Chemical, Biological & Environmental Engineering

COLLEGE OF ENGINEERING

CBEE
2015-2016
GRADUATE STUDENT HANDBOOK

Oregon State University
# Contents

WELCOME ...................................................................................................................................................... 1

FACULTY & STAFF CONTACTS......................................................................................................................... 2

GETTING SETTLED .......................................................................................................................................... 3
  GRADUATE ORIENTATION PROGRAM ................................................................. 3
  ONID ACCOUNTS ..................................................................................................................... 3
  OSU ID CARD ......................................................................................................................... 3
  BUILDING ACCESS .............................................................................................................. 4
  GRADUATE STUDENT OFFICES .................................................................................... 4
  MAILBOXES ......................................................................................................................... 5
  EMPLOYMENT/PAYROLL ............................................................................................. 5
  TELEPHONES .................................................................................................................. 6
  XEROX, OFFICE SUPPLIES, & SCANNER ........................................................................ 6
  VENDING MACHINE ....................................................................................................... 7
  COMPUTER USE .............................................................................................................. 7
  PARKING AND SHUTTLES ............................................................................................. 8
  SMOKING POLICY ......................................................................................................... 9

SPECIAL SERVICES AT OSU ............................................................................................................................10
  CAMPUS RESOURCE GUIDE ..................................................................................... 10
  OSU GRADUATE STUDENT ASSOCIATION .............................................................. 10
  OFFICE OF EQUITY AND INCLUSION (OEI) ................................................................ 10
  COUNSELING & PSYCHOLOGICAL SERVICES (CAPS) ........................................... 10
  CORVALLIS COMMUNITY RELATIONS (CCR) .......................................................... 10
  CAMPUS EMERGENCIES ............................................................................................. 11

FINANCE AND ACCOUNTING .........................................................................................................................12
  PURCHASING ................................................................................................................... 12
  TRAVEL ........................................................................................................................... 13

FACULTY .......................................................................................................................................................16

RESEARCH FACILITIES AT A GLANCE ................................................................................................................21

ACADEMICS ..................................................................................................................................................22
  GENERAL INFORMATION .......................................................................................... 22
  ACADEMIC PERFORMANCE ....................................................................................... 22
  GRADUATE ASSISTANTSHIPS ....................................................................................... 22
  REGISTRATION ............................................................................................................. 22
  PREREQUISITE COURSEWORK REQUIREMENTS ................................................................... 23
  TUITION BILLS .............................................................................................................. 24
  LEAVE OF ABSENCE ................................................................................................... 24
  SUMMER TERM ............................................................................................................. 25
  DISMISSAL FROM GRADUATE SCHOOL ..................................................................... 25
  BASIC REQUIREMENTS FOR ALL GRADUATE DEGREES .............................................. 25

MASTER DEGREE PROGRAM .........................................................................................................................29
  MASTER’S THESIS .......................................................................................................... 29
  NON-THESIS COMPREHENSIVE ORAL EXAM (MENG STUDENTS) .............................. 30
  THESIS DEFENSE COMMITTEES (MS STUDENTS) .......................................................... 31
Welcome to Oregon State University (OSU) and the School of Chemical, Biological, and Environmental Engineering (CBEE). This handbook is intended to help you get settled and answer some of the questions you might have as a new graduate student in our school. If, after reading the contents, you have unanswered questions, please feel free to ask for help. The staff, faculty, and fellow graduate students in the School are available and willing to help solve any issues as they arise. Additional information on deadlines, procedures, and requirements is provided by the current Oregon State University Graduate Catalog and Guide to Success which may be obtained from the Graduate School: [http://oregonstate.edu/dept/grad_school/](http://oregonstate.edu/dept/grad_school/).

Graduate students in CBEE are responsible for complying with the rules of the University, the Graduate School, the College of Engineering (COE), and the School. In some instances, the requirements of the School are more restrictive than those of the Graduate School. In such cases, the School requirements specified in this document will apply.

The faculty hopes that your time at OSU will be rewarding, memorable, and fruitful.

Anita Hughes, Graduate Program Coordinator  
Dr. Jeff Nason, Associate Professor and Associate School Head for Research and Graduate Training  
Dr. Chih-hung Chang, Professor and CHE Graduate Committee Chair  
Dr. Lewis Semprini, Distinguished Professor and ENVE Graduate Committee Chair
## FACULTY & STAFF CONTACTS

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GETTING SETTLED

The School of Chemical, Biological, and Environmental Engineering (CBEE) resides in the Gleeson Hall with satellite facilities in Merryfield, Graf, and Owen Halls.

GRADUATE ORIENTATION PROGRAM

CBEE will hold orientation sessions on September 21st and 22nd. These orientation sessions will draw attention to some of the major components of this manual. This orientation is required for all incoming students.

ONID ACCOUNTS

ONID is your OSU Network ID. Every student is assigned an ONID account. **You must activate your ONID account in order to register for classes.**

To activate your ONID account, go to [http://onid.oregonstate.edu](http://onid.oregonstate.edu) and choose “Sign Up For ONID” in the upper-left hand column. **ONID Email is the official communication link that the university uses to communicate with students.**

Use your ONID username and password to access email, online course materials, grades, and financial accounts. Among the services you may access are:

- **ONID Email**
- **Canvas**
- **MyOSU**
- **Google Apps for OSU**
- **OSU’s Wireless Networks**
- **ResNet** (campus dorm residents only)
- **Computing Labs**
- **Interlibrary Loan**

**ONID Support**

Support documentation and several video tutorials are posted at the [Helpdocs](http://oregonstate.edu/helpdocs/accounts/onid-osu-network-id) website. Phone and email support for ONID is provided by the [OSU Computer Helpdesk](http://oregonstate.edu/is/tss/och/contact-get-help-osu-computer-helpdesk), 541-737-3474.

OSU ID CARD

All OSU students may obtain a student identification card.

Corvallis campus students must visit the [ID Center](http://oregonstate.edu/helpdocs/accounts/onid-osu-network-id) in Memorial Union, 103, after registering for classes at OSU. Photo identification is required (state issued driver’s license or ID, passport, or military ID). The OSU ID card is your official identification for using campus services, facilities (door access) and activities, and is valid as long as you are registered for classes. It is scanned at many locations to verify registration. Your OSU ID card is your meal card if you live in university housing.

**MyCard** is the online card office where students can submit a digital photo of themselves for their initial ID card, view their OSU ID card balance and past card transactions, add money to their OSU...
Card Cash or Orange Rewards account, set up "Donors" (contributors other than themselves), and deactivate or reactivate their lost OSU ID card. OSU Card Cash and Orange Rewards is the campus debit account used with your ID card for copies at the library and purchasing food on campus. Card Cash and Orange Rewards are separate from your resident hall meal plan. You can add money to your OSU Card Cash or Orange Rewards at the ID Center or online at http://mycard.oregonstate.edu/. See this website for more information on Orange Rewards, a discount debit plan.

BUILDING ACCESS

KEYS
Graduate students are granted the authority to carry building and lab keys. All requests for keys must be supported by an academic advisor. Key forms may be picked up in the Main Office from the Office Coordinator. The forms must then be taken to the Key Shop where you must present your student ID. The Key Shop is located behind Kerr Administration Building, between McAlester Fieldhouse and the Facilities Shops. It is open Monday - Friday, 1100 – 1500.

The security of your keys is quite important for everyone’s safety. It is imperative that any loss of keys be reported immediately to the Main Office. You are requested to exercise the utmost care in the use of your keys. Under no circumstances should you lend your keys to other students or visitors.

AFTER-HOURS PASSES
Campus Security patrols all buildings periodically outside of building open hours (2300 – 0700). Anyone without an After-Hours Work Permit and valid photo ID will be required to leave the building. Office and laboratory doors and windows are to be kept closed and locked when not occupied. Security patrols will lock any open, vacant rooms. Do not let anyone into the building after hours. Individuals who are authorized to be in the building after hours are issued appropriate access codes and keys. Anyone abusing this system will have his/her After-Hours Work Permit revoked.

Passes change color at the beginning of each academic year. You must obtain a new pass each year or risk being escorted from the buildings.

Passes must be obtained from the proper personnel for each building. For Gleeson, Graf, and Merryfield Halls, please see the Office Coordinator in the Gleeson Main Office. For Owen Hall please see Julie Barlow in Civil and Construction Engineering.

GRADUATE STUDENT OFFICES
CBEE graduate student offices are located in various locations of all four of the buildings that we occupy. Offices are assigned by the Graduate Programs Coordinator in conjunction with your research advisor. Space is limited, therefore, not all students will be granted office space nor guaranteed a computer. Students on graduate research appointments will be given preference (PhD priority), with remaining students placed as space permits. For office assignments, see the Graduate Programs Coordinator. Once placed, please do not change your office space assignment without the
School Operation Manager’s approval.

**Cleaning of the desk is the occupant’s responsibility.** Please maintain a clean work environment and leave the desk cleaner than when you arrived. Cleaning supplies are available if needed. You are also expected to help keep common areas and shared equipment in graduate student offices clean (e.g., microwaves, refrigerators, whiteboards, study tables, etc.).

**MAILBOXES**

Each graduate student is assigned a mailbox located in Gleeson 102. U.S. mail is delivered directly to the Printing and Mailing Center where it is sorted and distributed to the remainder of campus. Campus mail arrives once daily at approximately 0900. U.S.P.S., FedEx, and other freight carriers deliver directly to Gleeson 103 throughout the course of the day. Please check your mailbox regularly for mail, package notifications, returned homework, school circulars, and other information.

All packages are received in Gleeson 103. They will remain in the main office, Gleeson 103, until you pick them up. A notification will be placed in your mailbox alerting you to the arrival of a package. You will receive an email notification for package arrival if the package is unusually large or requires temperature control. Office hours are 0800 – 1700, Monday-Friday.

Please be sure that all packages and correspondence is addressed properly. The correct address for all mailing or shipping to CBEE is the following:

<YOUR NAME OR YOUR MAJOR PROFESSOR>
CBEE or your major designation (Chemical Engineering, etc.)
102 Gleeson Hall
Oregon State University
Corvallis, OR 97331-2702

Mailboxes are setup for your use and are available to receive USPS items. Tampering in another person’s mailbox is the same as tampering with any standard mail receptacle and is a federal offense.

**EMPLOYMENT/PAYROLL**

**NEW HIRES**

If a student is offered employment either via hourly work or an assistantship, new hire paperwork must be completed in order to receive payment for your services. The following steps must be taken:

1. Supervisor must contact Graduate Programs Coordinator with job specifics, and
2. Student must report immediately to the Graduate Programs Coordinator to receive a new hire employment packet.

All employees must have a social security number in order to work. International students should report to the Graduate Programs Coordinator immediately to obtain instructions on applying for a social security number if you do not have one.

**TIMESHEETS**

Timesheets are found online at [http://mytime.oregonstate.edu](http://mytime.oregonstate.edu). Hourly students (e.g., graders, lab workers, etc.) must clock in/out for each shift. Timesheets are submitted on the 15th of each month. GRA/GTA and summer stipend appointments do not require a timesheet. Please confirm with the Graduate Programs Coordinator if you are unsure whether or not you should be filling out a timesheet.
**PAYCHECK**
Payment is distributed on the last non-holiday business day of the month. Direct deposits are available and will take place on the same day. Paycheck stubs for direct deposit recipients are available via the Online Services portal. Payroll checks are distributed to the department via the daily mail delivery at approximately 0900. If you have opted for a paper check, it will be placed in your mailbox upon arrival.

**HEALTH INSURANCE**
All Graduate Assistants are required to carry health insurance. Insurance may be provided by the university at a total premium cost of 15% to you as bargained by the Graduate Student Union. University provided insurance may be waived as long as the student supplies documentation that the outside coverage is equal to or greater than the coverage provided by the University. For more information, enrollment forms, and premium rates, visit the Student Health Services website. Deadline for fall term signup is October 01.

For more information, please see [http://studenthealth.oregonstate.edu/graduate-assistant](http://studenthealth.oregonstate.edu/graduate-assistant).

Other student health and wellness resources on campus include:

- OSU Student Health Services ([http://studenthealth.oregonstate.edu/](http://studenthealth.oregonstate.edu/), 541-737-9355)
- OSU Counseling & Psychological Services ([http://oregonstate.edu/counsel/](http://oregonstate.edu/counsel/), 541-737-2131)

**TELEPHONES**

**Long Distance Calls**
An authorization code is required to make long distance telephone calls. You will be given a code by your major professor, if you are expected to make such calls as part of your day-to-day research work. The authorization code is unique and is intended for use only by the person to whom it is assigned.

Authorization codes must be kept secure and not given to other persons. Codes must not be used for personal calls or purposes other than those intended. Directions on how to make and charge personal calls are provided online via Network Services Telecom website:

[http://oregonstate.edu/is/services/network-services/telecom](http://oregonstate.edu/is/services/network-services/telecom).

**FAX MACHINE**
A fax machine (541-737-4600) is available for student or work-related purposes. Long distance numbers require an authorization code. The fax machine is located in Gleeson 102. Please see the Main Office staff for assistance.

**XEROX, OFFICE SUPPLIES, & SCANNER**
The School provides a copier and document scanner, intended for research or teaching purposes only, in Gleeson 102. Anyone desiring to make personal copies will need to utilize resources available on the main floor of the Valley Library. Maintaining the cleanliness and organization of the copy room is important; please do your part.
Copies for class or official use must be approved by a faculty member, but generally, the class TA will make copies for class use. A copier code is required and can be supplied by the Instructor for whom the copies are being made.

The scanner is the HP scan-to-PDF machine on the counter. It will scan papers through an automatic document feeder, or the lid can be lifted and papers or books set on the glass. This machine is pre-programmed with the local email address book and will allow you to send a PDF to the desired email address.

Office supplies are for the use of faculty and staff members only. A stapler and hole-punch are available in the student lounge (Gleeson 109) for student use. These items should also be available in the various student office spaces. If any equipment is missing, please report it to the Main Office.

VENDING MACHINE

A Pepsi machine and a snack foods machine are located in the student lounge of Gleeson Hall, room 109.

The CBEE Student Club also has snacks for sale in this same room. Cans of soda are also available at $0.75 from the fridge at the opposing end. All of these sales are on the honor system and proceeds go to help raise club funds to support student activities. Your support is appreciated.

COMPUTER USE

Computer labs are available in most engineering buildings. They require an engineering account to log in. These computers maintain software for word processing, spreadsheet, and Internet connectivity applications. Options are available for remotely accessing research and other database or modeling software.

School computers are supplied on most graduate student office desks to allow you to perform your research activities and course work, and they should not be used for games or other personal uses during normal business hours (0800 - 1700, Monday – Friday). After hours personal use, within reason (as described by University policy), is allowed as long as others do not need the computers for their research or class activities. Computer use supporting funded research takes priority over use for non-funded research or personal activities.

Do not copy ANY software onto the School’s computer hard disks without approval from the School Head and the Network Administrator. Software licensing and disk space availability are two issues that must be considered. The installation of your own personal copies of software on the School’s machines without permission exposes the School to an unacceptable potential liability and therefore cannot be allowed. Please ask permission for the installation and use of your personal software if it is important to your research or course work. Also, please do not copy any software from the School’s computers without permission. This action, again, violates software licensing agreements.

COMPUTER USE POLICY

All use of OSU computer systems must conform to the University’s Policy on Acceptable Use of University Computing Facilities, which is located at

http://oregonstate.edu/helpdocs/accounts/onid-osu-network-id/getting-started/acceptable-use-policy

OSU computer systems must not be used for any illegal activity, or for storage or distribution of copyrighted material (e.g., music, videos, e-books, etc.).
If you have any general questions about using University computers, please contact Jordan Jones in Owen 236 (541-737-6516), or e-mail support@engr.orst.edu for assistance.

**PARKING AND SHUTTLES**

Except in the open or pay lots, all motor vehicles parked on campus from 0700 to 1700, Monday through Friday, must display a valid parking permit. On-street parking is available for up to 2 hours/day in the neighborhoods surrounding the OSU campus, and metered parking is available on Monroe St. (parking in these areas is enforced by Corvallis Police). All parking rules are enforced during posted hours, and citations will be given for unauthorized parking on or around campus.

For more information contact Parking Services at 541-737-2583, or visit their web site at [http://transportation.oregonstate.edu/parking](http://transportation.oregonstate.edu/parking).

The OSU campus and surrounding areas are serviced by buses operated by the Corvallis Public Transit System ([http://www.corvallisoregon.gov/index.aspx?page=884](http://www.corvallisoregon.gov/index.aspx?page=884)). All bus service is free, and the buses generally run at 30 minute intervals during the working day from Monday-Saturday (no service on Sunday). The “Night Owl” runs at night (typically 2100 to 0230) Thursday–Saturday.

OSU offers a free campus shuttle service for the convenience of students, staff, and visitors. Beginning this September, the improved OSU Shuttle will be called the Beaver Bus. The name Beaver Bus was previously used for the late night service operated by Corvallis Transit System. That service will resume in October, under the name “Night Owl.” The OSU Beaver Bus will provide expanded shuttle services to transport people from outer parking areas to and around campus.

- **Extended hours of operation:** 0700 to 1900
- **Four buses** serving campus on **three routes** for 33 weeks per year with **5 to 14 minute** service loops
- **Live shuttle mobile apps tracking systems**
SafeRide (541-737-5000, saferide@oregonstate.edu) is a student fee-supported, on-demand vanpool service for students, staff, and faculty working on campus at night. This service is free and runs from 1900 – 0100 in Fall and Spring term and 1800 to 0100 in Winter term. SafeRide services most of the OSU campus and surrounding city areas.

SMOKING POLICY

OSU’s Corvallis campus is smoke-free. This policy includes quads, parking lots, and all other footspace within the confines of campus. Please consult the map on the following webpage for the campus boundary

http://oregonstate.edu/smokefree/map.
SPECIAL SERVICES AT OSU

CAMPUS RESOURCE GUIDE

The campus resource guide is a list of services available to students and faculty. For details, please visit http://oregonstate.edu/dept/grad_school/resourceguide.php.

OSU GRADUATE STUDENT ASSOCIATION

The CBEE Graduate Student Association is a registered student organization dedicated to improving graduate student life in the OSU School of Chemical, Biological, and Environmental Engineering. Group activities and responsibilities include the planning of social events, administration of the graduate seminar series, representation on the faculty graduate committee, professional and social support structure for current, past, and future graduate students, and continued dedication to the overall improvement of the OSU CBEE Graduate Program. As a student led, student oriented group, active involvement and representation from all graduate students associated with the School is desired and encouraged.

OFFICE OF EQUITY AND INCLUSION (OEI)

Contact: Angelo Gomez, Executive Director and Title IX Coordinator 541-737-3556; Angelo.Gomez@oregonstate.edu
OEI addresses concerns about bias, discrimination, discriminatory harassment, bullying, and retaliation. Additionally, the Executive Director is the university’s Title IX Coordinator and should be consulted on disclosures of any form of sexual harassment, including sexual/dating/domestic violence and stalking (For additional information see Employee Responsibilities).

