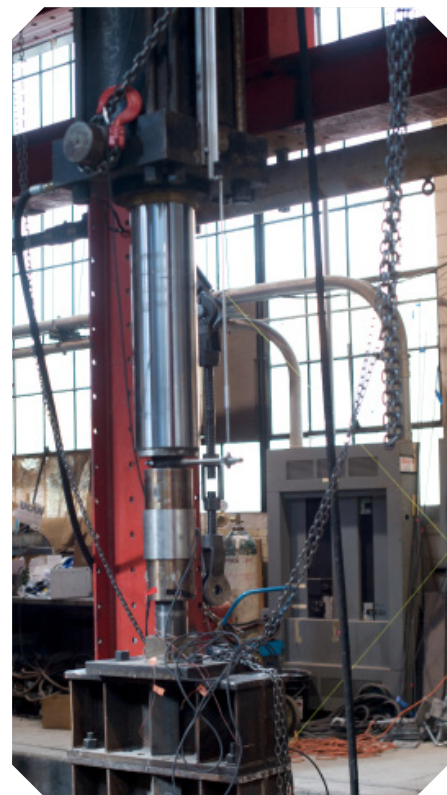
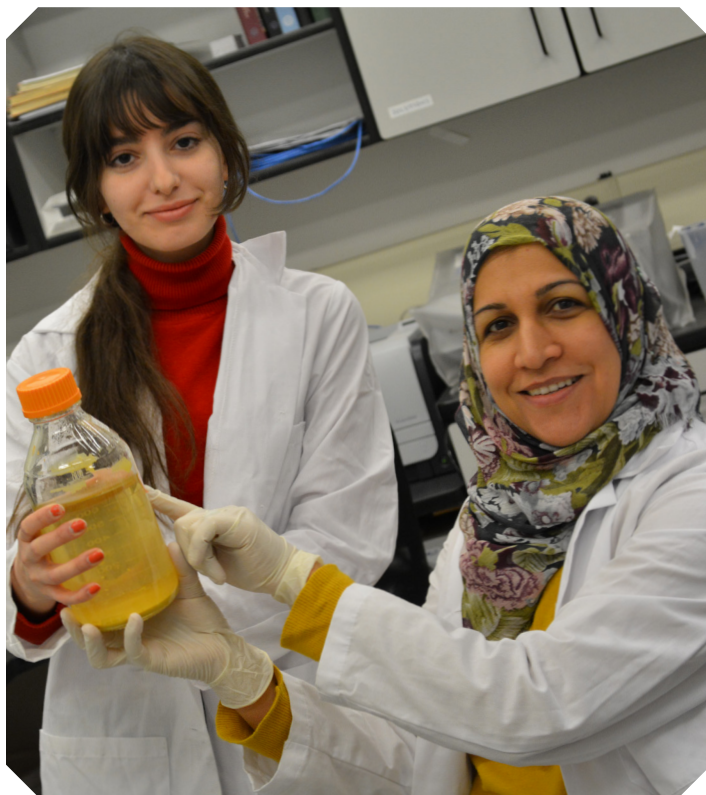


STUDENT

# HANDBOOK

2014-2016

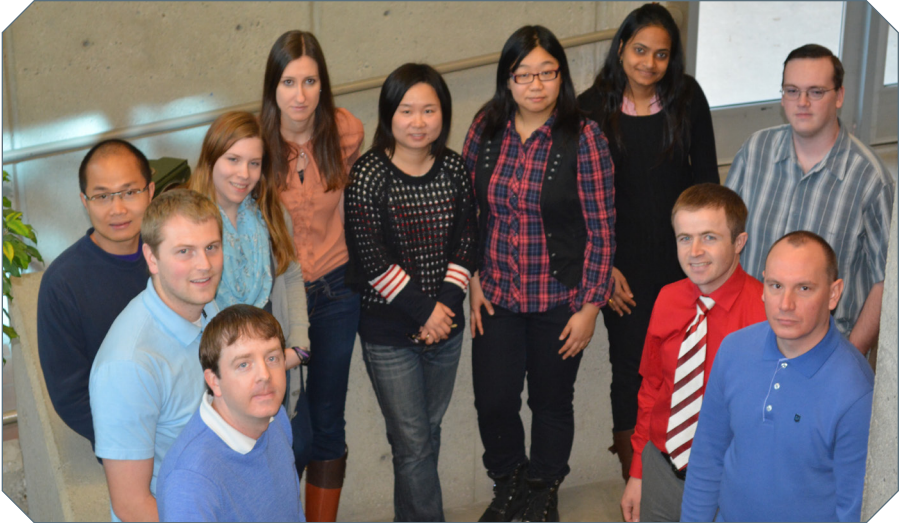




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## VISION STATEMENT

*Pursuit of excellence in preparing engineers to provide innovative solutions to the world's challenges in sustaining the environment and the infrastructure.*

## MISSION STATEMENT

*Provide high quality education in engineering and leadership, life-long learning opportunities, and innovation for the benefit of the State of Utah and the world.*


**Ashley Arpero**

Administrative Program  
Coordinator

Assistant to Dr. Michael Barber. Schedules his appointments, travel, project budgets, and speakers for the Seminar series. Assists with the Industrial Advisory Board and other things as needed.

