Average Score	Result
3.1	3.2	3.6	3.7	2.9	3.5	3.33	Pass
2.9	3.5	3.2	2.9	3.3	2.9	3.12	Fail
3.1	2.5	3.3	2.8	3.0	2.6	2.88	Fail

When do I find out if I have passed or not?

Short answer:

The end of the testing day! ~6:30 pm

Timeline:

Your grade for a section will be determined by the examining professor when you finish taking that section

- You will not be told your grade at this time

The examining professors will all come together at the end of the day to average and verify scores

You will then receive an email from Ariana notifying you whether you have passed or not

You will not receive your score breakdown by email

- You are welcome to visit Ariana in the MSE Office and ask for your scores after the exam

What happens if I fail the exam?

You have a chance to retake prelims!

The 2nd and final exam opportunity is usually offered in August of that same year, right before the start of the Fall semester

Course Requirements

9 required classes total!

Ph.D. Course Requirements

5 major courses (core MSE courses)

I. Thermodynamics

II. Structure and Bonding

III. Materials Characterization

IV. Materials Properties

V. Materials Processing

4 minor courses

2 minors with 2 classes each

Both minors can be outside the department

You can still choose to do a minor in the department, but one of your minors **must** be outside the department (CoE rule)

The Major Courses

MSE CORE COURSE REQUIREMENTS (must take one class from each of the 5 categories)

1) **Thermodynamics:** MSE 201A
2) **Structure and Bonding:** MSE 201B, MSE 202, MSE 215
3) **Materials Characterization:** MSE 204, MSE 241, MSE 242
4) **Materials Properties:** MSE 205, MSE C212, MSE 213, MSE 217, MSE 223, MSE 224, MSE C225, MSE 250, MSE 251, MSE 260
5) **Materials Processing:** MSE 121, MSE C216, MSE 221, MSE 223, MSE 224, MSE C225, MSE 227, MSE 250, MSE 251

Sample Minor Schedules

Example 1

Electrical Engineering	Chemistry
EE 230C	CHEM 221A
EE 232	CHEM 220A

Minors constructed around certain departments

Example 2

Polymer Science	Materials Physics
MSE 251	MSE 218
ME C223	PHYSICS 141A

Minors constructed around certain topics, with classes across departments

GPA Requirements

5 major courses (core MSE courses)

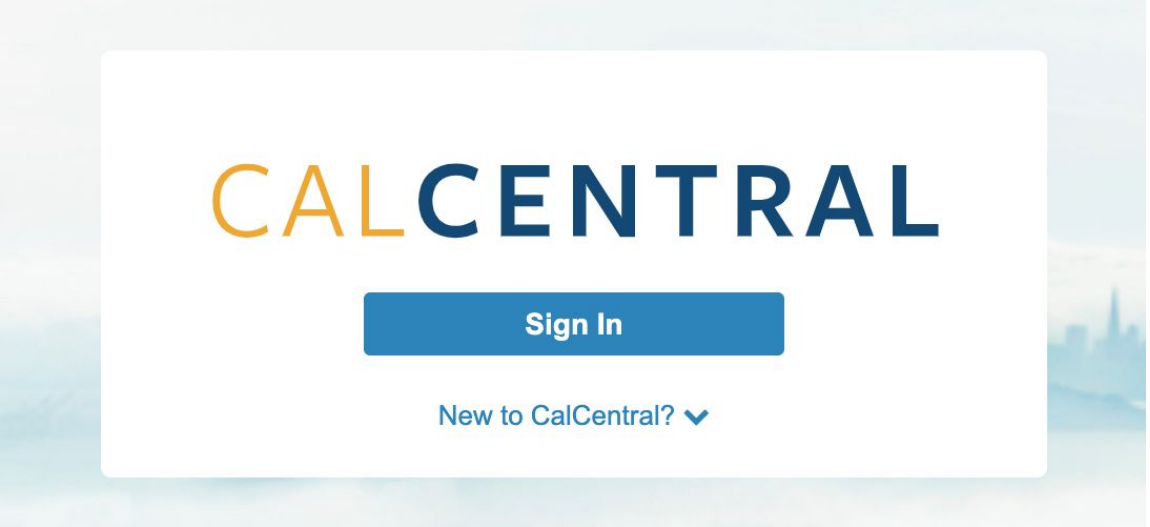
3.5

4 minor courses

3.0

(in each minor)

How do I sign up for classes?



https://calcentral.berkeley.edu/

Our Course Recommendations for First Semester

MATSCI 201A = Thermodynamics and Phase Transformations in Solids

- Major class - counts toward an MSE class requirement
- This class will cover pretty much everything you need to know for the Thermo section of prelims
- It will also cover some things you need to know for the Phase Transformation section of prelims

MATSCI 200A = Survey of Materials Science

- Optional class - does **not** count toward any MSE class requirement
- This class is a fantastic overview of all things MSE
- If you were not an MSE undergrad, this course could be a good way to start studying for prelims
- Morris's textbooks are incredible!! Highly recommend reading them as part of your studying

Our Course Recommendations for First Semester

You can certainly take another major class this semester that will count towards one of your requirements

If this is something you are interested in doing, the following courses are also being offered this fall:

I. MATSCI 215 (Intro. Comp. Mat. Sci.)
II. MATSCI 218 (Optical Mat. and Devices)
III. MATSCI 223 (Semiconductor Materials)
IV. MATSCI 251 (Polymer Surf. and Inter.)