COUNSELING & PSYCHOLOGICAL SERVICES (CAPS)

Contact: Marcey Bamba, Interim Director 541-737-2131; marcey.bamba@oregonstate.edu
CAPS will consult with faculty/staff on how to manage difficult mental health situations including depression, severe anxiety, suicidal thoughts or other psychological or emotional disturbances. The emergency counseling and consultation services are available to students and faculty 8:30 am – 4:30 pm Monday, Tuesday, Wednesday, and Friday; Thursday consultations are available from 11:00 am – 4:30 pm. In addition, you may also speak to an after-hours counselor any time the office is closed.

CORVALLIS COMMUNITY RELATIONS (CCR)

Contact: Jonathan Stoll, Director 541-737-8606; jonathan.stoll@oregonstate.edu
CCR was established to enhance neighborhood livability and inspire shared responsibility to help foster a healthy, livable and inclusive Oregon State University – Corvallis community. The independence of living on one’s own can be liberating, but extremely challenging for students. CCR connects students with community resources that foster good neighborly behavior and educational tools to educate tenants of their rights and responsibilities.
CAMPUS EMERGENCIES

Contact: Oregon State Police/Public Safety 541-737-7000 or dial 911
If the behavior is placing someone in immediate risk or if a serious or threatening incident occurs in the classroom, academic building or on campus, Public Safety should be contacted immediately.
FINANCE AND ACCOUNTING

PURCHASING

Several options listed below exist for purchasing supplies for OSU. Please contact the School Accountant to help you get started.

PURCHASING CARD (PCard)
The PCard is a quick and convenient way for units to obtain many of the items needed for day-to-day operations. Contact the School Accountant to make purchases using the PCard.

PCards may be used only to purchase goods and some services for the institution. Such purchases must comply with OSU policies governing purchasing and credit card usage. A $4,999 dollar limit per transaction exists.

Restrictions: The following are prohibited uses of the card:
- Cash Advances
- Inter-Departmental Expenses
- Any Travel or Hosting Related Expense:
- Transportation Fares - e.g., airfares, bus fares, train fares, ferry, etc.
- Misc. Lodging Charges e.g., room service, movies, phone, laundry service, etc.
- Meals
- Food / Groceries
- Alcoholic Beverages
- Entertainment
- Weapons / Ammunition

See a total listing of prohibited transactions on the Business Affairs website at

http://oregonstate.edu/fa/businessaffairs/accountspayable/visa_prohibited_uses

AUTO PAY VENDORS
OSU has store accounts at various local businesses where OSU faculty and staff may charge business expenses. The monthly statement of all invoices from the vendor is processed by central Accounts Payable rather than by individual departments or schools.

Obtain Index and Activity codes from School Accountant before using a store account. Vendors will require OSU ID when making a purchase. Upon making a purchase, obtain an itemized receipt and forward to School Accountant.

Major participating vendors are Office Max, Office Depot, Grainger, VWR, Azumano Travel, Teel’s Travel Planners, Enterprise Car Rental, Robnett’s Hardware, Bi-Mart, and Corvallis Napa Auto Parts. For a current list of CBEE online vendors, see the appendix in the back.

OSU INTERNAL SERVICE/SUPPLIES
Below are OSU departments who provide supplies or services to other OSU departments and bill the receiving department. Check with your School Accountant before you purchase or make
reservations for:

- OSU Book Store (http://osubookstore.com),
- Surplus Property (http://surplus.oregonstate.edu/),
- Chemistry Store (http://chem.science.oregonstate.edu/chemistrystores),
- Printing and Mailing (http://printmail.oregonstate.edu/),
- OSU Motor Pool (http://motorpool.oregonstate.edu),
- Environmental Health & Safety/Hazardous Waste Pickup (http://oregonstate.edu/ehs/).

**DIRECT-BILL TO OSU**

Vendors send individual invoices to OSU departments for supplies or services purchased by authorized personnel for operations.

- Check with vendors to ensure they will bill OSU before ordering.
- Check with School Accountant for purchasing procedures.
- Make purchase and submit receipts/packing slips to School Accountant.
- School Accountant will process individual invoices for payment as they are received.

**PERSONAL REIMBURSEMENTS**

Use of a Departmental Procurement Card or OSU’s Auto Pay Vendors are the preferred methods for OSU business related purchases. On the occasion when logistical reasons or extenuating circumstances occur that preclude the use of normal OSU purchasing processes or protocols, employees may (with approval from their manager) make small purchases (normally less than $100) with personal funds and then subsequently be reimbursed by OSU.

- Only purchases related to OSU business purpose will be reimbursed.
- Get itemized receipts, a personal credit card charge slip alone is NOT valid.
- Submit reimbursement request and backup documents to School Accountant for processing.
- All reimbursements must be submitted for payment within 60 days of incurring the cost or within 60 days after the conclusion of the travel/field-work during which the expenditure was made

**Restrictions:**

- NOT for purchase of gift certificates
- NOT for test incentive payments
- NOT for incentive payments to Institutional Review Board (IRB) human subjects
- NOT for equipment rental

Purchases that have been made with personal funds will be reimbursed by OSU when the following documentation is provided:

- Documentation showing purchase and payment by the employee,
- Statement of University business purpose, including intended use.

**TRAVEL**

**TRAVEL PLANNING**

Check with your School Accountant **before any** travel.
Conference Registration:
Conference registration can be prepaid using the departmental procurement card. See your School Accountant for instructions. If registration is processed on a personal card, you will be able to claim reimbursement only AFTER completion of the trip.

FOREIGN TRAVEL
International travel on grant funding
This travel should be authorized through OPAA (Office for Post Award Administration). Submit a Foreign Travel Authorization form to your School Accountant prior to making travel plans.

http://oregonstate.edu/fa/businessaffairs/bcr#opaa

Restrictions apply to airfare, check with department accountant, and see Fly America Act.

http://oregonstate.edu/fa/manuals/gcg/209-09

AIR TRAVEL
The University recommends that airfare for university-related travel is booked through one of the contracted travel agencies for direct billing to the university. Travel Agent contact information:
Azumano Travel: azcorvallis@azumano.com; 800-334-2929
Teel’s Travel Planners: travel@travel-planners.com; 800-824-1028

MILEAGE IN LIEU OF AIRFARE:
See your School Accountant to verify whether specific trips are allowable using mileage in lieu of airfare. A quote for the airfare that would be purchased for the business trip is required. OSU will reimburse mileage up to the amount of the airfare and associated expenses that would have been paid for air travel.

GROUND TRANSPORTATION
Vehicle rental:
Cars can be rented through the University Motor Pool or billed through Enterprise or National. See your department accountant for billing instructions. Rental should be for economy or compact rate whenever possible.

Personal Vehicle:
Private vehicle mileage is reimbursed at the current published Business Affairs rate. As of 1/1/2015, the current rate is $0.575/mile.

Parking:
Employees are expected to utilize cost effective parking while in travel status. Parking at Portland airport is authorized up to the Economy Lot rate ($10/day).

MEAL PER DIEM:
Meals while in overnight travel status can be reimbursed at current per diem rates. Meal per diem varies by locality. Current rate by city and state can be viewed at the following link

http://oregonstate.edu/fa/businessaffairs/travel/tres/per_diem_us

On one day trips with no overnight stay, breakfast and/or dinner are reimbursable to the employee as a taxable benefit when their itinerary supports departure/return time as 2 hours prior to/after
their regular work shift. Per diem rates may be used. *Lunch is not reimbursed on a one day trip unless it is a part of the meeting and the menu and cost are arranged by event organizers.*

**LODGING:**
Itemized receipts are required for lodging. Reimbursement can be approved up to the maximum per diem lodging amount. An exception for higher rates can be made for conference lodging with documentation showing conference lodging rate. Current rate by city and state can be viewed at the following link

http://oregonstate.edu/fa/businessaffairs/travel/tres/per_diem_us

**TRAVEL REIMBURSEMENTS**

The fillable Form can be found online here:  
http://fa.oregonstate.edu/sites/fa.oregonstate.edu/files/bebc/documents/travel_reimbursement_2015.xlsx

Reimbursement of allowable expenses must be submitted within 60 days of conclusion of travel. These expenses include, but are not limited to, lodging, meal per diem, mileage, car rental, parking, and commercial ground transportation. For receipt requirements or more information, contact your School Accountant.
A current listing of CBEE faculty and staff and their contact information can be found at:

http://cbee.oregonstate.edu/faculty-and-staff

**Árnadóttir, Líney**  
*Assistant Professor. Ph.D. Chemical Engineering (2007), University of Washington*  
Field of interest: surface interactions and catalysis through experimental techniques and Density Functional Theory-based calculations for renewable energy and sustainability; surface characterization of complex materials (thin films, biomaterials, corrosion surfaces) via surface analysis techniques (Time of Flight Secondary Ion Mass Spectrometry, X-ray Photoelectron Spectroscopy), and electronemistry for clean Hydrogen production and fuel cell applications.

**AuYeung, Nick**  
*Assistant Professor. Ph.D. Chemical Engineering (2011), Oregon State University*  
Field of interest: My research is focused on using sustainable energy in the conversion of readily available feed-stocks into fuels, fertilizers, or other useful products. I am very interested in doing these processes in a distributed, decentralized fashion, especially in emerging markets of developing regions. In particular, I am interested in applications of concentrated solar thermal energy such as thermochemical storage for dispatchable power generation.

**Baio, Joe**  
*Assistant Professor. Ph.D. Chemical Engineering (2011), University of Washington*  
Field of interest: Biomaterials Biomimetics Molecular self-assembly

**Bothwell, Michelle**  
*Associate Professor. Ph.D. Biological Engineering (1994), Cornell University*  
*Fields of interest:* Biointerfacial phenomena: preparation of interfacial coatings that will impart safe, efficacious function to implantable biomaterials; drug formulation and delivery strategies; and enzyme activity in the adsorbed state. Bioengineering ethics: professionalism; bioethics; and social ethics in engineering. Recruitment and retention of folks from traditionally underrepresented groups in engineering: K-12 outreach; and examination of difference, power and discrimination in engineering education and practice.

**Chang, Chih-hung**  
*Professor. Ph.D. Chemical Engineering (1999), University of Florida*  
*Fields of interest:* Electronic materials (Growth and Characterization), Integrated Micro-Chemical Systems, Thin Film Electronics, and Nanomaterials Processing.

**Dolan, Mark**  
*Associate Professor. Ph.D. Civil and Environmental Engineering (1996), Stanford University*  
*Fields of interest:* biological processes for the treatment of hazardous wastes, and on the fate and transport of organic contaminants in the environment. He specializes in aerobic and anaerobic microbial transformation of chlorinated solvents. He has been involved in a number of field demonstrations of aerobic cometabolic transformation of chlorinated solvents.
Fu, Elain

Assistant Professor Senior Research. Ph.D. Physics (1997), University of Maryland, College Park

Fields of interest: Research in the lab consists of three areas of focus: the investigation of molecular interactions and fluid transport in microfluidic systems, the development of tools and methods for use in high-performance microfluidic assays, and the implementation of microfluidic assays for clinically relevant analytes. An overall goal is to apply the work in the lab to global health applications in the areas of human disease diagnosis, veterinary medicine, environmental monitoring, and agriculture. In addition, a growing area of interest is undergraduate curriculum development using paper microfluidics.

Harper, Stacey

Associate Professor. Ph.D. Biological Sciences (2003), University of Nevada Las Vegas

Fields of interest: Novel approaches to predictive toxicology; assimilating and fusing information on nanomaterial–biological interactions to permit data mining, generate predictive knowledge and provide information to minimize toxicity; the relationships among currently disparate exposure, dose and toxicity data in animal systems (including humans) and the degree to which those relationships can accurately be extrapolated to other systems and exposure scenarios; novel tools to determine nanomaterial characteristics; biological activity and toxic potential of novel nanomaterials; as well as comparative physiology and toxicology.

Herman, Gregory

Associate Professor. Ph.D. Physical Chemistry (1992), University of Hawaii-Manoa

Fields of interest: detailed mechanistic characterization of heterogeneous catalysts using surface science techniques; advance fabrication methods and designs for solid oxide fuel cells; development of green manufacturing processes for displays and solar cells; development and characterization of novel optical and electrical materials; and advancement of flexible electronic manufacturing methods and applications. Currently his research focuses on the development of sustainable technologies for the production of materials, energy, and water resources using catalytic processes. Prior to joining OSU he held research staff and postdoctoral positions at Sharp Laboratories of America, Hewlett-Packard Corp., Pacific Northwest National Laboratory, and the Naval Research Laboratory.

Higgins, Adam

Associate Professor. Ph.D. Bioengineering (2008) Georgia Institute of Technology

Fields of interest: Cell and tissue preservation technologies (cryopreservation, freeze drying, desiccation, hypothermic storage). Cell-based devices such as biosensors. Cell membrane permeability. Nucleation and crystal growth processes in multicomponent systems. Applications of microscale fabrication technologies in biology and medicine (e.g., bio-MEMS).

Jovanovic, Goran

Distinguished Professor, Ph.D. Chemical Engineering (1979), Oregon State University

Fields of interest: microscale technologies started in the late eighties when his team developed a semiartificial pancreas, a technology based on the cell encapsulation technique. Currently his research is focused in two microscale technology areas: development of microscale chemical reactors and separators suitable for the development of microscale based chemical processes (NSF), and the development of microscale biosensors devices (DARPA). Dr. Jovanovic is, also, leading research projects in the development of “Zero gravity-compatible chemical processes for long space missions” (NASA) and “Environmental microreactors for in situ deployment” (INEEL).

Kelly, Christine

Associate Professor, Associate Dean of Student and Academic Affairs (COE) Ph.D. Chemical
Engineering (1997), University of Tennessee
Fields of interest: Biotechnology: Development of yeast and bacterial strains, through genetic engineering techniques, to produce valuable enzymes and products from waste biomass feed stocks. Optimization of cultivation conditions to achieve maximum product concentration. Effect of toxicants on wastewater treatment microbial communities. Teaching: regulation of drugs and medical devices, bioengineering design, and cell culture and tissue engineering applications.

Koretsky, Milo
Professor. Ph.D. Chemical Engineering (1991), University of California at Berkeley
Fields of interest: Electronic Materials Processing. Research interests in thin film materials processing, including plasma chemistry and physics, electronical processes and semiconductor yield prediction. Teaching interests include integration of microelectronic unit operations into the ChE curriculum and thermodynamics. Dr. Koretsky also serves as the ChE advisor to the MECOP internship

Levien, Keith
Associate Professor. Ph.D. Chemical Engineering (1985), University of Wisconsin at Madison
Fields of interest: Process Optimization and Control; Supercritical Fluids Technology. Methods to operate chemical processes using advanced computational tools and computers, typically involving fundamental process modeling and appropriate design of dynamic experiments.

McGuire, Joseph
Professor Ph.D. Chemical Engineering (1987), North Carolina State University
Fields of interest: Colloidal and interfacial phenomena in bioprocess and biomedical materials technology: biopolymer structure and function at natural and synthetic surfaces, biocompatibility, implant-induced thrombosis, bacterial adhesion and infection, and drug formulation and delivery.

Montfort, Devlin
Assistant Professor. Ph.D. Civil Engineering (2011), Washington State University.
Field of interest: Engineering Education including Conceptual and Epistemological Undercurrents of Learning as a Process of Change

Nason, Jeff
Associate Professor, Associate Head for Graduate Programs. Ph.D. Civil Engineering (2006), University of Texas
Field of interest: Physical/chemical treatment processes, particle dynamics and removal during water and wastewater treatment; environmental fate and transport of engineered nanomaterials, aquatic chemistry, stormwater characterization and treatment.

Radniecki, Tyler
Assistant Professor. Ph.D. Environmental Engineering (2005), Yale University
Field of interest: Molecular characterization of biological processes in engineered treatment systems, risk assessment of emerging contaminants and water and energy sustainability through the anaerobic treatment of wastewater. Current research projects include: characterizing the ecotoxicity of silver nanoparticles to nitrifying bacteria, assessing the ability of bacteria to develop antibiotic resistance after chronic exposure to environmental concentrations of pharmaceuticals, and enhanced methane production from the co-digestion of fats, oils and greases (FOG) in
wastewater anaerobic digesters.

**Rochefort, Skip**

*Associate Professor.* Ph.D. Chemical Engineering (1986), University of California at San Diego
Field of interest: polymer engineering and science, with a focus over the last few years on biomaterials, and engineering education. He is Director of both OSU and College of Engineering Precollege Programs, is an OSU Honors College faculty.

**Rorrer, Greg**

*Professor.* Ph.D. Chemical Engineering (1989), Michigan State University
Field of interest: Biochemical Engineering, Bionanotechnology, and Biomass Conversion.

**Schilke, Karl**

*Assistant Professor.* Ph.D. Chemical Engineering (2006), Oregon State University
Field of interest: Development of peptide-based bioactive surface modifications for biomedical devices, and applications of immobilized biomolecules in microreactors and lab-on-chip devices.

**Semprini, Lewis**

*Distinguished Professor.* Ph.D. Civil Engineering (1986), Stanford University
Field of interest: biological processes for the treatment of hazardous wastes, and on the fate and transport of organic contaminants in the environment. He specializes in field, laboratory, and modeling studies of aerobic and anaerobic processes for treating chlorinated solvents. His research efforts aim at integrating the results of field, laboratory, and modeling studies in order to effectively apply the technology in the field. He also performs research using naturally occurring radon-222 as a subsurface tracer.

**Walker, Travis**

*Assistant Professor.* Ph.D. Chemical Engineering (2013), Stanford University
Field of interest: the study of various areas associated with transport in complex fluids and multiphase flow phenomena in chemical and biological systems.
Fluid flow surrounds us. From the flow of water from a faucet and blood in our veins to the processing of most materials, we are both blessed and frustrated with the flow of material. People have developed a great intuition for fluids that experience a linear strain in the presence of a stress; however, most biological and industrial fluids exhibit a nonlinear response to deformation. This nonlinear response can be a hindrance when trying to get ketchup out of a glass bottle, or it can be a benefit when spreading paint on a vertical wall. These everyday examples illustrate that complex fluids can be difficult to process, yet when exploited, this complexity can also be desirable. The addition of multiple phases to flow systems drastically increases the complexity of the flow physics. These complexities reveal themselves on both the macroscopic and microscopic length scales and can involve solids as well as immiscible and miscible fluids. Complexities such as the presence of polymers, surfactants, colloids, and particulates to flow systems create complex fluids or soft materials that respond in a nonlinear way to stress. Interfacial interactions between miscible systems are further complicated by the presence of gradients in the chemical potential that vary in space and time. These gradients distinguish miscible systems from immiscible systems, which approximate these gradients as discontinuities. A vast number of manufacturing practices and biological materials involve multiphase systems that are highly structured and rheologically complex.
Wildenschild, Dorthe

Professor, Associate Dean in the Graduate School. Ph.D. Civil and Environmental Engineering (1996), Danish Technical University
Field of interest: Physics and chemistry of flow and transport in porous media, generally applied to the subsurface environment. Her main focus is detailed and highly controlled experiments (addressing flow, mass transfer, microbial behavior, heat transfer, and acoustic and electrical properties) that can help us evaluate new theory and numerical models. She believes that very accurate experiments are needed to test theory and models alike, - then uses numerical models to expand investigations beyond the potential constraints of experiments. Recent projects involve the use of x-ray microtomography and pore-scale modeling to evaluate pore-scale processes (interfacial characteristics, film formation, biofilm behavior) in porous media in the presence of multiple phases.