**2004 MCE**

**Phone:** 801.585.7710

**Fax:** 801.585.5477

**E-mail:** ashley.arpero@utah.edu


**Tiffany Hortin**

Administrative Officer

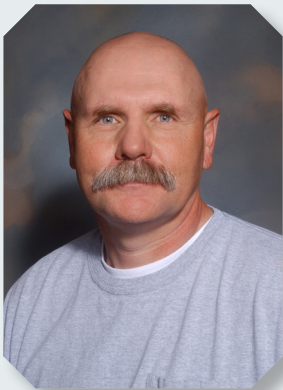
Administers finances, payroll and human resources for the Department. Coordinates the Tuition Benefit Program, and oversees the other administrative functions of the Department.

**2003 MCE**

**Phone:** 801.581.6933

**Fax:** 801.585.5477

**E-mail:** t.hortin@utah.edu


**Mark Bryant**

Department Technician  
and Safety Officer

Maintains all student labs and assists faculty with their research labs. Oversees Department-wide safety efforts, reports injuries and supervises student lab employees.

**211 CME**

**Phone:** 801.581.7057

**Fax:** 801.585.5477

**E-mail:** bryant@civil.utah.edu


**Andrea Gallegos**

Administrative Program  
Coordinator

Works on publications, graphic design and the website for the Department. Coordinates employment & internship opportunities for students.

**E-mail:** andrea.gallegos@utah.edu


**Alexi Crabb**

Undergraduate Academic Advisor

Main contact for undergraduate students. Assigns Faculty Advisors. Maintains student academic records and admissions applications for undergraduate students. Processes paperwork and administers policies for undergraduate program.

**2003 MCE**

**Phone:** 801.581.6933

**Fax:** 801.585.5477

**E-mail:** sherwood@civil.utah.edu


**Bonnie Ogden**

Graduate Academic Advisor

Advisor for MS and Ph.D. students in Civil, Environmental, and Nuclear. Assists students from recruitment through graduation, overseeing procedures and forms as well as coordinating the Tuition Benefit program.

**2008 MCE**

**Phone:** 801.581.6933

**Fax:** 801.585.6678

**E-mail:** bonnie.ogden@utah.edu



**Michael Barber, P.E.**  
*Professor & Chair*

Ph.D., 1991, University of Texas at Austin. Surface Water Quality Modeling with emphasis on prediction of macrophyte growth, epiphytic algae populations, and nutrient concentrations as a result of wastewater discharges and nonpoint source loadings.

**2038 MCE**

801.581.3578

bordelon@civil.utah.edu



**Amanda Bordelon, P.E.**  
*Assistant Professor*

Ph.D., 2011, University of Illinois Urbana-Champaign. Fiber-reinforced concrete, fracture mechanics, image visualization and analysis, concrete pavement design, ultra-thin white-topping and inlay designs, laboratory testing and materials characterization, recycled and other sustainable materials.

**2038 MCE**

801.581.3578

bordelon@civil.utah.edu



**Steven F. Bartlett, P.E.**  
*Associate Professor*

Ph.D., 1992, Brigham Young University. Geotechnical engineering, earthquake engineering, soil dynamics, liquefaction, site characterization, instrumentation, risk assessment, soil improvement, geofoam.

**2032 MCE**

801.587.7726

bartlett@civil.utah.edu



**Steven Burian, P.E.**  
*Associate Professor*

Ph.D., 1999, University of Alabama. Sustainable and resilient urban water infrastructure systems, including stormwater, wastewater, and water supply. Focus research areas include integrated urban water management, low-impact development, green infrastructure design, stormwater management, flood risk modeling, vulnerabilities and adaptation strategies for urban water systems, and the water-energy nexus.

**2044 MCE**

801.585.5721

burian@eng.utah.edu

# CVEEN FACULTY



**Janice J. Chambers, P.E., S.E.**  
*Associate Professor*

Ph.D., 1989, University of Colorado-Boulder. Analysis and design of steel structures with an emphasis on connections.

**2022 MCE**

801.581.3155

jchambers@civil.utah.edu



**Dan Fagnant**  
*Assistant Professor*

Ph.D. in civil engineering from the University of Texas. Research experience in automated vehicles, project planning and evaluation, transportation safety, motorcycles, bicycles and pedestrians.

**2135 MCE**

801.585.6590

dan.fagnant@utah.edu



**Otakuye Conroy-Ben**  
*Assistant Professor*

Ph.D., 2006, University of Arizona. Research interests include water and wastewater treatment, endocrine disruption, emerging contaminants, analytical chemistry, and metal and drug resistant bacteria.

**2062 MCE**

801.585.1128

otakuye.conroy@utah.edu



**Ramesh Goel**  
*Associate Professor*

Ph.D., 2003, University of South Carolina. Sludge minimization, EBPR biochemical models, diversity of ammonia oxidizers and denitrifiers, anaerobic ammonia oxidation, water sustainability through surface water quality, estrogens and their fate in wastewater treatment processes and in sediments, microbial diversity in natural systems and in engineered systems, educational outreach to k-12 students.