Please feel free to come talk to us about courses!

Unit Requirements

Units required every semester:

I. 1 unit of MSE 298.001
II. 1 unit of MSE 298.00X
III. 7 units of MSE 299.00X*

X = number assigned to your advisor

* This course jumps to 14 units once you finish all coursework

Total units required for PhD = 28

- 16 of these must be graduate units in the major field (core MSE courses)
- Cannot be ungraded courses
- Exceptions to be made in coordination with major field advisor

SHIP Eligibility

M.S. Course Requirements: Plan I

Coursework

20 total units

- 8 of these must be graduate units in MSE
  - 6 of these must be graded (can have 2 units of ungraded)
  - No more than 2 of these can come from MSE 298 (seminar) or MSE 299 (research)
- 12 of these must be upper-division or graduate courses approved by your Major Field Advisor

Research

You submit a research thesis that must be approved by your Major Field Advisor

- Must be submitted to AAC
- Must have a committee approved by the Graduate Division of 3 members:
  - Your PI
  - A CoE member not in MSE
  - An MSE member

M.S. Course Requirements: Plan II

Coursework

24 total units

- 12 of these must be graduate units in MSE
  - No more than 2 of these can come from MSE 298 (seminar) or MSE 299 (research)
- The remaining 12 of these must be graded upper-division or graduate courses approved by your Major Field Advisor

Research

You submit a project report that must be signed by your PI and other faculty

- Can be a paper published, or about to be published
- Can be separate report describing your research during the M.S. program

Does anyone already have a Masters degree?

(M.S. or M.Eng.)

Qualifying Exam

What is the qualifying exam?

The 2nd and last major department test that you take in graduate school in order to advance to candidacy

The combination of the preliminary exam and the qualifying exam test your knowledge of the field of MSE and your ability to communicate that knowledge effectively

- Prelims = fundamental knowledge test
- Quals = fundamental knowledge + most current knowledge (literature) test

The qualifying exam uniquely tests your ability to identify and conduct significant original research

1. Identify a significant problem
2. Assemble the background information needed to grasp it in the context of the field
3. Construct a technical approach that provides a plausible path to its solution

AKA, are you an effective researcher?

When do I take the qualifying exam?

No one expects you to be an effective researcher right now

The MSE department recommends that you take your quals at the **end of your 2nd year**

You must complete all of your major classes prior to taking your qualifying exam

Upon passing your qualifying exam, you advance to candidacy

- In addition to finally being able to call yourself a Ph.D. candidate, you also get a pay increase: Step V → Step VI

Qualifying Exam Committee

Your qualifying committee will be 4 faculty members

I. 2 members must be from the MSE department
II. At least 1 member must be from outside of the MSE department

It is customary to have committee members from your minor fields if they have direct application to the research area

Your advisor cannot be a member of your committee

When choosing your quals committee, you should try to select professors who will be able to speak to your abilities during the exam and into the future

- Research, coursework, and teaching abilities

GSI Requirement

GSI = Graduate Student Instructor

You are required to serve at least 1 semester as a GSI for an MSE course

- Undergrad or grad level MSE course

You apply to be a GSI for a course in the semester before you GSI

- Online application sent to you by the MSE Office

Your GSI requirement is fulfilled by a GSI appointment at a level between 25% and 50%.

- There are reader positions at 25% appointment
- These will **not** satisfy your requirement

If you are not currently a California resident as designated by the Office of Residency Statement of Legal Residence (SLR), you **cannot** GSI in your 1st year

GSI Pedagogy Course

In the semester that you serve as a GSI, you are also required to take a pedagogy course

It is required to take the pedagogy course offered by your department, unless your department does not offer one

MSE currently does not offer a GSI course in house, but we co-sponsor the offering from IEOR

You should enroll in this section

IEOR 375: GSI Proseminar on Teaching Engineering Instructor

Prof. Ken Goldberg (IEOR)

Course Number: 32738

This course is aimed at IEOR, MSE and Nuc. Eng. students

GSI Eligibility

1. You cannot be on filing fee status
2. Minimum GPA of 3.1
    a. You cannot have more than 2 incomplete grades in upper division or graduate courses
3. It is recommended that international students have advanced to candidacy
4. If English is not your native language, you must pass either the Speak test or the OPT test prior to being a GSI
5. You must be enrolled in at least 12 units that semester

GSI English Language Requirement

If English is not your native language, or if you did not receive your undergraduate degree in the US, you must take and pass the Speak or OPT exam

The department recommends that you take the Speak or OPT exam at least 1 year (but not more than 2 years) before you advance to candidacy

If you take the Speak or OPT exam and pass, the score is good for 2 years

If you do not pass the Speak exam and the OPT exam, you will be required to take the English course LANGPRO 100A

- Upon completing this course, you will be given the opportunity to re-take the Speak or OPT exam

Questions?