Wood, Brian

Professor. Ph.D. Civil and Environmental Engineering (1999), University of California at Davis
Field of interest: description of mass, momentum, and energy transport in natural and engineered multiscale systems. He also specializes in subsurface hydrology; bioremediation and biochemical processes; water and wastewater treatment; and sustainable design and engineering. Brian Wood's current research projects include: (1) Experimental and theoretical work examining the transport of microorganisms in porous media from a multiscale perspective (NSF); (2) Theoretical work on the fundamentals of describing reactive solute transport in highly heterogeneous porous media systems (NSF); (3) Investigations of how biofilm structure affects solute transport and reactions in biofilm-porous media systems (DOE).

Yokochi, Alex

Professor. Ph.D. Chemistry (1997), Texas A&M University
Field of interest: Sustainable energy technologies; materials science and engineering; microfluidic and microelectromechanical systems. Expanded Research Interests: My interests lie at the interface of Materials Science and Engineering, Chemistry and Chemical Engineering to drive innovative solutions, especially those focused on developing sustainable energy and resource production technologies. These include microreactors for hydrogen and biodiesel production, hydrogen storage materials and fuel cell issues; advanced batteries and other electrical energy storage methods; and innovative approaches to aluminum metal production (electrowinning). I also have interests in the synthesis and application of advanced materials using bulk and thin film techniques, such as the preparation of bulk nanostructured and amorphous materials, and their characterization by diffraction techniques and ancillary methods.
The School of CBEE is housed primarily in Gleeson Hall and Merryfield Hall on the OSU campus. The School also maintains research and teaching laboratories in Graf Hall and Owen Hall on the OSU Campus and shares laboratory space at the Microproducts Breakthrough Institute (MBI) on the Hewlett-Packard campus in Corvallis. In fall 2016, we anticipate the opening of Johnson Hall, which will serve as the primary research home for CBEE and the administrative offices. Specific laboratories in CBEE are

- Oregon Process Innovation Center (OPIC) for Solar Cell Manufacturing (MBI)
- Microtechnology-based Chemical Processing Laboratories (MBI, Gleeson Hall)
- Thin Film Materials Processing & Characterization Laboratories (Gleeson Hall, Graf Hall)
- Polymer Materials Processing & Characterization Laboratory (Gleeson Hall)
- Biomass Conversion & Bioprocess Engineering Laboratories (Gleeson Hall)
- Innovative Reaction Engineering for Materials and Sustainability (iREMS) Laboratory (Gleeson Hall)
- Environmental Molecular Biology Laboratory (Merryfield Hall)
- Cryopreservation Laboratory (Gleeson Hall)
- Biomaterials & Biointerfaces Laboratory (Gleeson Hall)
- Subsurface Bioremediation Laboratories (Merryfield Hall)
- Environmental Analytical Laboratory (Merryfield Hall)
- Porous Media Flow Characterization Laboratories (Merryfield Hall, Owen Hall)
ACADEMICS

GENERAL INFORMATION

Graduate students are expected to read the academic policies governing graduate students listed on the University website, which include but are not limited to the Graduate Catalog on the Graduate School’s website and the Student Conduct Regulations. The information herein addresses only a few topics regarding those policies.

ACADEMIC PERFORMANCE

A grade-point average of 3.00 (a B average) is required for all courses taken as a degree-seeking graduate student, and for courses included in the graduate degree or graduate certificate program of study. Grades below C (2.00) cannot be used on a graduate program of study. A grade-point average of 3.00 is required before the preliminary, final oral, or written exams may be undertaken.

GRADUATE ASSISTANTSHIPS

Graduate research or teaching assistants may be appointed on a term-by-term basis (3 months) or a full-year (12-month) basis. All graduate assistants are required to carry out the duties assigned by their faculty supervisor to justify their stipend. This service may be in addition to the time required to complete the thesis research.

University policy dictates that a graduate assistant (GRA/GTA) must be enrolled for no less than 12 credit hours in any term in which he or she is supported, except for summer term which requires a minimum of 9 credit hours.

Additionally, students who hold multiple jobs on campus may not work more than a total of 20 hours per week or 255 hours per term in total for all positions held while enrolled in at least 3 credits (6 during summer). Maintaining a GPA of 3.00 or better is required for continued financial support.

Students planning to take a short break or be away from work must notify their supervisors in advance in writing of their plans. The plans must be approved by the supervisor.

REGISTRATION

Students register for courses online at the Student Online Services site:

https://admininfo.ucsadm.oregonstate.edu/prod/twbkwbis.P_WWWLogin

For convenience, students should have their proposed schedule (including CRNs) prepared at the time of registration. An ONID login/password are required for registration. Students can sign up for an ONID account at

onid.oregonstate.edu.

MINIMUM REGISTRATION REQUIREMENTS

- EVERY student must register for a minimum of 3 credits, including
  - Any term in which a student enrolls,
• The term in which a thesis or dissertation (MS or PhD) is defended or comprehensive oral exam (MEng) is taken; and
• Any term a student uses university space and facilities or requires supervision of the major professor, regardless of the student’s location (on-campus or Ecampus).
• **GTAs / GRAs must register for at least 12 credits** (Fall - Spring terms), while auditing a class or enrolling in Continuing Higher Education and other self-support programs may not be used to satisfy enrollment requirements for graduate assistant tuition remission.

- **Students receiving financial aid** must contact the Financial Aid Office for specific registration requirements each term. Students must notify Financial Aid if they plan on enrolling less than full time.

Registration in thesis credits (CHE/ENVE 503/603) is typical once any required graduate courses are completed.

**FULL-TIME AND PART-TIME ENROLLMENT**

- Full-time status as a graduate student is defined as enrollment in 9 credits per term. The maximum load for a full-time graduate student is 16 credits. A student may exceed this limit only with the approval of the Graduate School. Students receiving approval to exceed 16 credits will be assessed a per-credit overload fee.
- Full-time status (i.e., a minimum of 9 credits per term) may be sufficient to qualify for purposes of veterans’ benefits, visa requirements, external fellowships, and federal financial aid.
- To assure full compliance with visa regulations, international students should consult with the Office of International Student Advising and Services (ISAS) for additional information about registration requirements.

**PREREQUISITE COURSEWORK REQUIREMENTS**

At a minimum, the following courses must be taken for each program prior to enrollment in the core graduate course curriculum. Your academic advisor should be consulted to ensure the proper pre- and co-requisite path is taken.

**Environmental Engineering**

Students without a B.S. degree in Environmental Engineering (or equivalent Engineering degree) must take the following courses in addition to the ENVE core:

Pre-requisite courses (completion required before taking ENVE core courses)
- Math through Differential Equations
- One year of General Chemistry
- One year of Physics
- CBEE 211 (3) Material Balances and Stoichiometry

Co-requisite courses
- ENVE 521 (4) Water and Wastewater Characterization**
- ENVE 522 (4) Environmental Engineering Design**
- ENVE 531 (4) Fate and Transport of Chemical in Environmental Systems
- CE 547 (4) Water Resources Engineering I: Principles of Fluid Mechanics

**Note: credits earned for ENVE 521 and ENVE 522 will not be counted toward the 45 units needed for graduation.**
Chemical Engineering
Students with a B.S. degree in Chemistry or other non-chemical engineering undergraduate degree must take the following courses prior to enrolling in the CHE core:

Pre-requisite courses (completion required before taking CHE core courses)
- Chemistry including General, Organic, and Physical
- Math through Differential Equations
- One year of Physics
- CHE 331 (3) Transport Phenomena (Fluid Flow)
- CHE 312 (3) Chemical Engineering Thermodynamics
- CHE 332 (4) Transport Phenomena II (Heat Transfer)
- CHE 443 (4) Chemical Reaction Engineering

TUITION BILLS

Students are sent an email to their ONID email account when their statement is ready to view, and they can then view their eBill statement online at http://mybill.oregonstate.edu. All billing for currently enrolled students is processed electronically through eBill on the 5th of each month.

Unpaid balances as of the 1st of the month following the eBill statement are considered past due, and they will be assessed interest at the rate of 1% per month (12% APR). Students are financially responsible for all courses for which they register. Students are responsible for paying fees by the deadline even if they do not receive a bill.

Please direct any questions about tuition, fees, and financial aid to the Business Affairs Office.

LEAVE OF ABSENCE

You must fill out a Leave of Absence form and have it approved by the Graduate School (at least 15 business days prior to the start of the term) if you need to take off a term (Fall, Winter, or Spring) for any reason.
- You are limited to three leaves of absence during your program. Some students (e.g., military students called to duty) have more flexibility in the number of leaves allowed by the Graduate School.
- Doctoral degree students may apply for a maximum of three academic terms of regular on-leave status prior to advancement to candidacy, and they may apply for a maximum of three academic terms of on-leave status after advancement to candidacy. The time spent in approved on-leave status will be included in the maximum five years that may elapse between the preliminary oral examination and the final oral examination.
- Notify the Graduate Programs Coordinator if you need to take a leave.
- You never need to fill out a leave form for summer term.
- If you do NOT fill out a leave form, you will have to reapply (including paying the application fee) AND register for 3 graduate credits for each term of the unauthorized break in registration and register for at least 3 credits for the term you are readmitted, e.g.,, 6 credits for one missed term.
- For more information about the Graduate School’s policies,
SUMMER TERM

Graduate Assistants on appointment during the summer term must register for a minimum of 9 credits (full-time enrollment). Thesis credits (CHE/ENVE 503/603) are typical. Please check with your advisor or the Graduate Programs Coordinator during Spring term to fully understand your summer status.

Registration for a minimum of 3 credits during summer term is required if you are defending your thesis during the summer.

DISMISSAL FROM GRADUATE SCHOOL

All students must read the Student Conduct Regulations to be aware of actions that may lead to the dismissal process:

http://catalog.oregonstate.edu/ChapterDetail.aspx?key=38

BASIC REQUIREMENTS FOR ALL GRADUATE DEGREES

School Seminar: All newly-enrolled MS and PhD graduate students are required to take the School seminar course CBEE 507 for the first year. This course is intended to develop your understanding of the profession, to introduce the research activities that take place in this School, and to develop professional skills including literature searching and citations, proposal writing, ethics, keeping laboratory notebooks and navigating graduate school. MENG students are required to take CBEE 507 for at least one quarter in either Winter or Spring term.

Graduate Minor: OSU does not require graduate students in engineering to pursue a minor. However, if desired, a minor may be selected. The minor may be a recognized school minor, a recognized integrated minor, or a student-designed/committee-approved minor. Minors appear on your transcript but will not be listed on your diploma. Speak with your major professor for more details on minors.

Program of Study: All students are required to complete a Program of Study outlining the courses that they will take to complete their degree requirements. The Program of Study is a contract between the student, the School, and the University (Graduate School). For the Masters Programs MEng, MS), signatures are required by your major professor, your minor professor (if applicable), and the remaining members of your committee. In the case of Doctoral Program (Ph.D.), students must conduct a Program Meeting with all committee members, including the Graduate Council Representative (GCR), who must approve the Program of Study.

All students must then receive the signature of the Associate Head for Graduate Programs (Academic Unit Chair) prior to submitting the form to the Grad School. Students should refer to their respective degree for information regarding deadlines for submission: Master; Doctoral

Prepared forms signed by the advisor must be submitted to the Graduate Programs Coordinator to
obtain the Associate Head for Graduate Programs’ signature and be turned in to the Graduate School.

Visit the Grad School’s “Forms” website for a blank form and instructions on how to compete the Program of Study. There is also an example for in the Appendices for your reference. You may need to reference the Graduate Catalog for further details.

http://oregonstate.edu/dept/grad_school/forms.php#program

**NOTE** The preliminary Program of Study completed during the CBEE 507 seminar course is not a binding/final Program. It does not get turned in to the Graduate School. This is simply an exercise to introduce to the Program form, get you thinking about the courses you will take to complete your degree, and stress the importance of the Program form itself.

**Advisor selection:** To file a graduate study program, a student must find a research advisor. The respective program Graduate Committee Chairperson will act as or appoint an advisor for all incoming graduate students until a major professor is selected. In conjunction with orientation activities, all research-active faculty will give short presentations about their research and a poster session. All MS/PHD students are required to register for CBEE 507 in the fall term. During this course, you will maintain two separate lab rotations with advisors of your preference. By the end of fall term, thesis-based students will be paired with major professors on the basis of mutual interest and available projects/funding. The School cannot guarantee each student gets their top choice of advisor, but reasonable attempts will be made to arrive at workable matches.

The choice of a major professor should be given considerable thought, since you will have a close working relationship with this individual for the duration of your degree program, and close professional and personal contacts thereafter. You are expected to complete your degree program under your assigned advisor’s supervision (unless exceptional circumstances prevent it). Your major professor will guide your research efforts to completion and oversee all aspects of your graduate studies. The student is also responsible for actively seeking information about individual research projects. Good sources of information are the professors themselves or their graduate students.

Make an initial appointment to see your advisor prior to registering. Your advisor will help you plan your schedule and make sure requirements are fulfilled. **You are, however, ultimately responsible for seeing that you have fulfilled all the requirements necessary for graduation.**

In addition to performing two laboratory rotations during the fall term of CBEE 507, students are encouraged to make individual appointments with faculty they are interested in working with. **Be sure to discuss financial support options with the faculty member when determining a proper fit and project.** Near the end of the fall term, students will complete an Advisor Selection Form listing their top three choices for preferred advisors. The selection process will be finalized prior to the completion of fall term.

The respective program Graduate Committee Chairperson will send a letter to each student to inform him/her of the results of this process. The student must sign the “letter of intent” to work with the specific advisor. A student is not allowed to change advisor after signing the letter, unless the student is placed under extraordinary circumstances. If a student needs to change his/her advisor because of funding reasons, the student must file a petition with the Graduate Committee. The Graduate Committee will make a decision on a case-by-case basis.

If a student fails in finding a research advisor, the student may seek for a research advisor outside the School of CBEE. However, any research project offered in a different program must be approved
by the respective Graduate Committee within CBEE in order to obtain an advanced degree in chemical or environmental engineering. If no advisor is determined, the student may transfer degrees to a MEng (coursework only) course of study and complete the program without a project.

MEng students will be assigned an advisor by the respective program Graduate Committee Chair during fall term. All questions regarding the program and curriculum should be first directed to the assigned advisor. If the assigned advisor is unresponsive or the student has unanswered questions, they should consult the Graduate Programs Coordinator or the respective program Graduate Committee Chair.

**Ethics Training:** As an OSU and CBEE graduate student you will be required to complete the Responsible Conduct or Research for Engineers course offered by the Collaborative Institutional Training Initiative (CITI). OSU has contracted with this organization to offer ethics training for all graduate researchers. To complete the ethics course, find the CITI home page at [https://www.citiprogram.org/default.asp?language=english](https://www.citiprogram.org/default.asp?language=english), and register as a new user. You will need your OSU ID number and our campus address, which is 102 Gleeson Hall, Corvallis OR, 97331.

Register for the Responsible Conduct for Research for Engineers course, which contains 14 modules with a quiz after most of the modules. Modules should take about 30-45 minutes to complete. When you complete the course, send your completion report to the Graduate Programs Coordinator, and they will note the training in your graduate student file. You will also have to provide this information on your program of study form under the ethical research training box. Your Program of Study will be held from submission to the Graduate School until completion of this training.

If the student desires, GRAD 520 may be taken as a replacement to this requirement.

**RESEARCH INTEGRITY**

Training in ethical research practices is an integral part of your graduate education and is required as part of the Program of Study. Further information concerning Research Integrity, including University policy, can be found at the following website:

[http://oregonstate.edu/research/ori/index.htm](http://oregonstate.edu/research/ori/index.htm)

**Safety Training:** OSU’s Environmental Health and Safety department has prepared 8 modules related to safety training for researchers working in laboratories. CBEE is committed to a safe work environment and is using these modules to facilitate safety training.

As a CBEE graduate student you will be required to watch, learn and reflect on these training videos. These videos can be found at [http://oregonstate.edu/ehs/training/lab_safety_training](http://oregonstate.edu/ehs/training/lab_safety_training).

Below is a list of the videos of the videos, which total 97 minutes.

- Modules 1 and 2: Program Overview and Safety Concepts (37 minutes)
- Modules 3 and 4: Safety Equipment and Supplies (29 minutes)
- Modules 5 and 6: Chemical Use and Hazardous Waste (19 minutes)
- Modules 7 and 8: Emergency Response and Additional Information (12 minutes)

During the fall term watch each of these videos and prepare a summary of the important concepts and information in each video (four summaries total) using the template found in the Appendices to the Graduate Programs Coordinator. The Graduate Programs Coordinator will review your summaries and note in your file when you have completed the training.
After you have completed the watching the four videos, acknowledge your training by completed the EH&S web acknowledgement form at

http://oregonstate.edu/ehs/training/lab_safety_training_acknowledgement

**Thesis Guide**

The Graduate School’s website has a complete guide to the thesis paper and the University requirements associated with the thesis. Students are encouraged to review the site, listed below, before starting to write the thesis to ensure understanding of the formatting, procedures, and deadlines.

http://oregonstate.edu/dept/grad_school/thesis.php

Note that the Graduate School takes the formatting, content, and other requirements for the thesis (and especially the “pretext pages”) very seriously. Failure to strictly adhere to these requirements may result in your printed thesis being rejected by the Graduate School.

**Thesis Binding**

The School requires one copy of each thesis, in the same format required in the Thesis Guide linked above, to be provided to the Main Office prior to departure. The School will take care of binding the copy provided to us. If your advisor would like a bound copy, an unbound copy may be provided to the Main Office at the same time, and we will facilitate the binding. In this case, you must provide the index number that the faculty member wishes to charge for the binding services. Students wishing to bind a personal copy are welcome to do so at the same time. A personal check made out to the following binding service must be provided at the time that the thesis copies are submitted to the Main Office. Checks should be made payable to the following address.

Cyrano’s
361 SW 2nd Street
Corvallis, OR 97333
Phone: 541-752-0469
Website: www.stpcyranos.com
E-mail: stpcyrano@hotmail.com
MASTER DEGREE PROGRAM

The School of Chemical, Biological, and Environmental Engineering is made up of two graduate programs: Chemical Engineering and Environmental Engineering. The CBEE School offers the following types of Masters degrees:

- Master of Engineering (MEng)
- Master of Science (MS)

The CHE and ENVE degree options require a minimum of 45 credits to graduate; each with a set of core course requirements totaling 21 and 20 respectively. Additional credits above 45 may be required depending on the educational background of the student. All students must complete a Program of Study form (see Graduate School website - http://gradschool.oregonstate.edu/) before completing 18 credits. All work must be completed within seven years, including transfer credits, course work, and the thesis/oral exam.

In addition to the formal requirements listed in the Graduate School Catalog (http://catalog.oregonstate.edu/), the CBEE School has policies listed below with regard to the course of study for each Master’s degree.

As with all policy matters, students have the right to petition for deviation from school policies to the CBEE School Graduate Committee. Such petitions must be made in writing, indicating the policy deviation requested and the reason(s) for the request. The decisions of the School Graduate Committee are final.

Masters of Engineering (CHE, ENVE)

The MEng degree option provides students the opportunity to pursue advanced-level study without the requirement for a research thesis. A comprehensive oral exam is taken in lieu of the thesis requirement and core course requirements are the same as for the MS degree. These degrees are intended as terminal degrees, not as preparation for a doctorate, and will emphasize job-related knowledge and skills. Although not required, students wishing to pursue a PhD in the future are advised to pursue an MS degree, not the MEng.