**2064 MCE**

801.581.6110

rgoel@civil.utah.edu



**Andy Hong, P.E.**  
*Professor*

Ph.D., 1988, California Institute of Technology. Biomass energy, soil/sediment remediation, produced water treatment, oil sands processing.

**2068 MCE**  
801.581.7232  
hong@civil.utah.edu



**Evert Lawton, P.E.**  
*Professor*

Ph.D., 1986, Washington State University. Geotechnical engineering, foundation engineering, soil improvement and stabilization, collapsible soils, geo-synthetics.

**2028 MCE**  
801.585.3947  
lawton@civil.utah.edu



**Luis Ibarra, P.E.**  
*Assistant Professor*

Ph.D., 2004, Stanford University. Structural engineering, performance-based design with emphasis on the collapse limit state, seismic risk assessment, and aging effects on structural performance.

**2024 MCE**  
801.585.9307  
ibarra@civil.utah.edu



**Xiaoyue Cathy Liu**  
*Assistant Professor*

Ph.D., 2013, University of Washington. Performance analysis, highway capacity analysis, traffic sensor data analysis, traffic operations, traveler information systems, advanced traffic control systems, freeway network modeling, and traffic simulations.

**2137 MCE**  
801.587.8858  
cathy.liu@utah.edu



**Brian McPherson**  
*Professor*

Ph.D., 1996, University of Utah. General research areas include groundwater hydrology, petroleum and energy resources engineering, numerical modeling of groundwater flow and coupled processes (including coupled stress-strain-fluid flow, coupled heat flow-fluid flow, coupled reactive transport and fluid flow), rock mechanics measurements and modeling. A focus research area

is analysis and engineering of subsurface CO<sub>2</sub> sequestration for greenhouse gas reduction and climate change mitigation.

**2048 MCE**

801.585.7961

b.j.mcpherson@utah.edu



**Christine A. Pomeroy, P.E.**  
*Associate Professor*

Ph.D., 2007, Colorado State University. Urban water infrastructure, green infrastructure, stormwater best management practices, watershed management, nonpoint source pollution, fluvial geomorphology and river mechanics.

**2042 MCE**

801.585.7300

christine.pomeroy@utah.edu



**Chris Pantelides, P.E., S.E.**  
*Professor*

Ph.D., 1987, University of Missouri-Rolla. Seismic design, evaluation, and rehabilitation of reinforced concrete building and bridge construction; earthquake engineering and fiber reinforced polymer composite materials.

**2115 MCE**

801.585.3991

c.pantelides@utah.edu



**Richard Porter, P.E.**  
*Assistant Professor*

Ph.D., 2007, Pennsylvania State University. Transportation safety, highway and traffic engineering, highway geometric design, traffic operations, driver behavior, highway project planning and development, applied econometric analysis of transportation data.

**2133 MCE**

801.585-1290

richard.jon.porter@utah.edu



**Lawrence D. Reaveley, P.E.**  
*Professor*

Ph.D., 1971, University of New Mexico. Structural engineering, structural dynamics as applied to building systems with emphasis on earthquake engineering, vibration problems and seismic rehabilitation methodologies.

**2113 MCE**  
801.581.6118  
reaveley@civil.utah.edu



**Doug Schmucker, P.E.**  
*Associate Professor, Lecturer*

Ph.D., 1996, Stanford University. Projects include assessment of existing structures, design of new facilities, development of design and/or assessment procedures, design of repairs and retrofits, and the preparation and presentation of technical papers, seminars, and workshops.

**2016 MCE**  
801.587.3815  
doug.schmucker@utah.edu



**Pedro Romero, P.E.**  
*Associate Professor*

Ph.D., 1996, Pennsylvania State University. Infrastructure sustainability, testing and characterization of construction materials, mechanistic pavement design and analysis, novel construction practices and quality control methods, health monitoring and rehabilitation of civil engineering systems.

**2131 MCE**  
801.587.7725  
romero@civil.utah.edu



**Ken Ament**  
*Associate Instructor*

*Highest Degree:* BS, 1969, Construction Management, Tennessee Technological University; Honor Graduate, 1969, U.S. Army Corps of Engineers Officer's School. *Employer:* President of Construction Control Corporation. *Teaches:* Cost Estimating and Proposal Writing.



**Elizabeth Murphy**  
*Research Assistant Professor*

*Ph.D., 1996, University of Utah. Application of remote sensing and geographic information systems for urban analysis. Recently, focusing on application of remote sensing for vegetation analysis, urban and periurban vegetation.*



**Craig Coburn**  
*Adjunct Associate Professor*

*Highest Degree:* J.D., 1980, University of Utah. *Employer:* Shareholder in Richards Brandt Miller Nelson. *Teaches:* Law for Engineers (Engineering Law).



**Denis Petersen**  
*Associate Instructor*

*Highest Degree:* D.Sc., 2004, Engineering Management, George Washington University. *Employer:* Founding Partner of Milestone Management Consultants, LLC. *Teaches:* Project Management, Project Scheduling, & Engineering Economics.