Masters of Science (CHE, ENVE)

A thesis in the major area is required for the MS degree, and the thesis format is bound by the rules of the Graduate School. Visit the Graduate School’s website @http://gradschool.oregonstate.edu/ for details. Nine of the required 45 graded credit hours must be thesis credits; more thesis may be taken to fulfill GRA/GTA registration requirements, but only nine credits of thesis can appear on the program of study.

Minor Option (CHE or ENVE)

A minor field of study is optional. If a minor is declared, however, the minor requirement specified by the Graduate School is 15 hours minimum (18 for doctoral). Master’s students are expected to take 15 hours or more of minor subject courses if the minor is “integrated”; i.e., it spans two or more schools. The CBEE School Graduate Committee may apply suitable CHE courses to such an integrated minor requirement as long as the CHE courses are not in your major area of concentration and they comprise less than one-half of the credits in the minor.

MASTER’S THESIS
The thesis demonstrates the student’s mastery of professional knowledge in a particular subject area of his/her chosen field. It must present innovative research or a novel application of a known methodology to appropriate problems. A conscientious survey of pertinent literature is a prerequisite to an acceptable thesis. The research topic must be approved by the major professor, and the research title must be registered with the Graduate School.

Since the thesis results from a significant body of work, the student is encouraged to publish the results of the thesis in the open literature. The student cannot schedule a defense exam with the Graduate School until the major professor approves the thesis for distribution to all committee members. Once approved, the student must submit a copy of the thesis to each committee member and complete the Exam Scheduling Form with the Graduate School at least two weeks prior to the intended defense date. See your major professor for any other rules regarding thesis defense preparation requirements.

An MS candidate will be subjected to a two-hour final oral comprehensive examination, which includes a thesis research presentation and defense and questions on major, minor, and other pertinent academic subjects.

**NON-THESIS COMPREHENSIVE ORAL EXAM (MENG STUDENTS)**

The following guidelines are written to help the student prepare for the oral exam. In addition to these guidelines, all rules of the Graduate School pertaining to final Master’s oral exams must be met.

1. The exam committee shall consist of the following:
   - the student’s major professor (the respective program Graduate Committee Chairperson may serve this role);
   - one other CBEE faculty member; and
   - the student’s minor professor, or if no minor is selected, committee member may be from graduate faculty at-large.

   *Note: No Graduate Council Representative is required for the MEng oral exam.*

2. You must contact members of the committee to arrange the date, time, and place of the exam. Then, schedule the exam with the Graduate School not less than two weeks before the examination using the Exam Scheduling Form. The exam should be scheduled for two hours.

3. The exam will consist of a 30 minute presentation prepared and delivered by the candidate that provides a meaningful evaluation and reflection on experiences gained in coursework completed toward the degree. The presentation will be followed by questions from the committee on the candidate’s presentation and knowledge gained from the candidate’s coursework. The 30 minute presentation should highlight the following items:
   - a statement of the candidate’s professional goals for obtaining the MEng degree;
   - an overview on how the MEng coursework, including both Major and Minor areas, provided the preparation needed to achieve the candidate’s professional goals;
   - a highlight of examples from class projects, homework, job search efforts, etc., that illustrate and elaborate on item b.

The MEng candidate must also provide a written two-page Reflection Statement that highlights items a-c above, to be turned in to the Committee no less than 24 hrs prior to the Final Exam.
THESIS DEFENSE COMMITTEES (MS STUDENTS)

1. The principal authority over a student’s program resides with the student's Master’s Committee. This committee is responsible for
   • assuring that University and School requirements are satisfied and
   • administering the final oral examination.

2. The Committee consists of at least 4 members:
   • the student’s major professor;
   • one other CBEE faculty member;
   • the student’s minor professor, or if no minor is selected, committee member may be from graduate faculty at-large; and
   • the Graduate Council Representative (GCR).

   Note that the composition of a student’s Master’s Committee MUST be approved by the major professor.

3. The committee is originally formed, with approval from the major professor, at the student’s invitation. The Graduate Council Representative is selected from a list generated by the online GCR list generation tool. The GCR is required to attend the final examination (thesis defense). Information on the role and duties of the GCR, and how to choose one, can be found at the following website.

   http://oregonstate.edu/dept/grad_school/degreecommittee.php#council
PROCEDURES LEADING TO A MASTER’S DEGREE

Below is an outline of the steps required to obtain the Master’s degree. You should become familiar with the specific and detailed information contained in the Graduate School Catalog, as well as School requirements. Final oral exams must take place before the first day of the following term to be considered for the current term (late exams will require registration for 3 credits in the following term if not completed). See also the Master’s Degree Flowchart from the OSU Graduate School: [http://gradschool.oregonstate.edu/sites/default/files/flowchart-masters.pdf](http://gradschool.oregonstate.edu/sites/default/files/flowchart-masters.pdf)

<table>
<thead>
<tr>
<th>Check Box</th>
<th>Item #</th>
<th>Step</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Be assigned a major professor (by default it is the Grad Program Chair unless otherwise selected)</td>
<td>By the end of your first term</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Start selection process to find two additional committee members</td>
<td>By the completion of second term</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>File a Masters Program of Study form</td>
<td>AT LEAST 1 term before your intended graduation term</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Notify your major professor and committee of your intended graduation term</td>
<td>AT LEAST 1 term before your intended graduation term</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Compare Program of Study form and transcripts for consistency</td>
<td>1 term before your intended graduation term</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>File Petition to Change Program form, if needed</td>
<td>1 term before your intended graduation term</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Review CBEE Graduate Learning Outcomes rubric used for evaluating final exams</td>
<td>1 term before your intended graduation term</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Confirm submission of your approved Program of Study with Graduate School</td>
<td>15 weeks prior to final oral examination</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>File a Diploma Application</td>
<td>AT LEAST 2 weeks prior to final oral examination</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>Decide on a day and time (2 hours) with all Committee members</td>
<td>AT LEAST 2 weeks prior to final oral examination</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Reserve a room with CBEE Office Coordinator</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Fill out Exam Scheduling Form</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>Confirm final oral examination appointment with the Grad School (make sure it is on their calendar!)</td>
<td>1 week after submitting exam scheduling form</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>Remind (e-mail) Committee of the final oral examination</td>
<td>2 days prior to final oral examination</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>Distribute your 2 page reflective statement to the Committee</td>
<td>1 day prior to the final examination</td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>Final oral examination</td>
<td></td>
</tr>
</tbody>
</table>
# PROCEDURES FOR MS STUDENTS

<table>
<thead>
<tr>
<th>Check Box</th>
<th>Item #</th>
<th>Step</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Choose a major professor and a general thesis topic</td>
<td>By the end of your first term</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Appoint Masters Committee with approval of your major professor</td>
<td>By completion of second term</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Generate <a href="#">Grad Council Rep (GCR) list</a> and contact those people until you find someone willing to serve as your GCR</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>File a <a href="#">Masters Program of Study form</a></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Read the Thesis Guide on the Grad School’s website</td>
<td>Prior to starting your thesis</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Notify your major professor and committee of your intended graduation term</td>
<td>AT LEAST 1 term before your intended graduation term</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Compare Program form and transcripts for consistency</td>
<td>1 term before your intended graduation term</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>File <a href="#">Petition to Change Program form</a> if needed.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>Confirm submission of your approved Program of Study with Graduate School</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>File a <a href="#">Diploma Application</a></td>
<td>15 weeks prior to final oral examination</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>Review CBEE <a href="#">Graduate Learning Outcomes</a> rubric used for evaluating final exams</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>Complete final draft of your thesis, and submit it to your major professor for review and approval</td>
<td>By the start of your last term</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>Decide on a day and time (2 hours) with all Committee members (faculty &amp; Grad Council Rep)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>Reserve a room with CBEE Office Coordinator</td>
<td>AT LEAST 2 weeks prior to final oral examination</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>Fill out <a href="#">Exam Scheduling Form</a></td>
<td></td>
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<tr>
<td>16</td>
<td>16</td>
<td>Submit thesis pretext pages to the Graduate School</td>
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<tr>
<td>17</td>
<td>17</td>
<td>Submit a final draft of the thesis to all committee members (with advisor’s approval)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>Submit final oral examination appointment to Graduate Programs Coordinator for announcement circulation</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>Remind (e-mail) Committee of the final oral examination</td>
<td>2 days prior to final oral examination</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>Final oral examination</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>Complete thesis revisions, have major professor approve &amp; sign final version, and print copies for binding using following <a href="#">Grad School Thesis Guidelines</a></td>
<td>Within 6 weeks of the exam or by the last day of the current term, whichever is first; if you miss the deadline, you may be required to register for an additional 3 credits.</td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>Print <a href="#">Electronic Thesis and Dissertation Form</a>, obtain signature, and submit final thesis paperwork (See <a href="#">Submission Instructions</a>)</td>
<td>Print certificate, and take to Grad School in exchange for a gift!</td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>Complete <a href="#">Graduate School Exit Survey</a></td>
<td></td>
</tr>
</tbody>
</table>
CHE DOCTORAL DEGREE PROGRAM

The School of Chemical, Biological, and Environmental Engineering offers a doctoral degree program in Chemical Engineering (CHE).

COURSE OF STUDY

The university requirements for the doctorate include the following:

1. at least 108 graduate credits beyond the bachelor’s degree;
2. at least 50% of the course work must be graduate stand-alone courses;
3. a presentation of an original dissertation for which a minimum of 36 credit hours of dissertation research (thesis course) has been accumulated;
4. a minimum of one year of residence, continuously, at OSU (i.e., three consecutive quarters as a full time student);
5. passing a preliminary oral examination in the major subject; and
6. successfully defending the dissertation in an oral presentation to a panel of experts.

For other regulations, see the OSU Graduate School Catalog.

1. In addition, school requirements include
   a. passing an oral qualifying examination for candidacy (this examination is administered by the CBEE department and is distinct from the “oral” preliminary examination required by the Graduate School);
   b. on assignment from the student’s doctoral committee, taking and passing (B average or higher) such courses as judged desirable by the doctoral committee for satisfactory progress in doctoral research;
   c. Ph.D. degree student without an OSU M.S. degree in Chemical Engineering must take the following six CHE core courses:
      i. CBEE 507 (1) Grad Seminar (3 credits required)
      ii. CHE 514 (4) Fluid Flow
      iii. CHE 520 (4) Mass Transfer
      iv. CHE 525 (4) Chemical Engineering Analysis
      v. CHE 537 (4) Thermodynamics
      vi. CHE 540 (4) Chemical Reactors I
   d. preparation and presentation of a written dissertation proposal: this paper will include a thorough literature review, outline of the proposed research project, and a description of the importance of the research with a perspective on the current state of the area of specialty.

Doctoral Program

The student must be registered for a minimum of 3 credits for the term in which the program meeting is held. When the program is approved by the doctoral committee, the departmental chair, and the dean of the Graduate School, it becomes the obligation of the student to complete the requirements as formulated. Changes in the program may be made by submitting a Petition for Change of Program form available in the Graduate School.

Selected 700-level courses that have been deemed equivalent to graduate-level learning may be used
on doctoral programs of study upon approval of the student’s graduate committee.

No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit program.

Programs must be completed prior to completion of the first academic year. Ideally, these meetings will be held early in the first spring term.

Students who wish to transfer credit must submit a Transfer Credit Request form before the end of their first year of study.

The final plan of study must be submitted to the Graduate School six weeks before the student’s oral preliminary examination.

DOCTORAL COMMITTEES

1. The principal authority over a student’s program resides with the student’s Doctoral Committee. This committee is responsible for
   • assuring that University and School requirements are satisfied,
   • monitoring student progress,
   • assigning and approving courses of study,
   • approving dissertation topics and paths-forward, and
   • administering preliminary and final oral examinations.

2. The committee consists of at least 5 members:
   • the student’s major professor;
   • two other CBEE faculty members;
   • the student’s minor professor, or if no minor is selected, committee member may be from graduate faculty at-large; and
   • one Graduate Council Representative (GCR).

   Note that the composition of a student’s Doctoral Committee MUST be approved by the major professor.

3. The committee is originally formed, with approval from the major professor, at the student’s invitation. The Graduate Council Representative is selected from a list generated by the online GCR list generation tool. The GCR is a permanent member of the committee and must attend all committee meetings, including the preliminary program committee meeting, the oral preliminary exam, and the final examination (dissertation defense). Information on the GCR can be found at

   http://oregonstate.edu/dept/grad_school/degreecommittee.php#council

4. The Committee should be appointed after advisor selection is complete. The committee should be formed during winter term of the first year.

MATRICULATION / CANDIDACY

1. Matriculation (first term of attendance) qualifies the student to
   a. select a general area of dissertation research, and
b. identify a major professor.

2. After matriculation, the student must pass a qualifying examination (described below). This examination must be taken during spring break of the student’s first year.

QUALIFYING ORAL EXAMINATIONS FOR DOCTORAL STUDENTS

The CHE qualifying oral examination will take place during a student’s first year in the CHE Ph.D. program. Students will receive assignments at the end of week 10 of winter quarter and the examination will be scheduled to take place the first week of spring quarter. Each student will receive a journal article from the current literature, chosen by their respective research advisor. This examination is based on two equally important elements: (1) student critique of that paper and (2) the depth of student understanding of the relevant fundamental science. The examination consists of two parts, totaling forty minutes.

1. An oral presentation of the critique of the paper. Each student is expected to address four items in their individual presentation.
   a) The student is expected to present the scientific content in the article, providing critical evaluation of the hypothesis, assumptions, methods, and conclusions of the authors.
   b) The student is expected to perform a literature survey relevant to the content of the article that allows them to place the assigned article into the context of work in the field.
   c) The student is expected to connect the content of the assigned article to basic core CHE course material.
   d) The student is expected to propose an extension of the core ideas or work to a future application in the field.

A student’s presentation will be strictly limited to 20 minutes (notified at 18 minutes and stopped at 20 minutes). A student should practice their presentations and use of associated equipment. The critique should demonstrate a depth of thinking about the research strategy and the fundamental chemical, physical, and/or biological concepts that govern the behavior of the system being studied.

2. A question and answer period. Following part (1), the student will be asked to wait outside the examination room for a short period of time. The student will then return for questions pertaining to the research field or the specifics of the paper. This period will last approximately 20 minutes. The questions will probe students’ depth of thinking about the research strategy and the fundamental chemical, physical, and/or biological concepts that govern the behavior of the system being studied.

Preparation for the examination must represent the student’s individual effort. However, the student may have general discussions with other students and are encouraged to practice their talk in front of other students at a GSA-organized practice session. The student should document any discussions that they have with other students in the form of an “Acknowledgements Section” at the end of your presentation. Please refrain from contacting the authors of your assigned paper and any faculty.

If the student fails the examination, one additional attempt will be allowed.

PRELIMINARY ORAL EXAMINATION

Ph.D. candidates will present their proposed dissertation research to their committee as part of their preliminary exam. This formal seminar should be given by spring term of the student’s second year and is to be a presentation of their planned research and a review of the literature supporting this
plan.

As a means for giving the student’s committee an early chance to help direct the doctoral research, the preliminary examination will consist of discussions concerning the student’s research direction with a 30 minute (or amount of time determined by the major professor) presentation by the student on his/her proposed research. The discussion is meant to identify strengths and weaknesses within the student’s preparation and proposal. It is intended to be a constructive critique of the progress achieved to date, as well as to provide focus for the student’s research. The oral preliminary examination will be scheduled for a minimum of two hours.

The remaining portion of the examination will focus on the student’s basic understanding of Chemical Engineering and the minor area(s), as well as all of the courses that the student has taken at OSU. The scoring rubric can be found in the appendices.

Students should complete the oral preliminary exam within 12 months after having passed the qualifying exam. At least one complete academic term must elapse between the time of the preliminary oral examination and the final oral examination. If more than five years elapse between these two examinations, the candidate will be required to take another preliminary oral examination.

**FINAL ORAL EXAMINATIONS**

After completion of or while concurrently registered for all work required by the program, the student must pass a final oral examination. The final oral examination must be scheduled in the Graduate School not less than two weeks prior to the date of the examination. The final oral examination information must be submitted to the Graduate Programs Coordinator for announcement in the School of Chemical, Biological, and Environmental Engineering no less than two weeks prior to the examination date.

The thesis defense portion of the final oral examination is open to all interested persons. After the open portion of the exam, the examining committee excludes all other persons and continues with the examination of the candidate’s knowledge of his or her field and the evaluation of the candidate’s performance. The oral final examination should be scheduled for at least two hours.

The student is expected to display a mastery of knowledge in his/her field and professional maturity as a Chemical Engineer. In the oral examination, the candidate is expected to defend the thesis and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.

The final oral examination must be taken within five years after the oral preliminary examination. If more than five years elapse, the candidate is required to take another oral preliminary examination.

**RE-EXAMINATION**

The candidate is expected to defend their thesis during the final oral exam and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.
DOCTORAL DISSERTATION

All Ph.D. candidates must submit a thesis embodying the results of research and presenting evidence of originality and ability in independent investigation. The thesis must constitute a valid contribution to knowledge in the field of study and must be based on the candidate’s own investigation, including one or more of the following elements:

- Contribution to theory,
- Development of new method for scientific investigation,
- Generation of new scientific data which clearly contribute to the development of sciences, and
- Development and/or novel implementation of a numerical model.

The thesis must reflect a mastery of the literature of the subject and be written in scientific format. The preparation of an acceptable thesis will require at least one full-time academic year. The booklet, Thesis Guide: Preparing a Thesis or Dissertation at OSU, is available electronically on the Web at http://gradschool.oregonstate.edu/success/thesis-guide.

The results from studies conducted using human subjects without obtaining Institutional Review Board approval shall not be used to satisfy master’s thesis or doctoral dissertation requirements. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at http://oregonstate.edu/research/irb/.

When scheduling their final oral examinations, doctoral students are required to submit the pretext pages of their dissertations to the Graduate School at least two weeks prior to the final oral examination. Pretext pages include the abstract, copyright (optional), title page, approval page, acknowledgment page, contribution of authors, table of contents, list of figures, tables, appendices, dedication (optional), and preface (optional). It is expected that students will distribute examination copies of their thesis to all committee members, including the Graduate Council representative, sufficiently early to permit thorough review of the thesis prior to the student’s final oral examination.

Within six weeks after the final oral examination or before the first day of the following term, whichever comes first, upload one PDF copy of your thesis, without signatures, electronically to ScholarsArchive and submit the signed ETD submission approval form with a copy of the title page to the Graduate School. If final submission requirements are after the initial six-week period, the student may be subject to re-examination. Please refer to the Graduate School’s website for complete details (http://gradschool.oregonstate.edu/success/thesis-guide).

Signatures on the ETD submission approval form can be electronic, signed, scanned and emailed or faxed. The thesis will not be accepted for graduate requirements until it has received approval by the graduate dean, which the thesis editor will obtain.

Within six weeks of the final oral examination, one printed copy your thesis must be submitted to the School of CBEE main office for binding and archiving in the CBEE thesis library.
ENVE DOCTORAL PROGRAM

The School of Chemical, Biological, and Environmental Engineering offers Doctoral Degrees in the Environmental Engineering (ENVE)

The university requirements for the doctorate include the following:
1. at least 108 graduate credits beyond the bachelor’s degree;
2. at least 50% of the course work must be graduate stand-alone courses;
3. a presentation of an original dissertation for which a minimum of 36 credit hours of dissertation research (thesis course) has been accumulated;
4. a minimum of one year of residence, continuously, at OSU (i.e., three consecutive quarters as a full time student);
5. passing a preliminary oral examination in the major subject; and
6. successfully defending the dissertation in an oral presentation to a panel of experts.

For other regulations, see the OSU Graduate School Catalog.

In addition, school requirements include:
- A minimum of one full-time academic year of regular non-blanket course work (at least 36 credits) must be included on the doctoral program
- No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit program

**Coursework completed as part of a Master’s degree (M.S. or M.Eng.) can be transferred for credit towards the doctoral degree with the consent of the student’s doctoral committee.

A Ph.D. degree student without an OSU M.S. degree in Environmental Engineering must take the following six ENVE core courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 525</td>
<td>4</td>
<td>Chemical Engineering Analysis</td>
</tr>
<tr>
<td>ENVE 532</td>
<td>4</td>
<td>Aquatic Chemistry: Natural and Engineered Systems</td>
</tr>
<tr>
<td>ENVE 535</td>
<td>4</td>
<td>Physical and Chemical Processes for Hazardous Waste Treatment</td>
</tr>
<tr>
<td>ENVE 536</td>
<td>1</td>
<td>Aqueous Environmental Chemistry Laboratory</td>
</tr>
<tr>
<td>ENVE 541</td>
<td>4</td>
<td>Microbial Processes in Environmental Systems</td>
</tr>
<tr>
<td>CBEE 507</td>
<td>3</td>
<td>Seminar (1 credit each term, F,W,SP)</td>
</tr>
</tbody>
</table>

A Ph.D. candidate without a B.S. degree in Environmental Engineering (or equivalent Engineering degree) must take the courses listed in the Prerequisite section of the manual in addition to the ENVE core.

There are five steps to be completed towards a Ph.D. degree:

1. Approval of graduate study program
2. Oral qualifying examination
3. Preliminary examination
4. Final oral examination
5. Thesis submission

DOCTORAL COMMITTEES

1. The principal authority over a student’s program resides with the student’s Doctoral
Committee. This committee is responsible for:
• assuring that University and School requirements are satisfied;
• monitoring student progress;
• assigning and approving courses of study;
• approving dissertation topics and paths-forward; and
• administering preliminary and final oral examinations.

2. The committee consists of at least 5 members:
   • the student’s major professor;
   • two other CBEE faculty members;
   • the student’s minor professor, or if no minor is selected, committee member may be from
graduate faculty at-large and
   • one Graduate Council Representative (GCR).

   Note that the composition of a student’s Doctoral Committee MUST be approved by the major
professor.

3. The committee is originally formed, with approval from the major professor, at the student’s
invitation. The Graduate Council Representative is selected from a list generated by the
online GCR list generation tool. The GCR is a permanent member of the committee and must
attend all committee meetings, including the preliminary program committee meeting, the
oral preliminary exam, and the final examination (dissertation defense). Information on the
GCR can be found at:

   http://oregonstate.edu/dept/grad_school/degreecommittee.php#council

4. The Committee should be appointed after successful completion of the qualifying exam.

MATRICULATION / CANDIDACY

1. Matriculation (first term of attendance) qualifies the student to:
   a. select a general area of dissertation research;
   b. identify a major professor

2. After matriculation, the student must pass a qualifying examination (described below). This
   examination must be taken before the end of the first 18 months as a PhD student.

ENVE SPECIFIC PROGRAM MEETING REQUIREMENTS

ENVE doctoral students will not have a formal qualifying exam. The ENVE faculty, in cooperation
with the student’s assembled Ph.D. Committee, will evaluate the candidate’s performance in classes
and research at the time that they submit their program of study for signatures. As stated above,
the program meeting for Ph.D. students should occur in the Spring term of their first year in
residence. Prior to that meeting, the student’s major professor will review the student’s transcript
and consult with ENVE faculty with whom the student has taken core ENVE classes. During the
program meeting, this information will be shared with the rest of the committee and additional oral
questioning of the student on aspects of the core ENVE curriculum will occur. If the student is trying
to proceed towards a PhD directly, prior to getting an MS degree, the committee will make a decision
if this is acceptable, or will determine if the student must first complete an MS Thesis. If the student
has already completed an MS degree, the committee will decide if the student should progress
towards a PhD degree with the next step being the Preliminary Exam.

**PRELIMINARY EXAMINATIONS FOR DOCTORAL STUDENTS**

There are two components to preliminary examinations completed as part of a Ph.D. degree in Environmental Engineering: (1) the Written Preliminary Examination, and (2) the Oral Preliminary Examination.

The written preliminary exam followed by an oral defense is intended to evaluate a Ph.D. student’s ability to utilize scientific literature, to think critically, to write creatively, to articulate ideas, and to demonstrate understanding of his/her specific field of study. The oral part of this examination will also evaluate the student’s breadth of knowledge in areas of broader focus, yet related to the area of research. Generally, the oral part of the exam will begin with an approximately 45 minute presentation by the student, in which he/she presents his research, and thus, the content of the written report. This will be followed by a question and answer session in which the committee can address both the research itself and also more general knowledge. Preliminary exams should be scheduled for *at least two hours*.

**WRITTEN PRELIMINARY EXAMINATION**

The Written Preliminary Exam must be completed prior to the Oral Preliminary Exam. Candidates must write a proposal on their thesis topic and distribute it to their doctoral committee members at least *one week prior* to the date of the Oral Preliminary Exam.

*Guidelines for the Written Research Proposal*

This examination will also test the student’s ability to develop, investigate, and defend their original research idea. The originality, scholarly quality, and the technical feasibility of the research proposal will be evaluated.

The format of the written research proposal required for the Preliminary Exam is as follows.

1. The report is intended to contain a summary of the student’s research, to demonstrate knowledge in the area of research, progress so far, expected results, and a timeline for completing the research and thus to graduation.
2. This ‘report’ style document should contain an introduction, literature review, outline of major hypotheses, discussion of methods that will be used to test the hypotheses, preliminary findings up to the point of the exam, a summary, and a timeline indicating roughly when key elements of the research will be completed. Such a report would likely serve as a basis for the first several chapters of the Ph.D. candidate’s dissertation.
3. The written research proposal is limited to *fifteen single-spaced pages* (including references, timeline, etc.)
4. The written research proposal must be written by the Ph.D. candidate with limited input from the thesis advisor.

**ORAL PRELIMINARY EXAMINATION**

The Oral Preliminary Examination is conducted by the student’s doctoral committee and should cover the student’s knowledge in his/her major and minor subjects. The examination consists of an oral defense of the proposal submitted in the Written Preliminary Examination on the candidate’s proposed research topic. However, no more than one-half of the time should be devoted to specific aspects of the thesis project. The first part of the examination (i.e., the presentation and defense of
the student’s thesis proposal) is generally presented as a seminar to the student’s doctoral committee. This portion should last no longer than 30 to 45 minutes. The committee will then ask questions relating to the thesis proposal, the candidate’s course work, or the student’s research. All members of the doctoral committee, including the GCR, are expected and encouraged to participate in examining the student. No committee member should be allowed to monopolize the examination, and the student must be given an adequate and fair opportunity to respond to the questions. The examination will be scheduled for at least two hours, and the examination date must be scheduled with the Graduate School at least one week in advance.

If more than one negative vote is recorded by the examining committee, the candidate will have failed the oral examination. Only one re-examination is permitted.

At least one complete academic term must elapse between the time of the Oral Preliminary Examination and the Final Oral Examination. If more than five years elapse between these two examinations, the candidate must take another Oral Preliminary Examination.

**FINAL ORAL EXAMINATIONS**

After completion of or while concurrently registered for all work required by the program, the student must pass a final oral examination. The final oral examination must be scheduled with the Graduate School not less than two weeks prior to the date of the examination. The final oral examination information must be submitted to the Graduate Programs Coordinator for announcement in the School of Chemical, Biological, and Environmental Engineering no less than two weeks prior to the examination date.

The thesis defense portion of the final oral examination is open to all interested persons. After the open portion of the exam, the examining committee excludes all other persons and continues with the examination of the candidate’s knowledge of the field of study and the evaluation of the candidate’s performance. The oral final examination should be scheduled for at least two hours.

The student is expected to display a mastery of knowledge in his/her field and professional maturity as an Environmental Engineer. In the oral examination, the candidate is expected to defend the thesis and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.

The final oral examination must be taken within five years after the oral preliminary examination. If more than five years elapse, the candidate is required to take another oral preliminary examination.

**RE-EXAMINATION**

The candidate is expected to defend their thesis during the final oral exam and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate has failed the examination. Only one re-examination is permitted.

**DOCTORAL DISSERTATION**

All Ph.D. candidates must submit a thesis embodying the results of research and presenting evidence of originality and ability in independent investigation. The thesis must constitute a valid contribution to knowledge in the field of study and must be based on the candidate’s own investigation, including one or more of the following elements:
• Contribution to theory,
• Development of new method for scientific investigation,
• Generation of new scientific data which clearly contribute to the development of sciences, and
• Development and/or novel implementation of a numerical model.

The thesis must reflect a mastery of the literature of the subject and be written in scientific format. The preparation of an acceptable thesis will require at least one full-time academic year. The booklet, Thesis Guide: Preparing a Thesis or Dissertation at OSU, is available electronically on the Web at http://gradschool.oregonstate.edu/success/thesis-guide.

The results from studies conducted using human subjects without obtaining Institutional Review Board approval shall not be used to satisfy master’s thesis or doctoral dissertation requirements. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at http://oregonstate.edu/research/irb/.

When scheduling their final oral examinations, doctoral students are required to submit the pretext pages of their dissertations to the Graduate School at least two weeks prior to the final oral examination. Pretext pages include the abstract, copyright (optional), title page, approval page, acknowledgment page, contribution of authors, table of contents, list of figures, tables, appendices, dedication (optional), and preface (optional). It is expected that students will distribute examination copies of their thesis to all committee members, including the Graduate Council representative, sufficiently early to permit thorough review of the thesis prior to the student’s final oral examination.

Within six weeks after the final oral examination or before the first day of the following term, whichever comes first, upload one PDF copy of your thesis, without signatures, electronically to ScholarsArchive and submit the signed ETD submission approval form with a copy of the title page to the Graduate School. If final submission requirements are after the initial six-week period, the student may be subject to re-examination. Please refer to the Graduate School’s website for complete details (http://gradschool.oregonstate.edu/success/thesis-guide).

Signatures on the ETD submission approval form can be electronic, signed, scanned and emailed or faxed. The thesis will not be accepted for graduate requirements until it has received approval by the graduate dean, which the thesis editor will obtain.

Within six weeks of the final oral examination, one printed copy your thesis must be submitted to the School of CBEE main office for binding and archiving in the CBEE thesis library.

**PROCEDURES LEADING TO THE DOCTORAL DEGREE**

Below is a brief list of the steps required to obtain the Ph.D. degree. You should also become familiar with the specific and detailed information contained in the Graduate School Catalog as well as School requirements.
### Procedures for PhD Students

<table>
<thead>
<tr>
<th>Check Box</th>
<th>Item #</th>
<th>Step</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identify a Major Professor</td>
<td>During first term</td>
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<tr>
<td>2</td>
<td>Establish general area of dissertation research</td>
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<tr>
<td>3</td>
<td>Take Oral Qualifying Exam (CHE only)</td>
<td>Spring Break, 1st Year</td>
<td></td>
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<tr>
<td>4</td>
<td>Generate <a href="#">Grad Council Rep (GCR) list</a> and contact those people until you find someone willing to serve as your GCR</td>
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<tr>
<td>5</td>
<td>Schedule doctoral program meeting with all committee members; reserve a room with CBEE Office Coordinator</td>
<td>By the end of your first academic year (early spring term)</td>
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<tr>
<td>6</td>
<td>Doctoral program meeting: Print <a href="#">GCR Checklist</a> and take to the meeting</td>
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<tr>
<td>7</td>
<td>File <a href="#">Doctoral Program of Study</a></td>
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<tr>
<td>8</td>
<td>Schedule the Preliminary Oral Examination with your committee (one hour)</td>
<td>AT LEAST 2 weeks prior to preliminary oral examination</td>
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<tr>
<td>9</td>
<td>Reserve a room in CBEE with the Office Coordinator for the Preliminary Oral Examination</td>
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<tr>
<td>10</td>
<td>Review copies of <a href="#">Preliminary Oral Examination scoring guide</a> from Graduate School</td>
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<tr>
<td>11</td>
<td>Complete and Submit <a href="#">Exam Scheduling Form</a></td>
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<tr>
<td>12</td>
<td>Complete preliminary oral examination</td>
<td>Spring Term, Second Year</td>
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<tr>
<td>13</td>
<td>Hold regular meetings with your Committee to keep them updated on your progress</td>
<td>Throughout your degree progression (at least once a year)</td>
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<tr>
<td>14</td>
<td>Read the Thesis Guide on the <a href="#">Grad School’s website</a></td>
<td>Prior to starting your dissertation</td>
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<tr>
<td>15</td>
<td>Present Project Poster at Graduate Visitation</td>
<td>Winter Term, Third Year</td>
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<tr>
<td>16</td>
<td>Compare Doctoral Program of Study form and transcripts for consistency</td>
<td>1 term before your intended graduation term</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>File <a href="#">Petition to Change Program form</a> if needed.</td>
<td>Any Term, Fourth Year</td>
<td></td>
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<tr>
<td>18</td>
<td>Present Research in Graduate Seminar (CBEE 507)</td>
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<tr>
<td>19</td>
<td>File a <a href="#">Diploma Application</a></td>
<td>15 weeks prior to final oral examination</td>
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<tr>
<td>20</td>
<td>Complete final draft of your dissertation and submit it to your major professor for review and approval</td>
<td>By the start of your last term</td>
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</tr>
<tr>
<td>21</td>
<td>Schedule the final oral examination w/your committee</td>
<td>AT LEAST 2 weeks prior to final oral examination</td>
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<tr>
<td>22</td>
<td>Reserve a room with CBEE Office Coordinator</td>
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<tr>
<td>23</td>
<td>Pick up copies of final oral examination scoring guide from Graduate School</td>
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<tr>
<td>24</td>
<td>Complete <a href="#">Exam Scheduling Form</a></td>
<td></td>
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<tr>
<td>25</td>
<td>Submit thesis pretext pages to the Graduate School</td>
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<tr>
<td>26</td>
<td>Submit a final draft dissertation to all committee members (with advisor’s approval)</td>
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<tr>
<td>27</td>
<td>Confirm final oral examination appointment with the Grad School (make sure it’s on their calendar!)</td>
<td>1 week after submitting exam scheduling form</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Submit final oral examination appointment to Graduate Programs Coordinator for announcement circulation</td>
<td>AT LEAST 2 weeks prior to final oral examination</td>
<td></td>
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</tbody>
</table>
### NOTES ABOUT THE CHECKSHEET

The **Doctoral Program of Study** form is located on the Graduate School’s website. You should work with your advisor to fill out the Program of Study form *before* you hold your doctoral program meeting because your committee needs to approve the Program of Study before you can submit it to the Graduate School.

The **Written Qualifying exam** for CHE students is offered only in the Spring term. Students who need to take the exam will be notified of the exam dates at the end of the preceding Winter term. Upon passing the exam, the student becomes a PhD “Candidate.”

For various reasons, changes often occur in the classes that you plan to take and what you actually need to earn your degree. When you graduate, the Program of Study must be 100% accurate. You should compare the program on file with your transcripts, which can be viewed by logging into Student Online Services. Make corrections by filling out the **Petition to Change the Program of Study form** at least one term before you plan to defend. You do not have to revise the above form each time you deviate from your original program; however, you need to keep your committee informed of any and all changes, since they are the ones who must approve your Program.

Give yourself and your committee members a lot of time to **plan for the defense date**. Sometimes committee members will be on **sabbatical leave** during the term in which you plan to defend. You should check with your committee members about such leaves far in advance to better plan, especially if you need to change a committee member for any reason. Note that your GCR *must attend* all meetings and examinations during your degree program.

The **Diploma Application** must be filed no later than week two of the term in which you defend. However, completion of the form a term or two early is OK. If you need to change your end term after you file a Diploma Application, simply fill out the application again.

When you **confirm** your defense **exam date with the Graduate School**, you are making sure your exam is on their calendar. If they are not aware of your defense date, even if you filled out all the paperwork, *you will not be allowed to defend* and will have to reschedule.
### M.ENG. DEGREE CURRICULUM IN CHEMICAL ENGINEERING

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 540</td>
<td>Grad Reaction Engineering</td>
<td>CBEE 507 Grad Seminar 1 cr</td>
<td>CBEE 507 Grad Seminar 1 cr</td>
</tr>
<tr>
<td>CHE 525</td>
<td>CHE Analysis</td>
<td>CHE 537 Grad Thermo 4 cr</td>
<td>CHE 520 Grad Mass Transfer 4 cr</td>
</tr>
<tr>
<td>CHE 514</td>
<td>Grad Fluid Flow</td>
<td>Grad Elective 3-4 cr</td>
<td>Grad Elective 3-4 cr</td>
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<td>Grad Elective</td>
<td>3-4 cr</td>
<td>Grad Elective 3-4 cr</td>
<td>Grad Engineering Specific 3-4 cr</td>
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<td>Grad Elective</td>
<td>3-4 cr</td>
<td>Grad Engineering Specific 3-4 cr</td>
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<tr>
<td>Grad Elective</td>
<td>3-4 cr</td>
<td>Grad Engineering Specific 3-4 cr</td>
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<tr>
<td>TOTAL</td>
<td>~14-16</td>
<td>~15-17</td>
<td>~14-17</td>
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</tbody>
</table>

**Notes:**
- **CHE Core** (21 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540
- CBEE 507 Seminar is required for either Winter or Spring term, very strongly recommended for the other.
- Engineering Specific (9 cr): Any graduate level course offered by the College of Engineering.
- 2 additional seminar credits can be used towards these credits
- Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses. These are your most flexible credits.
# M.Eng. Degree Curriculum in Chemical Engineering, Non-CHE UG Majors

(all non-chemical engineering majors use this curriculum in combination with advice from your academic advisor)

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
</tr>
</tbody>
</table>
| CHE 331 UG Fluids 3 cr  
CHE 443 UG Reaction Engineering 4 cr  
CHE 525 CHE Analysis 4 cr | CBEE 507 Grad Seminar 1 cr  
CHE 312 UG Thermo 3 cr  
CHE 332 UG Transport II (Heat Trans) 4 cr | CHE 520 Grad Mass Transfer 4 cr  
Grad Elective 3-4 cr  
Grad Elective 3-4 cr  
Grad Elective 3-4 cr | CHE 540 Grad Reaction Engineering 4 cr  
CHE 537 Grad Thermo 4 cr | Grad Engineering Specific 3-4 cr  
Grad Engineering Specific 3-4 cr  
Grad Engineering Specific 3-4 cr |

| **TOTAL** | **12** | **12** | **12** | **12** | **12** |
| **3-4 cr** |

**Notes:**

**CHE Core** (21 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540  
CBEE 507 Seminar is required for Winter or Spring term, very strongly recommended for other.  
Engineering Specific (9 cr): Any graduate level course offered by the College of Engineering, 2 additional seminar credits can be used towards these credits  
Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses, These are your most flexible credits.
### M.ENG. DEGREE CURRICULUM IN ENVIRONMENTAL ENGINEERING

<table>
<thead>
<tr>
<th></th>
<th>YEAR 1</th>
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<tbody>
<tr>
<td></td>
<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>CHE 525</td>
<td>CHE Analysis</td>
<td>ENVE 541</td>
<td>ENVE 535</td>
</tr>
<tr>
<td></td>
<td>4 credits</td>
<td>Microbial Proc in Env. Syst.</td>
<td>Phys + Chem Proc for ENVE</td>
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<tr>
<td>ENVE 532</td>
<td>Aqueous Chem.</td>
<td>ENVE 531</td>
<td>ENVE 525</td>
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<tr>
<td></td>
<td>3-4 credits</td>
<td>3-4 credits</td>
<td>3-4 credits</td>
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<tr>
<td>ENVE 536</td>
<td>Aq. Chem. Lab</td>
<td>Gen. Grad Engineering</td>
<td>ENVE 556</td>
</tr>
<tr>
<td></td>
<td>1 credit</td>
<td>3-4 credits</td>
<td>Sust. Water Res. Engr. or Gen. Eng.</td>
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<tr>
<td></td>
<td>Grad Elective</td>
<td>Grad Elective</td>
<td>Grad Elective</td>
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<td>3-4 credits</td>
<td>3-4 credits</td>
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<tr>
<td>Grad Elective</td>
<td>3-4 credits</td>
<td>Grad Elective</td>
<td>3-4 credits</td>
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<tr>
<td></td>
<td>CBEE 507 Seminar</td>
<td>CBEE 507 Seminar</td>
<td>1 credit</td>
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<td>1 credit</td>
<td>1 credit</td>
<td>1 credit</td>
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<tr>
<td>Total</td>
<td>15-17</td>
<td>15-17</td>
<td>15-18</td>
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</table>

**Notes:**
- **Graduate ENVE Core**, 18 credits: CBEE 507(1), CHE 525(4), ENVE 532(4), ENVE 536(1), ENVE 535(4), ENVE 541(4) [Seminar (CBEE 507) is required for one term, highly recommended for the other]
- General Engineering, 10 credits: Take 1 of ENVE 525, ENVE 556 and ENVE 531. (Depending upon progress, these courses could be distributed into Year 2).
- Graduate Elective: 17+ credits, typically 4-5 courses. (Depending upon progress, these courses could be distributed into Year 2).