**Jerod Johnson**  
*Associate Instructor*

*Highest Degree:* Ph.D., 2012, Civil & Environmental Engineering, University of Utah. *Employer:* Principal, Reaveley Engineers. *Teaches:* Reinforced Masonry/Timber Design.



**Luther McDonald**

*Assistant Professor: Assistant Director of Utah Nuclear Engineering Program*

Ph.D. Washington State University. 2013 Research group is nuclear forensics and environmental remediation of heavy metals. He is currently building a program centered on mass spectrometry. The projects are diverse

ranging from instrument design to ion manipulation to analytical method development.

**1490A MEB**

801.581.7768

[luther.mcdonald@utah.edu](mailto:luther.mcdonald@utah.edu)



**Azaree Lintereur**

*Assistant Professor*

Ph.D., Pacific Northwest National Laboratory. Radiation detector development, detector design with MCNPX, coincidence and multiplicity counting, novel radiation detection materials.

**1490B MCE**

801.581.6785

[azaree.lintereur@utah.edu](mailto:azaree.lintereur@utah.edu)



**Tatjana Jevremovic**

*Professor; Director of the Utah Nuclear Engineering Program & Endowed Chair*

Ph.D., 1993, University of Tokyo, Japan. Develop computational methodologies for current and future generation of nuclear applications with emphasis on open architecture tools for rapid design/prototyping of systems that involve radiation transport phenomena including, but not limited to, nuclear energy, homeland security, medical oncology applications, advanced numerical simulations and visualization incorporating mobile technologies, and advancing nuclear engineering and science related learning and training techniques and methods worldwide.

**2298 MEB**

801.587.9696

[tatjana.jevremovic@utah.edu](mailto:tatjana.jevremovic@utah.edu)

# NUCLEAR FACULTY

## DEGREE REQUIREMENTS

Students enrolling in the Civil Engineering program should make note of the following Department and degree titles:

Department Name:	Civil & Environmental Engineering
Degree offered:	Bachelor of Science in Civil Engineering
Minor offered:	Nuclear Engineering

The Bachelor of Science Degree in Civil Engineering at the University of Utah is accredited by the Engineering Accreditation Commission of ABET ([www.abet.org](http://www.abet.org)).

The following is a suggested four-year schedule for the undergraduate degree. Taking these courses in the years shown will ensure that you have the prerequisites for the following year's courses. All students take the same engineering courses during their freshman, sophomore, and part of their junior year. Students then select different technical electives and the Professional Practice & Design course to complete their undergraduate program. All information in this handbook and forms referenced in this document can be found on the Department website, [www.civil.utah.edu](http://www.civil.utah.edu).

### Freshman Year: Fall Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
LEAP 1501 (E-Leap)	3	Social & Ethical Implications of Engineering		
CHEM 1210	4	General Chemistry I	MATH 1050	
CHEM 1215	1	General Chemistry Lab I	MATH 1050	
WRTG 2010 <b>or</b> ESL 1060	3	Intermediate Writing or Advanced Writing for Non-Native speakers of English	WRTG 1010 or Placement	
MATH 1310	4	Engineering Calculus I <sup>a</sup>	MATH 1080	
CVEEN 1000	2	Intro to Civil & Environmental Engineering		
<b>Total</b>	<b>17</b>			

### Freshman Year: Spring Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
LEAP 1500 (E-Leap)	3	LEAP Seminar in Humanities for Engineers		
PHYS 2210	4	Physics for Scientists & Engineers I <sup>b</sup>	MATH 1310	
PHYS 2215	1	Physics for Scientists & Engineers Lab I <sup>c</sup>	MATH 1310	
CHEM 1220	4	General Chemistry II <sup>d</sup>	CHEM 1210	
MATH 1320	4	Engineering Calculus II <sup>a</sup>	MATH 1310	
<b>Total</b>	<b>16</b>			

<sup>a</sup> Students who have taken AP Calculus in high school may replace these courses with Honors MATH 1311 or 1321. Please see the Academic Advisor for further information on your placement.

<sup>b</sup> Students must take PHYS 2210 after MATH 1310.

<sup>c</sup> Students must take an additional lab course: PHYS 2215 (recommended), or CHEM 1225, or CHEM 2315.

<sup>d</sup> Students can choose between CHEM 1220, or CHEM 2310, or PHYS 2220.

*Students should check with their faculty advisors to see which of these options is best for their program.*

## Sophomore Year: Fall Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
MG EN 2400	3	Surveying	MATH 1060	
CVEEN 2130	4	Statistics/ Economics	MATH 1310 & Intermed. Status	
MSE 2170	1.5	Elements of Material Science for Civil Engineers <sup>e</sup>	MATH 1210 & Intermed. Status	
CVEEN 2010	3	Statics <sup>f</sup>	MATH 1310 & Intermed. Status	
MATH 2250	4	Differential Equations and Linear Algebra	MATH 1320	
<b>Total</b>	<b>15.5</b>			

## Sophomore Year: Spring Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
MG EN 1050	2	Technical Communication <sup>g</sup>		
CS 1000	3	Engineering Computing	MATH 1210	
CH EN 2300	2	Thermodynamics <sup>d</sup>	PHYS 2210 & MATH 1220	
CVEEN 2140	3	Strength of Materials	CVEEN 2010 & Intermed. Status	
MATH 3140	4	Vector Calculus and PDES	MATH 2210	
ME EN 2020	2	Particle Dynamics	CVEEN 2010 & PHYS 2210	
<b>Total</b>	<b>16</b>			

<sup>e</sup> Students must take 2 of 3: ECE 2200 Electrical Engineering; MSE 2170 Material Science; CH EN 2300 Thermodynamics. Students can complete MSE 2160, Elements of MSE (full semester), to meet their Additional Science Requirement (ASR) . Students who take MSE 2160 to meet their ASR must complete Ch EN 2300 and ECE 2200 to fulfill the 2 out of 3 requirement.