Total Graduate Credits: 45+
Coursework Credits: 45 minimum (18 Graduate ENVE Core and 17 Graduate Elective, 10 general engineering).
# M.S. DEGREE CURRICULUM IN CHEMICAL ENGINEERING

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>CBEE 507 Grad Seminar 1 cr</td>
<td>CBEE 507 Grad Seminar 1 cr</td>
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<tr>
<td>CHE 540 Grad Reaction Engineering 4 cr</td>
<td>CHE 514 Grad Fluid Flow 4 cr</td>
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<tr>
<td>Grad Elective 3-4 cr</td>
<td>Grad Elective 3-4 cr</td>
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<tr>
<td><strong>Winter</strong></td>
<td><strong>Winter</strong></td>
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<tr>
<td>CBEE 507 Grad Seminar 1 cr</td>
<td>CHE 520 Grad Mass Transfer 4 cr</td>
</tr>
<tr>
<td>CHE 537 Grad Thermo 4 cr</td>
<td>Grad Elective 3-4 cr</td>
</tr>
<tr>
<td>Grad Elective 3-4 cr</td>
<td>CHE 503 MS Thesis Variable 1-12 cr</td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>CBEE 507 Grad Seminar 1 cr</td>
<td>CHE 520 Grad Mass Transfer 4 cr</td>
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<td>CHE 520 Grad Mass Transfer 4 cr</td>
<td>Grad Elective 3-4 cr</td>
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<tr>
<td><strong>Notes:</strong></td>
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<tr>
<td>CHE Core (23 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540</td>
<td>CHE Core (23 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540</td>
</tr>
<tr>
<td>CBEE 507 Seminar is required for all three terms (effective W15, CBEE 507 will become CBEE507)</td>
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</tr>
<tr>
<td>M.S. Thesis (9 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements</td>
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</tr>
<tr>
<td>Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses, These are your most flexible credits.</td>
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</tr>
<tr>
<td>Year 2: completion time is dependent upon intensity of project</td>
<td>Year 2: completion time is dependent upon intensity of project</td>
</tr>
</tbody>
</table>
M.S. DEGREE CURRICULUM IN CHEMICAL ENGINEERING FOR NON-CHE UG MAJORS
(all non-chemical engineering majors use this curriculum in combination with advice from your research or academic advisor)

<table>
<thead>
<tr>
<th>Year 1</th>
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<td>CHE 514 Grad Fluid Flow 4 cr</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Note:

- **CHE Core** (23 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540
- CBEE 507 Seminar is required for all terms (effective W15 CBEE 507 will become CBEE 507)
- M.S. Thesis (9 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements
- Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses, These are your most flexible credits.
- Prerequisites for Graduate Core (14 cr): CHE 312, CHE 331, CHE 332 (or CHE 333 offered Spring term), CHE 443 - are not included on Program of Study
# M.S. Degree Curriculum in Environmental Engineering

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 525 CHE Analysis</td>
<td>4 credits</td>
<td>ENVE 541 Microbial Proc in Env. Syst.</td>
</tr>
<tr>
<td>ENVE 532 Aqueous Chem.</td>
<td>4 credits</td>
<td>Grad Elective #2</td>
</tr>
<tr>
<td>ENVE 536 Aq. Chem. Lab</td>
<td>1 credit</td>
<td>Grad Elective #3</td>
</tr>
<tr>
<td>CBEE 507 Seminar</td>
<td>3-4 credits</td>
<td>3-4 credits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YEAR 2</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVE 535 Phys + Chem Proc for ENVE</td>
<td>4 credits</td>
<td>ENVE 503 M.S. Thesis</td>
<td>Variable credit</td>
</tr>
<tr>
<td>ENVE 503 M.S. Thesis</td>
<td>Variable credit</td>
<td>ENVE 503 M.S. Thesis</td>
<td>variable credit</td>
</tr>
<tr>
<td>Grad Elective #1</td>
<td>3-4 credits</td>
<td>Grad Elective #2</td>
<td>Grad Elective #4</td>
</tr>
<tr>
<td>Grad Elective #3</td>
<td>3-4 credits</td>
<td>Grad Elective #5</td>
<td>3-4 credits</td>
</tr>
<tr>
<td>CBEE 507 Seminar</td>
<td>3-4 credits</td>
<td>CBEE 507 Seminar</td>
<td>CBEE 507 Seminar</td>
</tr>
</tbody>
</table>

| Total | 13-14 | 12+ | 12+ | 12 | 12 | 12 |

**Notes:**
- Graduate ENVE Core, 20 credits: CBEE 507(3x1), CHE 525(4), ENVE 532(4), ENVE 536(1), ENVE 535(4), ENVE 541(4)
- Seminar (CBEE 507, effective W15 CBEE 507) is required for all three terms in the first year (if possible)
- M.S. Thesis, 9+ credits: only 9 thesis credits are counted toward degree requirements; however, thesis credits can exceed 9 units total to meet graduate assistantship requirements (e.g., 12 credits per term)
- Graduate Elective: 16+ credits, typically 4-5 courses. Depending upon the demands of your research assistantship, these course can be distributed into Year 2

Total Graduate Credits: 45+
Coursework Credits: 36 minimum (20 Graduate Major and 16 Graduate Elective)
M.S. Thesis Credits: 9
## Ph.D. Degree Curriculum in Chemical Engineering

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<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3-6</th>
</tr>
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<tbody>
<tr>
<td><strong>Fall</strong></td>
<td><strong>Winter</strong></td>
<td><strong>Spring</strong></td>
</tr>
<tr>
<td>CBEE 507 Grad Seminar</td>
<td>CBEE 507 Grad Seminar</td>
<td>CBEE 507 Grad Seminar</td>
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<tr>
<td>1 cr</td>
<td>1 cr</td>
<td>1 cr</td>
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<tr>
<td>CHE 540 Grad Reaction Engineering</td>
<td>CHE 537 Grad Thermo 4 cr</td>
<td>CHE 520 Grad Mass Transfer 4 cr</td>
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<tr>
<td>4 cr</td>
<td>4 cr</td>
<td>4 cr</td>
</tr>
<tr>
<td>CHE 525 CHE Analysis</td>
<td>CHE 514 Grad Fluid Flow 4 cr</td>
<td>Grad Elective</td>
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<tr>
<td>4 cr</td>
<td>4 cr</td>
<td>3-4 cr</td>
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<tr>
<td>Grad Elective</td>
<td>Grad Elective</td>
<td>Grad Elective</td>
</tr>
<tr>
<td>3-4 cr</td>
<td>3-4 cr</td>
<td>3-4 cr</td>
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</table>

**TOTAL:** 12 12 12 12 12 12 12 12 12

**CHE Core:** (23 cr): CBEE 507, CHE 514, CHE 520, CHE 525, CHE 537, CHE 540

**Notes:**

- CBEE 507 Seminar is required for all three terms (effective W15, CBEE 507 will become CBEE507)
- Ph.D. Thesis (36 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements
- Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses. These are your most flexible credits.
- Year 3-6: completion time is dependent upon intensity of project, and credits are based on funding/coursework
- 108 Total Credits required
### Ph.D. DEGREE CURRICULUM IN ENVIRONMENTAL ENGINEERING

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<th>Year 3-6</th>
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<td>Winter</td>
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<tr>
<td>CBEE 507</td>
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<tr>
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<tr>
<td>ENVE 532</td>
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</tr>
<tr>
<td>Aqueous Chemistry</td>
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<tr>
<td>ENVE 536</td>
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</tr>
<tr>
<td>Aq. Chem Lab</td>
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<tr>
<td>CHE 525</td>
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<tr>
<td>Grad Elective</td>
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<td>3-4 cr</td>
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<td>3-4 cr</td>
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<tr>
<td>TOTAL</td>
<td>13-14</td>
<td>13-17</td>
<td>13-14</td>
</tr>
</tbody>
</table>

Notes:
- **ENVE Core** (20 cr): CBEE 507(1x3), CHE 525(4), ENVE 532(4), ENVE 536(1), ENVE 535(4), ENVE 541(4)
- CBEE 507 Seminar is required for all three terms (effective W15, CBEE 507 will become CBEE507)
- Ph.D. Thesis (36 cr): variable credits, thesis credits can go over 9 units total to meet GTA/GRA requirements
- Graduate Elective (15 cr): Any graduate-level course, typically 4-5 courses, These are your most flexible credits.
- Year 3-6: completion time is dependent upon intensity of project, and credits are based on funding/coursework
- 108 Total Credits required
Electronic Thesis and Dissertation Submission Approval Form

Oregon State University Graduate School

Electronic Thesis and Dissertation (ETD) Submission Approval Form

Student Name: ___________________________ ID: ________________

(Major) ___________________________ (Degree Name) ________________

Thesis or Dissertation Title:

ETD Release Options: Placing your thesis or dissertation in ScholarsArchive@OSU provides the greatest opportunity for your research to make an impact because it's openly available to anyone in the world with an Internet connection. If, for some reason (patent or proprietary concerns), you need to restrict access only to the OSU community for a limited period, please indicate below.

Check one of the Following:

☐ Provide open and immediate digital access to ScholarsArchive
☐ Delay digital access of my work via the World Wide Web for the following period of time:

☐ 6 months ☐ 1 year ☐ 2 years

Review and Acceptance of Thesis or Dissertation:

I certify that the version I submitted to ScholarsArchive is the same as that approved by my Major Professor. I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature authorized release of my thesis to any reader upon request.

Student Signature: ___________________________ Date: ___________________________

I have reviewed the final electronic version of the above-mentioned document and determined that it is an accurate representation of the document reviewed and accepted by the committee.

Major Professor Name: ___________________________ Date: ___________________________

Co-Major Professor Name: ___________________________ Date: ___________________________

Approval Signature:

Head/Chair/Director/Dean of Majors Program Name: ___________________________ Date: ___________________________

Signature: ___________________________ Date: ___________________________

Dean of the Graduate School: Brenda McComb

Signature: ___________________________ Date: ___________________________

Revised 11/07/2013

55
DOCTORAL PROGRAM MEETING CHECKLIST FOR GRADUATE COUNCIL REPRESENTATIVE

Student’s Name ___________________________ Major __________________

GENERAL INFORMATION

The major professor chairs this meeting.

The student should have devised a draft program, usually with help from the major professor. The student should furnish copies of this program to all committee members at the meeting.

The student (or major professor) is responsible for providing for committee use a copy of transcripts containing all completed courses that will be transferred to the program. Courses to be transferred must be graduate level courses with A or B (or equivalent) grades. Courses taken before the completion of a four-year baccalaureate degree (or equivalent) must have been officially reserved for graduate credit. Courses used on a master’s degree can be transferred to a doctorate. Graduate courses taken at OSU while the student was a graduate non-degree student or a postbaccalaureate student, or courses reserved for graduate credit while an undergraduate or postbaccalaureate student, are considered transfer courses. If the transfer credit is from a foreign university, the student must provide an English translation of the transcript with the courses to be transferred clearly indicated.

CHECKLIST

1. ____ Is the meeting being held at the scheduled time?

2. ____ Are all committee members present?

3. ____ Are all the necessary transcripts available for committee use?

4. ____ Does the program show at least three years of full-time graduate work beyond the baccalaureate degree (i.e., a minimum of 108 credits)?

5. ____ Does the program show at least 36 credits devoted to the Ph.D. thesis (24 credits for the Ed.D. thesis)?
6. ____ Does the program contain a least one full-time academic year of regular non-blanket course work (i.e., a minimum of 36 credits)?

7. ____ Does the program guarantee that the following residence requirement will be met? 1.) A minimum of 36 graduate Oregon State University credits, and 2.) At least three terms of full-time graduate academic work (at least 9 credits/term) on site at the Corvallis campus or at an off-campus site approved by the Graduate School.

8. ____ Does each declared minor contain at least 18 credits (15 credits for an Integrated Minor)?

9. ____ Does the program contain not more than 15 credits of blanket-numbered courses, other than thesis? (Excess blanket-numbered courses are allowed to the extent that the program exceeds 108 credits.)

10. ____ Does the program guarantee that all departmental requirements will be fulfilled?

11. ____ Does the program include a plan for the student to be informed/trained as to what is required to conduct scholarly activities in an ethical manner? For examples of such plans, see PhD assessment requirements at http://oregonstate.edu/dept/grad_school/assessment.php.

12. ____ Do all transfer courses appear to fit the above-mentioned guidelines for transfer courses?

13. ____ Are all transfer courses clearly identified as such?

14. ____ Is the program meeting being held early enough in the student’s academic career to permit the committee to contribute meaningful input to the program?

15. ____ Other comments?

Please sign

Graduate Council Representative

Date

Please Return this Form Promptly to the Graduate School after the Meeting.
**Masters Program of Study**

### Graduate School

**Masters**

<table>
<thead>
<tr>
<th>Check One</th>
<th>EdM</th>
<th>MA</th>
<th>M Coun</th>
<th>MEng</th>
<th>MF</th>
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<th>MPP</th>
<th>MS</th>
<th>MMP</th>
<th>MHP</th>
<th>PSM</th>
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<th>(Former)</th>
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<th>Email Address</th>
<th>Degree Now Held</th>
<th>When/Where Rcvd</th>
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</thead>
</table>

#### Academic Unit

- **Major**: [Insert Major]
- **Minor**: [Insert Minor]
- **Option**: [Insert Option]

#### CAPSTONE

<table>
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<tr>
<th>Transfer Symbol</th>
<th>Course</th>
<th>Cr.</th>
<th>Gr.</th>
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</thead>
<tbody>
<tr>
<td>G*</td>
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**Thesis (6-12 credits)**

- [If applicable]
  - Dept.
  - No.

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<th>Course</th>
<th>Cr.</th>
<th>Gr.</th>
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</table>

**Total**

#### SUPPORTIVE REQUISITES

- **MA ONLY**: Foreign language requirements vary among academic units.

**Languages**

Master’s students are expected to "be able to conduct scholarly or professional activities in an ethical manner." Indicate the training you have completed or will complete to meet this learning outcome. See page 2 of this form for more information.

- **Ethical Research Training**
- **SFM ONLY (MF, MS & PhD)**: See SFM Advising Guide

**Communication Training**

- a. Total Major Hours
- b. Total First Minor or Option Hours
- c. Total Blanket Hour Credits
- d. Total 4XX6XX Program Credits
- e. Total Graduate Standalone Credits

**TOTAL CREDITS ON PROGRAM (d+e)**

- *Mark courses that will be graduate standalone with the letter "G" in this column.*

Revised August 2015
The program of study will be audited to determine if it is accurate and it meets the minimum requirements for this degree as established by the OSU Faculty Senate. Please be sure that the following items are correct:

1. The correct degree is indicated in the first row. Please refer to and attach an unofficial copy of your transcript.
2. Student name, phone, ID number, email address, degree held, year the degree was awarded, and institution from which it was received are filled in.
3. The academic units, majors, and thesis or non-thesis are indicated.
4. If your degree includes a thesis, the program of study must include from 6 to 12 credits of XXX503 Thesis, where XXX is the course code of your major. If both majors require a thesis, an approximately equal amount of thesis is taken in each major. The thesis can be directed by one person qualified in both majors or by co-major professors (one in each major). If one major requires a thesis and the other does not, the major requiring a thesis should list 6-12 credits of XXX503 and the major that does not require a thesis may list up to 6 credits of XXX501 or XXX506.
5. If your degree is non-thesis, the program of study must include 3 to 6 credits of project such as XXX501 or XXX506. If both majors offer a non-thesis option, each may list 3 to 6 credits of XXX 501 or XXX506.
6. The maximum number of blanket numbered credits is 24 on a 60 credit degree program or 9 on a 45 credit degree program.
7. A transfer symbol is indicated for each transfer course (T1 for the first university, T2 for the second, etc.)
8. Transfer courses have been approved by your major advisor and minor advisor if they are in the minor field.
   All transfer courses must be either:
   a. Graduate courses taken at OSU while enrolled as a non-degree, undergraduate, or post-baccalaureate student and not used to satisfy undergraduate degree requirements;
   b. Graduate courses taken at OSU in a prior graduate degree program and falling within the limits of transfer credit accepted from one OSU graduate degree to a second OSU graduate degree (refer to current graduate catalog); or
   c. Stand-alone graduate courses taken at other accredited universities but not used to satisfy requirements for a bachelor’s, master’s, or doctoral degree or international equivalents.
9. All courses listed as transfer courses must comply with policies:
   a. be graded B, B+, A-, A, or A+ (no P/N, S/U, credit/no credit graded courses will be allowed), and
   b. not have been used on a previous master’s or doctoral degree, and
   c. grades of “B” (3.00) or better have been earned.
10. Thirty (30) credits must be taken at OSU after having been admitted as a regular, degree-seeking graduate student. (Transfer courses, as defined above, cannot be counted toward this residence requirement.)
11. For each standalone graduate course a G is entered in the G column.
12. Each course in the major and minor has a title, abbreviated if necessary, a department code, a course number, number of credits and a grade, if the course has been completed.
13. Grades of non-transfer courses listed on this program will be either C or above, or P, or R for research.
14. The total number of credits at the 4XX/5XX level is entered and the number of 5XX or 6XX credits is entered.
15. No more than 50% of the credits are slash courses (the 5XX component of a 4XX/5XX course). To determine if a course is a slash course examine the OSU course catalog for the term that you took 5XX course. If there is a 4xx course with the same title during the same term, then this is a slash course.
16. Your plan includes training in the conduct of scholarly or professional activities in an ethical manner. This could be a course offered by your degree program, GRAD 520, RCR training modules, training in research groups, etc. For more information on the requirement, see http://oregonstate.edu/dep/grad_school/assessment.php.
17. Your total number of credits must be at least 45. (Your major/track may require more credits—check with them.)
18. All work toward this degree will be completed within seven (7) years. This includes transfer credits, all course work, all examinations, and final library copies of thesis, if applicable.
19. Your major professor(s) must belong to the Graduate Faculty in your majors. Your minor professor, if you have a minor, must be a Graduate Faculty member in your minor.
20. Committee Requirements:
   a. MA, MBE, MCoun, Meng, MFA, MHP, MMP, MS, MocE, MPP, PSM: Non-Thesis: The examining committee consists of three members of the graduate faculty-two in the major field and one in the minor field if a minor is included. When a minor is not included, the third member may be from the graduate faculty at large. Thesis: The examining committee consists of at least four members of the graduate
faculty-two in the major field, one in the minor field if a minor is included, and a Graduate Council representative. When a minor is not included, the fourth member may be from the graduate faculty at large.

b. **EdM**: Individual committees are usually not established for students in these programs. Each student will need to identify a Graduate Faculty member from the major department and Graduate Faculty member representing the minor department if a minor is declared.

c. **MF**: Two members of the Graduate Faculty from the major department; one member of the Graduate Faculty from the minor if a minor is declared, otherwise another member of the Graduate Faculty; and a Graduate Council Representative if a thesis is involved. The major professor is one of the two members representing the major department.