<sup>f</sup> Students must take Statics before CVEEN 2140 and ME EN 2020.

<sup>g</sup> Students, can petition to substitute GEOG 3040, GEOG 3140, or an additional technical elective for this course if they can demonstrate CAD capability with documents that they have created.





### Junior Year: Fall Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
CVEEN 3000	0.5	Seminar <sup>h</sup>	Intermed. Status	
CVEEN 3210	3	Structural Load & Analysis	CVEEN 2140 & Major Status	
CVEEN 3410	3	Hydraulics	CVEEN 2140 & Major Status	
CVEEN 3415	1	Hydraulics Lab <sup>i</sup>	CVEEN 2140 & Major Status	
CVEEN 3520	3	Transportation Engineering	WRTG 2010 or ESL 1060 & Major Status	
CVEEN 3510	3	Civil Engineering Materials <sup>j</sup>	CVEEN 2140	
CVEEN 3100	3	Technical Communication for Civil Engineers	WRTG 2010 or ESL 1060 & Major Status	
<b>Total</b>	<b>16.5</b>			

### Junior Year: Spring Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
CVEEN 3310	3	Geotechnical Engineering	CVEEN 2140 & Major Status	
CVEEN 3315	1	Geotechnical Engineering Lab <sup>i</sup>	CVEEN 2140 & Major Status	
CVEEN 3610 <sup>†</sup>	3	Environmental Engineering	CVEEN 2140 & Major Status	
	3	CVEEN Technical Elective <sup>j</sup>		
	3	Additional Science Requirement <sup>k</sup>		
	3	Intellectual Exploration <sup>l</sup>		
<b>Total</b>	<b>16</b>			

<sup>h</sup> The seminar series (CVEEN 3000 and CVEEN 4000) may be started during the fall semester of the sophomore year.

<sup>i</sup> CVEEN 3415 must be taken concurrently with CVEEN 3410 & CVEEN 3315 must be taken concurrently with CVEEN 3310.

<sup>j</sup> Students select from Primary and Secondary offerings explained on page 26 of Undergraduate Handbook.

<sup>k</sup> See page 245 of Undergraduate Handbook.

<sup>l</sup> All Student must take 2 Fine Arts, 2 Humanities, and 2 Social & Behavioral Science courses to fulfill the Intellectual Exploration requirements. 3 credits must be designated as a Diversity Course and 3 credits must be designated as a International Requirement.

## Senior Year: Fall Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
CVEEN 4000	0.5	Seminar	Major Status	
	3	CVEEN Technical Elective <sup>j</sup>	Major Status	
	3	CVEEN Technical Elective <sup>j</sup>	Major Status	
	3	CVEEN Technical Elective <sup>j</sup>	Major Status	
	3	Intellectual Exploration/ International Requirement <sup>l</sup>		
	3	Intellectual Exploration		
<b>Total</b>	<b>15.5</b>			

## Senior Year: Spring Semester

Course Number	Credit Hours	Course Title	Prerequisite	Grade
CVEEN 4910	3	Professional Practice & Design	CvEEN 3100, Major Status, & 2 Design Tech. Electives	
	3	CVEEN Technical Elective <sup>j</sup>	Major Status	
	3	CVEEN Technical Elective <sup>j</sup>	Major Status	
	3	American Institutions <sup>m</sup>		
	3	Intellectual Exploration		
<b>Total</b>	<b>15</b>			

<sup>m</sup> Students select from Econ 1740, Hist 1700, or Pols 1100





## GENERAL EDUCATION REQUIREMENT

All students are required to fulfill the general education requirements as set forth in the University of Utah's Undergraduate Student Bulletin. The University may determine that an Associate's Degree relieves the student of the University General Education requirements. However, the Department will still require that the Intellectual Exploration courses, as shown below, are completed:

### General Education Requirements

<b>1. Intellectual Exploration (I.E.)*</b> <i>(2 courses in each area)</i>	
Fine Arts (FF)	
Fine Arts (FF)	
Humanities (HF)	LEAP 1500 (E-Leap)
Humanities (HF)	
Social/Behavioral Science (BF)	LEAP 1501 (E-Leap)
Social/Behavioral Science (BF) <sup>++</sup>	ECON 2010/2020
<b>2. Writing (WR)</b>	
Writing (WR)	WRTG 2010
<b>3. American Institutions (AI)</b>	
American Institutions (AI)	
<b>4. Quantitative Reasoning</b>	
(QA) Math	MATH 1310
(QB) Statistics/Logic	MATH 1320

### Bachelor's Degree Requirements

<b>5. Diversity Requirement*</b>	
Diversity Requirement	LEAP 1500 (E-Leap)
<b>6. International Requirement*</b>	
International Requirement	
<b>7. Upper-division Communication/Writing</b>	
Upper-division Communication/Writing	CVEEN 3100
<b>8. Bachelor of Science Quantitative Intensive (QI)</b>	
2 of these 3 required courses will fulfill this requirement	
Bachelor of Science Quantitative Intensive (QI)	CVEEN 3210
Bachelor of Science Quantitative Intensive (QI)	CVEEN 3410
Bachelor of Science Quantitative Intensive (QI)	CVEEN 3310
Bachelor of Science Quantitative Intensive (QI)	CVEEN 4410

\* Select I.E. courses may be double-counted as satisfying Diversity (number 5) or the International Requirement (number 6). See the University Undergraduate Student Bulletin for more details.

<sup>++</sup> Students are not required to complete ECON 2010 or 2020 for the second Social/Behavioral Science course. However either of these may be completed to meet this requirement.

**Please refer to the University of Utah's General Catalog for the complete listing of University courses that fulfill these requirements.**

## COMPUTER REQUIREMENT

All Major Status students are required to have a laptop which will be used in the Department's upper level courses. The minimum requirements for the laptop are: wireless 802.11 with minimum capability of protocol "g", the newer protocols of "n", "ac", or "ad" are fine; 4 GB RAM, 80 GB Hard Drive free space, Windows 7 or newer operating system (no Windows XP), Intel i3 or better or AMD Athlon or better processor, and a mouse with wheel. The University Bookstore has student packages for laptops as well as other computer companies.

## FERPA & UMAIL

The Family Educational Rights and Privacy Act (FERPA) requires faculty and staff to only communicate about a student's education history and plan with the student. If you would like the Department to also communicate with another family member, spouse, or guardian, complete the FERPA release contract that is located on the Campus Information System.

To meet FERPA requirements Department communication with students will be done through their Umail accounts. Students need to check their Umail account on a regular basis to promptly respond to the Department requests.

## DEGREE AUDIT REPORTS (DARS)

A Degree Audit Report (DARS) is used throughout a student's career at the University. Students need to bring DARS with them to academic advising appointments, when submitting Department forms, and when applying for graduation. When running DARS, students need to know what academic catalog they are using. To determine the catalog year, use the academic year when you first received status; unless told otherwise by the Academic Advisor.

To run a DARS you will log into the Campus Information System (CIS) and then go to the Graduation tab then to DARS. Click the "Generate Degree Audit Reports", this will open a new window. In the new window indicate the catalog year and select CVENBS – Civil Engineering.

If courses are not showing in the appropriate spot in the DARS, send an email to the Academic Advisor with the changes that need to be reviewed, along with your University ID.

## STUDENT ADVISING

Faculty members take an active role in advising students with their education as well as career decisions. Students in CVEEN 1000, Introduction to Civil & Environmental Engineering will be able to indicate their area of interest and a faculty advisor in that area will be assigned. Students who transfer into the program and do not need to take CVEEN 1000 should request a faculty advisor by completing the Advisor Request form located on the Department website. You can change your interest area at any time by completing the Advisor Request Form.

When meeting with your advisor please come prepared with a copy of your Degree Audit Report and a flowchart indicating your progress.



## GPA & COURSE GRADE REQUIREMENTS FOR GRADUATION

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In order to progress within the program and graduate, the Department requires passing grades and a minimum Engineering GPA\* of 2.50 or higher. The University requires the degree candidate to have a Cumulative GPA of 2.00 or higher. It is also required that students achieve the grades listed below:

A grade of "C" or better must be met for the following courses (taken after Summer 2012 semester):

- All Math
- All Chemistry
- All Physics
- CVEEN 2010, 2130, and 2140

The following courses must be completed with a grade of "C-" or better:

- All other 1000 and 2000- level courses, except A.I. and I.E.
- All 3000- level courses except CVEEN 3000
- All 4000- level courses except CVEEN 4000

If a student falls below the minimum engineering GPA 2.50 he/she will be removed from status and must retake courses or take additional non-CvEEN courses until he/she achieves a 2.50 engineering GPA. Students will not be allowed to enroll in additional CvEEN courses until the engineering GPA is achieved.

\*Engineering GPA is defined as courses counted towards the major with the exception of the following: LEAP 1500/1501, WRTG 2010, ESL 1060, CVEEN 1000, and CVEEN 3000/4000.

## REPEAT POLICY

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A student can take an engineering GPA course for grade only twice at the University. Students withdrawing from an engineering GPA course are allowed three attempts, including the withdrawal. In all cases, the last letter grade received in the course is counted as the official grade for the requirement.

When retaking an engineering GPA course, if it was taken at the University of Utah, it must be retaken at the University of Utah. For example, you cannot count a class taken at SLCC or Weber to replace a class in which you get an "I", "E", or low grade at the University of Utah.

## E-LEAP

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E-Leap is a two semester sequence, learning community course for all civil engineering students. The seminar is offered in a small classroom setting where students benefit from the guidance of a faculty member and peer advisors. Students are provided the opportunity to network with other engineering students and form study groups.