21. The program of study must be signed by the student, all committee members, and the academic unit chair.

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<thead>
<tr>
<th>Student's Signature</th>
<th>Signature</th>
<th>Date</th>
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<tbody>
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<td>APPROVED - Major Professor</td>
<td>Typeled Name</td>
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</tr>
<tr>
<td>APPROVED - Chair, Academic Unit</td>
<td>Typeled Name</td>
<td>Signature</td>
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<tr>
<td>APPROVED - Minor Professor</td>
<td>Typeled Name</td>
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<td>APPROVED - Graduate Council Representative</td>
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<tr>
<td>APPROVED - Committee Member</td>
<td>Typeled Name</td>
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<td>APPROVED - Committee Member</td>
<td>Typeled Name</td>
<td>Signature</td>
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<tr>
<td>APPROVED - Graduate School</td>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
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Return this program of study to the:
Graduate School
300 Kerr Administration Building
Corvallis, OR 97331-2121
Graduate.School@oregonstate.edu
541-737-4881

Revised August 2015
Doctoral – Program of Study

Graduate School

Check One □ PhD □ EdD

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If additional lines are needed, use a second form

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If additional lines are needed, use a second form

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<td>T4</td>
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SUPPORTIVE REQUISITES

Foreign language requirements vary among academic units.

Languages

Doctoral students are expected to "be able to conduct scholarly or professional activities in an ethical manner." Indicate the training you have completed or will complete to meet this learning outcome. See page 2 of this form for more information.

Ethical Research Training

SFM ONLY (MF, MS & PhD): See SFM Advising Guide

Communication Training

Mark courses that will be graduate standalone with the letter "G" in this column.

Revised August 2015
The **program of study will be audited** to determine if it is accurate and it meets the minimum requirements for this degree as established by the OSU Faculty Senate. Please be sure that the following items are correct:

1. Student name, phone, ID number, email address, degree held, year awarded, and institution from which it was received.
2. The academic unit, major, minor and option, if applicable, are indicated. Please run an **unofficial copy** of your OSU transcript to attach to this form. [https://prod/wbkwbis.P.WWWLogin](https://prod/wbkwbis.P.WWWLogin)
3. The program of study satisfies the residence requirement. That is, (1) a minimum of 36 credits on the form are courses taken at OSU after admission as a regular, degree-seeking graduate student and (2) a minimum of three terms of full-time graduate academic work (at least 9 credits/term) will be spent on site at the Corvallis campus or at an off-campus site approved by the Graduate School. Transfer courses as defined above are not counted toward this residence requirement.
4. The maximum number of blanket numbered credits is 15 on a 108 credit degree program.
5. A transfer symbol is indicated for each transfer course (T1 for the first university, T2 for the second, etc.)
6. Transfer courses must have been approved by your major advisor and minor advisor if they are in the minor field. All transfer courses must be either:
   a. Graduate courses taken at OSU while enrolled as a non-degree, undergraduate, or post baccalaureate student and not used to satisfy undergraduate degree requirements.
   b. Graduate courses taken at OSU in a prior graduate degree program and falling within the limits of transfer credit accepted from one OSU graduate degree to a second OSU graduate degree (refer to current graduate catalog); or
   c. Stand-alone graduate courses taken at other accredited universities but not used to satisfy the requirements for a bachelor’s degree or international equivalent.
7. All courses listed as transfer courses must comply with policies:
   a. be graded B, B+, A-, A, or A+ (no P/N, S/U, credit/no credit graded courses will be allowed), and
   b. not have been used on a previous doctoral degree,
   c. grades of “B” (3.00) or better have been earned, and
   d. must not include thesis credits.
8. For each standalone graduate course a G is entered in the G column.
9. Each course in the major and minor has a title, abbreviated if necessary, a department code, a course number, number of credits and a grade, if the course has been completed.
10. Grades of non-transfer courses listed on this program will be either C or above, or P, or R for research.
11. The total number of credits at the 4XX/5XX level is entered. And the number of 5XX or 6XX credits is entered.
12. No more than 50% of the credits are slash courses (the 5XX component of a 4XX/5XX course). To determine if a course is a slash course examine the OSU course catalog for the term that you took 5XX course. If there is a 4xx course with the same title during the same term, then this is a slash course.
13. A minimum of 36 credits of XXX603 Thesis is entered.
14. Your plan includes training in the conduct of scholarly activities in an ethical manner. See [http://gradschool.oregonstate.edu/faculty/program-assessment](http://gradschool.oregonstate.edu/faculty/program-assessment).
15. Your total number of credits must be at least 108. (Your major may require more credits—check with them.)
16. Your major professor and at least one other member of your committee must be members of the Graduate Faculty in your major. Your minor professor, if you have a minor, must be a Graduate Faculty member in your minor. All other committee members must be members of the OSU graduate faculty with authority to serve on doctoral advisory committees.
17. The program of study must be signed by the student, the student’s committee members, and the academic unit chair.
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<tr>
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Return this program of study to the:
Graduate School
300 Kerr Administration Building
Corvallis, OR 97331-2121
GraduateSchool@oregonstate.edu
541-737-4881

Revised August 2015
Transfer Credit Request

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Cr. = credits earned
Gr. = course grade
El. = Eligible to be used on a graduate program of study
(Graduate School decision).

Student

Approved - Major Professor

Approved - Program Director

Approved - Graduate School
GENERAL INSTRUCTIONS FOR COMPLETING THE REQUEST TO DETERMINE ELIGIBILITY FOR TRANSFER CREDIT

This form is to be used to determine if the courses listed above meet the university's requirements to transfer courses. The Graduate School will review the request and determine if the courses are eligible to be transferred to your OSU graduate program.

1. Fill in your names and previous name, if any.
2. Fill in (a) a day telephone phone number, (b) your student ID number, and (c) your email address.
3. Fill in (a) the most recent or highest degree you hold (e.g. B.S. botany, M.S. chemistry), (b) the year you received the degree and (c) from what institution you received it.
4. Indicate your major. (This must be one of the majors listed in the university catalog at this URL: http://catalog.oregonstate.edu/ChapterDetail.aspx?key=46#Section842).
5. Indicate the academic unit of your major. This is found in the same row as your major at the above URL.
6. Indicate the name of each institution on a separate line in the box titled "Transfer courses indicated." Then mark each transferred course with the appropriate transfer symbol (T1, T2, T3, T4).
7. Fill in course titles, numbers, credit hours, and grades as they appear on your official transcripts. List only courses that your program will endorse for use on a graduate program of study.
8. Do not list undergraduate courses even if your prior university allowed them to be used to meet degree requirements.
9. For transfer credits to a master’s degree, do not list courses that will be older than 7 years at the time of degree completion.
10. Official transcripts (for all courses to be transferred from other institutions) must be on file in the Graduate School Office BEFORE your program can be approved. When requesting transcripts from another institution, ask that they be sent directly to the Graduate School Office. Only graduate level courses with a grade of a 3.0 (B) or better are transferable. To convert semester hours to quarter hours: multiply semester hours by 1.5. See additional information under "Transferred Credit" in the Graduate Catalog (http://catalog.oregonstate.edu/ChapterDetail.aspx?key=38#Section1802).
11. Obtain the signatures of your major professor and graduate program director. Then submit the request for transfer credit to the Graduate School.

Copies of your transfer credit audit form will be sent to you, your major department, and major professor c/o your major department. Please contact your department for your copy.

If you have any questions, please call 541-737-8881 (Graduate School).

Rev. 11.05.10
Transfer Credit Information from the catalog (http://catalog.oregonstate.edu/ChapterDetail.aspx?key=38#Section1802)

Students who wish to transfer graduate credits from other schools must provide transcripts for courses already completed to the Graduate School prior to the submission of a study program. If a student undertakes a transfer course after his or her study program has been approved, the student must provide the Graduate School with a transcript of this course prior to the final examination. The Graduate School does not assume responsibility for obtaining transcripts from other institutions.

Courses to be transferred must be graduate level, taken after the completion of a four-year baccalaureate degree (or equivalent), with grades of "B" (3.00) or better. Courses delivered off-campus or by electronic means must satisfy the OSU guidelines for the electronic delivery of courses. It is the responsibility of the student wishing to transfer the course to provide the necessary documentation to satisfy the OSU guidelines. Traditional extension and correspondence courses with no live or real-time interaction with the instructor are not transferable.

Graduate courses may be transferred if:

1. the work is appropriate to and will be placed on the student's graduate certificate or degree program;
2. the transfer is approved by the student's committee (for degree-seeking students), by the major program or department, and by the Graduate School; and
3. grades of "B" (3.00) or better have been earned.

If the transfer credit is from a foreign university, the student must provide copies of the original transcript and an English translation of the transcript, with the courses to be transferred clearly indicated. Grades and credits for the courses must be clearly identified. In some countries, the first university degree, which OSU considers to be equivalent to a baccalaureate degree, may take five years or more to complete. All of the course work toward such a degree is considered a requirement for the first university degree, and hence none of it can be transferred to a graduate certificate or graduate degree at OSU.

Students may not transfer courses graded on a nonstandard basis (e.g., Pass/No Pass, Credit/No Credit, Satisfactory/Unsatisfactory) to their graduate certificate or degree programs unless it can be verified from the registrar of the university offering the course that the grade is equivalent to a "B" (3.00) or better.

Graduate courses to be transferred to an OSU master's degree must not have been used to satisfy the requirements for a master's degree (or equivalent) or a doctoral degree from another institution.

Graduate courses to be transferred from an OSU master's degree to a second OSU master's degree must meet the following three requirements:

1. Credits used to satisfy the residency requirements of one master's degree may not be used to satisfy the residency requirements of another master's degree.
2. Students who earn two master's degrees at Oregon State University must complete all degree requirements for each degree. This requires filing separate programs of study forms for each degree, filing separate commencement applications for each degree, completing separate projects or theses for each degree, scheduling separate final oral examinations for each degree, and passing final oral examinations for each degree.
3. Such credit will be granted only for graded course work earned at Oregon State University and completed with a grade of "B" or higher.

Up to 15 graduate credits may be transferred toward a 45-credit master's degree. Up to 6 graduate credits may be transferred toward an 18-credit graduate certificate.

Graduate courses to be transferred to a doctoral degree program can be courses that were used to satisfy the graduate course requirements for a graduate certificate or a master's degree (or equivalent). Selected 700-level courses that have been deemed equivalent to graduate-level learning may be used on doctoral programs of study upon approval of the student's graduate committee. There is no limit on transfer credit toward the doctoral degree as long as the doctoral residence requirement is satisfied.

Credits earned in fulfillment of a graduate certificate program may be applied to a graduate degree, so long as they meet the appropriate standards for use in the degree and the criteria to transfer credit as defined herein. Courses completed for a degree program may likewise be applied toward a certificate program.

Graduate courses taken at OSU while the student was a graduate nondegree-seeking student, a postbaccalaureate student, or a professional degree seeking student (PharmD or DVM), and courses reserved for graduate credit while the student was an undergraduate or postbaccalaureate student are considered transfer courses.
Change of Degree Request – MS to PhD (Departmental)

CBEE Graduate Program
Degree Change from MS to PHD Form

Submit this form along with a personal statement to Elisha Brackett (Elisha.Brackett@OregonState.edu) to apply to change your current M.S. degree program to a Ph.D. degree program in Chemical or Environmental Engineering.

1. Date:

2. Name:

3. Current Degree Program (Circle one): Chemical Engineering     Environmental Engineering

4. Prospective Ph.D. Advisor:

   I agree to accept this student as my advisee for his/her Ph.D. program, and will provide a letter of recommendation to the graduate committee.

   Plan for student support (circle one):

   The student is currently self-funded. I am offering the student financial support this or next term.
   I am not offering the student financial support at this time.

   ________________________________     ________________________________
   Prospective Advisor Printed Name     Signature

5. I have attached my one-page personal statement describing why I want to change my degree program and why I think I will be successful.

   ________________________________
   StudentSignature
CBEE Graduate Student EH&S Lab Safety Training

Student Name:
Date:
Student ID #: 

Video title:
Written summary of the important concepts and information in this video:

Video title:
Written summary of the important concepts and information in this video:

Video title:
Written summary of the important concepts and information in this video:

Video title:
Written summary of the important concepts and information in this video:
Online Graduate Bios Information Form

Graduate Student Information Sheet
The information on this sheet will be collected and displayed for visitors to the “Graduate Student” page on the cbee.engr.oregonstate.edu website.

First Name                                                      Last Name

Degree Sought
☐ Masters
☐ Ph.D.
☐ Masters of Engineering

Classification
☐ GRA
☐ GTA
☐ Other: _______________

Contact Info (e-mail, desk location, etc.)
_____________________________________________________________________________________

Degrees and Institutions (i.e. Oregon State Univ., B.S. Physics, 2010)
_____________________________________________________________________________________
_____________________________________________________________________________________

MINI BIO:
Research Interests/Areas of Expertise
_____________________________________________________________________________________
_____________________________________________________________________________________

Recent Publications and/or Conference Presentations
_____________________________________________________________________________________
_____________________________________________________________________________________

Personal Interests and Activities
_____________________________________________________________________________________
_____________________________________________________________________________________

Additional Information
We can add a résumé, short or long CVs, any links to personal webpages, etc. Please write down anything you would like added to your profile below…
_____________________________________________________________________________________
_____________________________________________________________________________________

Signature
By signing above you consent to release the information contained on this sheet for the sole purpose of creating a profile for you on the Oregon State University Chemical Engineering graduate student webpage.
Doctoral Deliverables Timeline

**Oregon State University**  
School of Chemical, Biological, and Environmental Engineering  
*Ph.D. Timeline*  
Version 04-10-2015

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<td>Attend Graduate Orientation</td>
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<td>1st</td>
<td>Fall</td>
<td>Complete Rotations</td>
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<tr>
<td>1st</td>
<td>Fall</td>
<td>Complete Major Professor Selections</td>
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<td>1st</td>
<td>Spring Break</td>
<td>Complete Qualification Exam (CHE Only)</td>
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<td>1st</td>
<td>Spring</td>
<td>Submit Program of Study</td>
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<td>2nd</td>
<td>Spring</td>
<td>Complete Oral Preliminary Exam</td>
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<td>3rd</td>
<td>Winter</td>
<td>Present Poster at Graduate Open House</td>
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<td>4th</td>
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<td>Present research in Graduate Seminar (CBEE 507)</td>
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<tr>
<td>5th +</td>
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<td>Defend thesis</td>
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</table>
We are committed to providing comprehensive support for all our clients. Our team of experts is dedicated to ensuring that our clients receive the best possible service. Please do not hesitate to contact us if you have any questions or concerns. We look forward to hearing from you soon.
Oregon State University
School of Chemical, Biological and Environmental Engineering
Student/Advisor Memorandum of Understanding

________________________________________ and ______________________________________
Advisor

Student:

The purpose of this Memorandum of Understanding is to clearly identify the Advisor/Student relationship for members of the graduate program in CBEE and to identify the initial expected source of funding (if any).

By filling and signing this form, the Student and Advisor parties agree to work together towards an MS / PhD (cross off one) degree by the Student.

At the time of signing, the Student is Self Funded / offered funding at ___ FTE from ______ (Source of Funds) starting on ______ (Starting Date) (cross off one). It is mutually understood that renewal of any offer of funding in future terms is at the discretion of the Advisor and contingent on availability of funds. The Advisor will discuss the funding situation with the Student in a timely fashion to enable the Student to make alternative financial arrangements as necessary.

______________________________ _________________
Student Signature Date

______________________________ _________________
Advisor Signature Date
Appendix: Student and Advisor responsibilities

A healthy and fruitful relationship helps both the Advisor and the Student and forms the foundation of a career-long beneficial relationship. The set of general guidelines below explaining the expected responsibilities on both parts is intended to help establish such relationships.

Advisor(s) Responsibilities

- The Advisor will maintain a respectful and professional relationship with the Student.
- The Advisor is neither the Student's best friend, nor his opponent – the Advisor's responsibility is to help the Student be successful by providing opportunities and guidance in coursework selection and research. These opportunities include access to a clean, safe, and well-equipped work environment, opportunities for publications and professional presentations; and supplying accurate and objective references for potential employers.
- The Advisor will ensure that coursework and research are up to the high standards of graduate engineering education at OSU and that qualifying, preliminary, and/or final exams are fair. If there are concerns about the quality of the Student's coursework or research, the Advisor will step in to discuss possible options and remedies.
- The Advisor will give high-level direction research work but it is the Student's responsibility to conceive and implement the day-to-day tasks necessary to move the research forward.
- The Advisor does not have an obligation to provide funding to the Student but will strive to provide funding opportunities whenever possible.

Student Responsibilities

- The Student is expected to treat the Advisor with respect and address them formally, be respectful of other students, and help create a positive environment in the research group, the School and the University.
- It is the Student's responsibility to plan the program of study that meets the degree program and University requirements regarding number and types of credits needed for graduation with input from the Advisor. To achieve this, the Student should prepare a draft of the Program of Study (see http://oregonstate.edu/dept/grad_school/forms.php?program) by the end of the Student's first term working with the Advisor and discuss options. It is also the Student's responsibility to be aware of key dates and requirements for qualifying exams, program meetings, preliminary exams, and/or final exams.
- When research funding is offered the Advisor and Student will attempt to reconcile the research topic desires of the student with the needs of the funding source – generally, there is sufficient freedom to tailor the research toward the student's areas of interest. If the Student is unsatisfied with the research topic, it is the Student's responsibility to raise this concern with the Advisor. The Student always has the option of rejecting funding. However, once a commitment is made, the Student is expected to meet targets as deemed reasonable and agreed upon with the Advisor.
- It is the Student's responsibility to stay in contact with the Advisor and ensure the Advisor is current on research progress. For the purpose, the Student should take the initiative to schedule any meetings with the Advisor to discuss research questions or issues.
- The Student is expected to take ownership the research project and to bring energy, enthusiasm, and innovation to the project. In the end, the thesis must contain many of the Student's ideas and results interpretation. The time spent in the development of the research project should be in addition to any paid professional commitments contracted by the Student (e.g., beyond a GRA or GTA offer, if any).
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</tr>
<tr>
<td>Fisher Scientific</td>
<td>PGC Scientific</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Evaluated Graduate Learning Objectives/Outcomes for PhD, MS, and MEng Programs
Chemical Engineering, College of Engineering

<table>
<thead>
<tr>
<th>PhD Outcomes</th>
<th>MS Outcomes</th>
<th>MEng Outcomes</th>
</tr>
</thead>
</table>
| **Outcome 1: Demonstration of Scholarship**  
The student will be able to identify and conduct original research resulting in a significant contribution to knowledge in the fields spanned by Chemical, Biological and Environmental Engineering (CBEE) and to effectively communicate this work to a technically literate audience. This will be assessed using the PhD Qualifier Examination, PhD Thesis and Final Oral Examination (“Defense”). | **Outcome 1: Demonstration of Scholarship**  
The student will be able to conduct original research and assemble a creative new body of work in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience. This will be assessed using the MS Thesis and Final Oral Examination. | **Outcome 1: Demonstration of Scholarship**  
The student will be able to assemble a presentation synthesizing aspects of core knowledge in the fields spanned by CBEE and to effectively communicate this work to a technically literate audience. This will be assessed using the MEng Final Oral Examination. |

| Outcome 2: Mastery of Subject Material  
The student will be able to think critically, creatively and to address technical problems in CBEE. This will be assessed through satisfactory completion of the graduate program of study. | **Outcome 2: Mastery of Subject Material**  
The student will be able to think critically, creatively and to address technical problems in CBEE. This will be assessed through satisfactory completion of the graduate program of study. | **Outcome 2: Mastery of Subject Material**  
The student will be able to think critically, creatively and to address technical problems in CBEE. This will be assessed through satisfactory completion of the graduate program of study. |

| **Outcome 3: Ethical Conduct**  
Students will be educated in ethical and responsible conduct in research and professional activities. This will be assessed through satisfactory completion of the graduate seminar (CBEE507). | **Outcome 3: Ethical Conduct**  
Students will be educated in ethical and responsible conduct in research and professional activities. This will be assessed through satisfactory completion of the graduate seminar (CBEE507). | **Outcome 3: Ethical Conduct**  
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Evaluated Graduate Learning Outcomes/Outcomes for PhD, MS, and MEng Programs
Environmental Engineering, College of Engineering

<table>
<thead>
<tr>
<th>Ph.D. Outcomes</th>
<th>M.S. Outcomes</th>
<th>M.Eng. Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outcome 1: Scholarship</strong></td>
<td><strong>Outcome 1: Scholarship</strong></td>
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</tr>
<tr>
<td>The student will be able to identify and conduct original research resulting</td>
<td>The student will be able to conduct original research and assemble a creative</td>
<td>The student will be able to assemble a presentation synthesizing aspects of core</td>
</tr>
<tr>
<td>in a significant contribution to knowledge in the fields spanned by Chemical,</td>
<td>new body of work in the fields spanned by CBEE and to effectively communicate</td>
<td>knowledge in the fields spanned by CBEE and to effectively communicate this</td>
</tr>
<tr>
<td>Biological and Environmental Engineering (CBEE) and to effectively communicate</td>
<td>this work to a technically literate audience. This will be assessed using the</td>
<td>work to a technically literate audience. This will be assessed using the</td>
</tr>
<tr>
<td>this work to a technically literate audience. This will be assessed using the</td>
<td>M.S. Thesis and Final Oral Examination (“Defense”).</td>
<td>M.Eng. Final Oral Examination.</td>
</tr>
<tr>
<td><strong>Outcome 2: Mastery of Subject Material</strong></td>
<td><strong>Outcome 2: Mastery of Subject Material</strong></td>
<td><strong>Outcome 2: Mastery of Subject Material</strong></td>
</tr>
<tr>
<td>The student will be able to think critically, creatively and to address technical</td>
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</tr>
<tr>
<td>problems in the fields spanned by CBEE. This will be assessed through satisfactory</td>
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</tr>
<tr>
<td>completion of the graduate program of study, as well as course summaries written</td>
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<tr>
<td>by the instructors.</td>
<td>by the instructors.</td>
<td>by the instructors.</td>
</tr>
<tr>
<td><strong>Outcome 3: Ethical Conduct</strong></td>
<td><strong>Outcome 3: Ethical Conduct</strong></td>
<td><strong>Outcome 3: Ethical Conduct</strong></td>
</tr>
<tr>
<td>Students will be educated in ethical and responsible conduct in research and</td>
<td>Students will be educated in ethical and responsible conduct in research and</td>
<td>Students will be educated in ethical and responsible conduct in professional</td>
</tr>
<tr>
<td>professional activities. This will be assessed through satisfactory completion</td>
<td>professional activities. This will be assessed through satisfactory completion of</td>
<td>activities. This will be assessed through satisfactory completion of the</td>
</tr>
<tr>
<td>of the graduate seminar (CBEE507), as well as ethical completion of the Ph.D.</td>
<td>the graduate seminar (CBEE507), as well as ethical completion of the M.S.</td>
<td>graduate seminar (CBEE507), as well as ethical completion of the M.Eng.</td>
</tr>
</tbody>
</table>
## Final Oral Exam Scoring Rubric – MENG Chemical Engineering

### Scoring Guide (Rubric) for Graduate Learning Outcome Assessment

**M.ENG. FINAL ORAL EXAM in CHEMICAL ENGINEERING**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to Synthesize Technical Literature Knowledge in Chemical Engineering</td>
<td>Process description is patently incorrect; the associated literature review belies a summative approach, with information presented in a disconnected, disjointed manner and not clearly tied to the process described; widely known technical references clearly missing or cites references not germane to the topic at hand.</td>
<td>Process description is accurate but unclear or otherwise flawed; the associated literature information is organized by themes that are related; ideas are explored as the presentation attempts to take an expert approach. However, some themes may be disconnected; some references known to experts in the field may be missing.</td>
<td>Process description is accurate and clearly described; the associated literature information is clearly synthesized into themes; presentation demonstrates an expert approach by illustrating the relationship between themes, concepts, and ideas reported in the literature, and links these themes to the focus of the process reviewed; references are complete.</td>
</tr>
<tr>
<td>4b. Quality of Oral Communication</td>
<td>Disorganized presentation with low original content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills.</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills.</td>
<td>Highly engaging conference quality presentation; Excellent communication skills; Answers show superior knowledge in subject area and well developed critical thinking skills.</td>
</tr>
</tbody>
</table>

During the examination process I did not perceive any lapses in ethical performance and/or reporting of research: __________

**Examination committee: Please use the reverse of this form for written commentary as needed.**
## ATTACHMENT 2

Scoring Guide (Rubric) for Graduate Learning Outcome Assessment
MEEng FINAL ORAL EXAM in ENVIRONMENTAL ENGINEERING

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Does Not Pass Exam</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ability to Synthesize Technical Literature Knowledge in Environmental Engineering</td>
<td>Process description is patently incorrect; the associated literature review belies a summative approach; with information presented in a disconnected, disjointed manner and not clearly tied to the process described; widely known technical references clearly missing or cites references not germane to the topic at hand.</td>
<td>Process description is accurate but unclear or otherwise flawed; the associated literature information is organized by themes that are related; Ideas are explored as the presentation attempts to take an expert approach. However, some themes may be disconnected; some references are cited and experts in the field may be missing.</td>
<td>Process description is accurate and clearly described; the associated literature information is clearly synthesized into themes; presentation demonstrates an expert approach by illustrating the relationship between themes, concepts, and ideas reported in the literature, and links these themes to the focus of the process reviewed; references are complete.</td>
</tr>
<tr>
<td>4b. Quality of Oral Communication</td>
<td>Disorganized presentation with low original content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills.</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills.</td>
<td>Highly engaging conference quality presentation; Excellent communication skills; Answers show superior knowledge in subject area and well developed critical thinking skills.</td>
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</table>

During the examination process I did not perceive any lapses in ethical performance and/or reporting of research:

Signature of Examiner: ____________________

Examiner: Please use the reverse of this form for written commentary as needed.
## Scoring Guide (Rubric) for Graduate Learning Outcome Assessment

**M.S. THESIS and FINAL ORAL EXAM in CHEMICAL ENGINEERING**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1a. Research Hypothesis and Objectives</strong></td>
<td>Research problem not clearly stated, or statement not carefully considered and hypothesis driven; Research plan to investigate solution to the defined problem is not fully considered; Measurable technical outcomes not described.</td>
<td>Research problem clearly stated and hypotheses behind research activities identified; Research plan to investigate solution to the defined problem adequately considered; Measurable technical outcomes described.</td>
<td>Research problem fully considered and hypotheses behind all research questions clearly enunciated with broader impacts in the field identified; Research plan to investigate solution to the defined problem fully considered; Measurable technical outcomes described and significance of likely measurements discussed.</td>
</tr>
<tr>
<td><strong>1b. Literature Review</strong></td>
<td>The review belies a summative approach, with information presented in a disconnected, disjointed manner and not clearly tied to the research; widely known technical references clearly missing or cited references not germane to the topic at hand.</td>
<td>The information is organized by themes that are related; Ideas are explored as the writing attempts to take an expert approach. However, some themes may be disconnected; some references known to experts in the field may be missing.</td>
<td>The information is clearly synthesized into themes. The writing demonstrates an expert approach by illustrating the relationship between themes, concepts, and ideas reported in the literature, and links these themes to the focus of the research. References are complete.</td>
</tr>
<tr>
<td><strong>2. Ability to Demonstrate a Creative Solution to the Problem</strong></td>
<td>Proposed concept is well known, previously described in technical literature, or is impossible/logical.</td>
<td>Proposed work is original and possible but derivative/incremental in nature.</td>
<td>Proposed work is original, practical and demonstrates a novel approach.</td>
</tr>
<tr>
<td><strong>4a. Quality of Written Communication</strong></td>
<td>Writing style is immature. Profuse grammatical errors, poor sentence construction and/or poor document structuring make it laborious to read.</td>
<td>Writing style is academic and flows by presenting information in a concise manner. There are only minor grammatical and spelling errors.</td>
<td>Writing style is scholarly and flows naturally, presenting information in a clear and precise manner. Voice is active and devoid of bias. No grammar or spelling errors.</td>
</tr>
<tr>
<td><strong>4b. Quality of Oral Communication</strong></td>
<td>Disorganized presentation with low original content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills.</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills.</td>
<td>Highly engaging conference quality presentation; Excellent communication skills; Answers show superior knowledge in subject area and well developed critical thinking skills.</td>
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**Examiner:** Please use the reverse of this form for written commentary as needed.
# Final Oral Exam Scoring Rubric – MS Environmental Engineering

## ATTACHMENT 2

**Scoring Guide (Rubric) for Graduate Learning Outcome Assessment**

**MS THESIS and FINAL ORAL EXAM in ENVIRONMENTAL ENGINEERING**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Does Not Pass Exam</th>
<th>Satisfactory</th>
<th>Passes Exam</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a. Research Hypothesis and Objectives</td>
<td>Research problem not clearly stated, or statement not carefully considered and hypothesis driven; Research plan to investigate solution to the defined problem is not fully considered; Measurable technical outcomes not described.</td>
<td>Research problem clearly stated and hypotheses behind research activities identified; Research plan to investigate solution to the defined problem adequately considered; Measurable technical outcomes described.</td>
<td>Research problem fully considered and hypotheses behind all research questions clearly articulated with broader impacts in the field identified; Research plan to investigate solution to the defined problem fully considered; Measurable technical outcomes described and significance of likely measurements discussed.</td>
<td></td>
</tr>
<tr>
<td>1b. Literature Review</td>
<td>The review belies a summative approach, with information presented in a disconnected, disjointed manner and not clearly tied to the research; widely known technical references clearly missing or cites references not germane to the topic at hand.</td>
<td>The information is organized by themes that are related; ideas are explored as the writing attempts to take an expert approach. However, some themes may be disconnected; some references known to experts in the field may be missing.</td>
<td>The information is clearly synthesized into themes. The writing demonstrates an expert approach by illustrating the relationship between themes, concepts, and ideas reported in the literature, and links these themes to the focus of the research. References are complete.</td>
<td></td>
</tr>
<tr>
<td>2. Ability to Demonstrate a Creative Solution to the Problem</td>
<td>Proposed concept is well known, previously described in technical literature, or is impossible/ illogical.</td>
<td>Proposed work is original and possible but derivative/incremental in nature.</td>
<td>Proposed work is original, practical and demonstrates a novel approach.</td>
<td></td>
</tr>
<tr>
<td>4a. Quality of Written Communication</td>
<td>Writing style is immature. Profuse grammatical errors, poor sentence construction and/or poor document structuring make it laborious to read.</td>
<td>Writing style is academic and flows by presenting information in a concise manner. There are only minor grammatical and spelling errors.</td>
<td>Writing style is scholarly and flows naturally, presenting information in a clear and precise manner. Voice is active and devoid of bias. No grammar or spelling errors.</td>
<td></td>
</tr>
<tr>
<td>4b. Quality of Oral Communication</td>
<td>Disorganized presentation with low original content; excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills.</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills.</td>
<td>Highly engaging conference quality presentation; Excellent communication skills; Answers show superior knowledge in subject area and well developed critical thinking skills.</td>
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During the examination process I did not perceive any lapses in ethical performance and/or reporting of research:

Signature of Examiner: ________________________________

*Examiner: Please use the reverse of this form for written commentary as needed.*
## Scoring Guide (Rubric) for Graduate Learning Outcome Assessment
### Ph.D. THESIS and FINAL ORAL EXAM in CHEMICAL ENGINEERING

<table>
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<tr>
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<td><strong>1a. Research Hypothesis and Objectives</strong></td>
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</tr>
<tr>
<td><strong>1b. Literature Review</strong></td>
<td>The review belyes a summative approach, with information presented in a disconnected, disjointed manner and not clearly tied to the research; widely known technical references clearly missing or cites references not germane to the topic at hand.</td>
<td>The information is organized by themes that are related; ideas are explored as the writing attempts to take an expert approach. However, some themes may be disconnected; some references known to experts in the field may be missing.</td>
<td>The information is clearly synthesized into themes. The writing demonstrates an expert approach by illustrating the relationship between themes, concepts, and ideas reported in the literature, and links these themes to the focus of the research. References are complete.</td>
</tr>
<tr>
<td><strong>2. Ability to Demonstrate a Creative Solution to the Problem</strong></td>
<td>Proposed concept is well known, previously described in technical literature, or is impossible/ illogical.</td>
<td>Proposed work is original and possible but derivative/incremental in nature.</td>
<td>Proposed work is original, practical and demonstrates a novel approach.</td>
</tr>
<tr>
<td><strong>4a. Quality of Written Communication</strong></td>
<td>Writing style is Immature. Profuse grammatical errors, poor sentence construction and/or poor document structuring make it laborious to read.</td>
<td>Writing style is academic and flows by presenting information in a concise manner. There are only minor grammatical and spelling errors.</td>
<td>Writing style is scholarly and flows naturally, presenting information in a clear and precise manner. Voice is active and devoid of bias. No grammar or spelling errors.</td>
</tr>
<tr>
<td><strong>4b. Quality of Oral Communication</strong></td>
<td>Disorganized presentation with low original content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills.</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills.</td>
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</table>

During the examination process I did not perceive any lapses in ethical performance and/or reporting of research: ____________

Examiner: Please use the reverse of this form for written commentary as needed.
**ATTACHMENT 3**

Scoring Guide (Rubric) for Graduate Learning Outcome Assessment

**PhD PRELIMINARY or FINAL ORAL EXAM in ENVIRONMENTAL ENGINEERING**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Does Not Pass Exam</th>
<th>Satisfactory</th>
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</thead>
<tbody>
<tr>
<td><strong>1a. Research Hypothesis and Objectives</strong></td>
<td>Research problem not clearly stated, or statement not carefully considered and hypothesis driven; Research plan to investigate solution to the defined problem is not fully considered; measurable technical outcomes not described</td>
<td>Research problem clearly stated and hypotheses behind research activities identified; Research plan to investigate solution to the defined problem adequately considered; measurable technical outcomes described</td>
<td>Research problem fully considered and hypotheses behind all research questions clearly enunciated with broader impacts in the field identified; Research plan to investigate solution to the defined problem fully considered; measurable technical outcomes described and significance of likely measurements discussed</td>
<td></td>
</tr>
<tr>
<td><strong>1b. Literature Review</strong></td>
<td>Disorganized and too brief to adequately explore the topic; widely known technical references clearly missing or not germane to the topic at hand</td>
<td>Logically crafted and adequately explores the topic; some references known to experts in the field may be missing;</td>
<td>Fully explores the topic and illustrates the state of the knowledge in the field, may be missing an obscure reference or two</td>
<td></td>
</tr>
<tr>
<td><strong>2. Ability to Demonstrate a Creative Solution to the Problem</strong></td>
<td>Proposed concept is well known to be described in technical literature or is impossible/absurd</td>
<td>Proposed work is original and possible but derivative/incremental in nature</td>
<td>Proposed work is original, practical and high-risk/high-payoff</td>
<td></td>
</tr>
<tr>
<td><strong>3. Application of Science and Engineering Fundamentals</strong></td>
<td>Science/Engineering principles underlying Research Hypothesis and Objectives not clearly discussed</td>
<td>Science/Engineering principles underlying Research Hypothesis and Objectives discussed</td>
<td>Science/Engineering principles underlying Research Hypothesis and Objectives discussed; as appropriate math models and associated predictions developed</td>
<td></td>
</tr>
<tr>
<td><strong>4a. Quality of Written Communication</strong></td>
<td>Profuse grammatical errors, poor sentence construction and/or poor document structuring makes it impossible to read through</td>
<td>Adequate document structure, grammar and writing enables adequate understanding of the material presented</td>
<td>Near publication quality, great reading with minor flaws</td>
<td></td>
</tr>
<tr>
<td><strong>4b. Quality of Oral Communication</strong></td>
<td>Disorganized presentation with low real content; Excessively poor communication skills; Answers to questions show weakness in depth of knowledge in subject matter and/or poor critical thinking skills</td>
<td>Adequately organized presentation where concepts flow logically; Adequate communication skills; Answers show adequate knowledge in subject area and adequate critical thinking skills</td>
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During the examination process I did not perceive any lapses in ethical performance and/or reporting of research:

Signature of Examiner: __________________________

*Examiner: Please use the reverse of this form for written commentary as needed.*