All civil engineering students are required to take both E-LEAP courses (LEAP 1501 in the Fall and LEAP 1500 the following Spring). Transfer students, who at the time of transfer receive major status or already have credit for 2 Humanities or 2 Social/Behavioral Science courses, or 1 course from each of those Intellectual Exploration categories do not need to take the series. This sequence for engineering fulfills 1 Humanities, 1 Social/Behavioral science and the Diversity requirement. The completion of the sequence provides Honors in Engineering credit.



## SCHOLARSHIPS

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The Department and College of Engineering offers scholarships to undergraduate students, including freshman and transfer students. Scholarships are awarded for the academic year and the award is split between fall and spring semesters. Scholarship applications for the following academic year are due by February 15. For the specific application and guidelines see the Department website.

Additional scholarship applications and information are available from the Office of Financial Aid and Scholarships, [www.sa.utah.edu/finance/](http://www.sa.utah.edu/finance/) and can also be found on our website.

## ARTICULATION AGREEMENT

A student transferring to the University from any Utah System of Higher Education (USHE) college or university, BYU, or BYU- Idaho should refer to the articulation sheet to see which courses are acceptable substitutions for the program. For the list of these courses please refer to the Department website.

## TRANSFER STUDENTS

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A transfer student is one who is transferring from another University, College, or Department (Major). Transfer students should apply for Intermediate or Major Status as soon as they meet the requirements. A student transferring to the University from any Utah college or university should refer to the articulation sheet, which is located on the Department website to determine the acceptable courses taken at other Utah institutions.

Students admitted by the University of Utah who have transfer credit from an institution outside the state of Utah, must submit a completed Out of State Course Evaluation form. A DARS should accompany each Out of State Course Evaluation. Only courses listed on the Department's graduation review sheet are subject to review for credit. Out of State Course Evaluations forms should be submitted prior to the beginning of the student's first semester. This will allow time for the coursework to be evaluated by the faculty to determine where the students falls within the program .

Students transferring science and math courses into the Department to be used to meet the degree requirements will need to have completed a minimum of 36 credit hours of math and science courses. If students do not meet this requirement they will need to take additional math and science courses to meet the required hours. Students should petition for the additional course to be accepted prior to enrolling.

Students who have received an associate's degree must complete 2 fine arts, 2 humanities, and 2 social/behavioral science courses. These courses are required by the Department even though the University may waive them with the completion of an associate's degree. If a course has been taken at another university or college, a petition must be filed which includes rationale for why the course taken at another institution should be accepted by the Department.

Students who do not receive major status or do not already have credit for 2 Humanities courses, or 2 Social/Behavioral Science courses, or 1 course from each of those Intellectual Exploration categories when they transfer into the program, must take the E-LEAP sequence (LEAP 1501 &1500). More information can be found under the E-LEAP section.



## ADVANCED PLACEMENT EXAMINATION CREDIT

Credit earned through Advanced Placement courses in high school may be substituted for corresponding University-level courses, if the credit appears on the student's University of Utah transcript. The following equivalent credit will be used for purposes of making decisions on admission to intermediate and major status. Civil & Environmental Engineering maintains a stricter policy than that of the University. The Department recommends that students with an AP score of 4 take the University-level math, physics, and chemistry courses. A student with an AP score of 3 is required to take the University-level course(s). Any student who does not feel qualified to continue as a result of AP credit may take the University course program.

For AP Scores of 4 or 5 the following are the equivalent course(s) at the U of U:

Subject	Equivalent Course(s) at the U of U
Calculus AB <sup>+</sup>	N/A
Calculus BC	MATH 1310
Physics C: Mech.*	PHYS 2210
Physics C: E & M*	PHYS 2220
Chemistry*	CHEM 1210/1220
English	WRTG 2010

<sup>+</sup> Students who receive a score of 4 or 5 on AB have the option of taking either MATH 1310 or 1311. However it will not waive either course.

\*To receive credit for the associated laboratory course, the student must submit his/her lab notebook or other documented proof of having taken the lab course.

## STANDARD EXCEPTIONS

All requests for exceptions must be submitted to the Academic Advisor (2012 MCE). It is the student's responsibility to request that their records be updated according to these exceptions.

Full semester courses accepted for 1/2 semester courses:

- ME EN 2080, Dynamics may replace ME EN 2020, Particle Dynamics.
- ECE 2210, Electrical Engineering for Non-Majors may replace ECE 2200, Electrical Engineering for Civil Engineers.
- ECE 2240, Fundamentals of Electrical Circuits may replace ECE 2200.
- MSE 2160, Material Science for Non-Majors may replace MSE 2170, Material Science for Civil Engineers or count towards the Additional Science Requirement.

CVEEN 1000, Intro to Civil Engineering may be waived if the student meets one of the following requirements:

- The Student has an introductory course from another Engineering Department.
- The Student is eligible for and receives Major status at the time of transfer.
- The student has an Associate's degree in Engineering (Transcript required).



## RECOMMENDED COURSEWORK HOURS

The Civil & Environmental Engineering faculty recognizes that many students will be working and attending school. A student can complete the BS degree in 4 years while working 15 hours a week. The following table shows the maximum recommended number of credit hours that students should be taking according to how much they are working.

Employment (hours/week)	Coursework (Recommended Max. Credit Hours)
40	3
30	6
20	12
<16	16

When you are planning your work and class schedule be aware that:

1. It is expected for each credit hour taken, the student will have two to three hours of homework or out of class reading and preparation.
2. The student is expected to have the prerequisites when they are registering for a course.
3. The student cannot register for courses that have overlapping times.

## HONORS PROGRAMS

The Department encourages students to participate in the Honors Programs at the University of Utah. The programs that are available to students are listed below.

### HONORS IN ENGINEERING

The Honors in Engineering Program in the College of Engineering is designed to provide a challenging, individualized educational experience to high achieving students and to promote life-long learning. Honors in Engineering challenges top students by offering them access to more advanced levels of study, facilitates the highest use of their creative abilities, encourages sustained interest in advanced education and basic research, as well as fostering leadership and fellowship within the engineering community. More information can be found at: <http://www.coe.utah.edu/current-undergrad/hie.php>.

### UNIVERSITY HONORS

The Honors College has a long and distinguished history of excellence in undergraduate education. The centerpiece of Utah's Honors College is Engaged Learning Opportunities — a signature experience that brings together students and community partners to collaborate on research that results in real-world applications. For more information please go here: <http://honors.utah.edu/>.

### PRE-CIVIL ENGINEERING STATUS

Matriculated students are admitted, upon request, to University College as Pre-Civil Engineering, and are permitted to enroll in 1000-level engineering classes. Intermediate or Major status is required to enroll in the Department's higher level courses. Advancement to intermediate and/or major status is required to graduate with a degree in Civil Engineering.



## INTERMEDIATE STATUS

Students with an Engineering Grade Point Average (GPA) of 2.50 or higher may apply for intermediate status upon completion of the requirements shown below. Students with an Engineering GPA less than 2.50 will be advised by the Director of Undergraduate Studies. Status applications should be submitted in accordance with the procedures on the status form. Application forms are available on the Department's website.

Course Number	Credit Hours	Course Title
The following must be successfully completed:		
MATH 1310*	4	Engineering Calculus I
Two of the following courses must be successfully completed:		
CHEM 1210	4	General Chemistry I
MATH 1320**	4	Engineering Calculus II
PHYS 2210	4	Physics for Scientists & Engineers I
WRTG 2010 or ESL 1060	3	Intermediate Writing or Advanced Writing for Non-Native Speakers of English

Note: Successful completion of each of the above listed courses with the exception of WRTG 2010 or ESL 1060, require a grade of C or better.

\*MATH 1210 or MATH 1311 are acceptable alternatives

\*\* MATH 1220 or MATH 1321 are acceptable alternatives .

## MAJOR STATUS

Students with an Engineering Grade Point Average (GPA) of 2.50 or higher may apply for major status upon completion of the requirements shown below. Students who did not complete the Engineering Calculus series should visit our website for alternative courses. Students with an Engineering GPA less than 2.50 will be advised by the Director of Undergraduate Studies. Status applications should be submitted in accordance with the procedures on the status form. Application forms are available on the Department's website.

Course Number	Credit Hours	Course Title
Successful completion of the following courses:		
CHEM 1210	4	General Chemistry I
CVEEN 1000	2	Introduction to Civil Engineering
CVEEN 2010	3	Statics
LEAP 1501	3	Engineering LEAP
MATH 1310*	4	Engineering Calculus I
MATH 1320**	4	Engineering Calculus II
PHYS 2210	4	Physics for Scientists & Engineers I
WRTG 2010 or ESL 1060	3	Intermediate Writing or Advanced Writing for Non-Native Speakers of English
Successful completion of, or enrollment in the current semester in all of the following courses:		
CS 1000	3	Engineering Computing
CVEEN 2140	3	Strength of Materials



Course Number	Credit Hours	Course Title
LEAP 1500	3	Engineering LEAP
MATH 2250	3	ODE Calculus III
Successful completion of, or enrollment in the current semester of 3 of the following 5 courses:		
CVEEN 2130	4	Statistics/Economics
MATH 3140	4	Engineering Vect Calc & PDEs
MG EN 2020	2	Particle Dynamics
MG EN 1050	2	Technical Communication
MG EN 2400	3	Surveying

Note: For successful completion a grade of C or better must be achieved in Math, Physics, Chemistry and CVEEN 2010, 2130, and 2140. Successful completion of all other courses listed above requires a grade of C- or better.

\*MATH 1310 or MATH 1311 are acceptable alternatives

\*\* MATH 1320 or MATH 1321 are acceptable alternatives.

## ADDITIONAL SCIENCE REQUIREMENT

All students are required to take one additional science course that is not Chemistry, Physics, or Math. Please see recommended courses below:

Course Number	Title
BIOL 2010	Evolution & Diversity of Life
BIOL 3460	Global Environmental Issues
GEO 1110 and GEO 1115	Introduction to Earth Systems & Introduction to Earth Systems Lab
GEOG 3110	Remote Sensing
GEOG 3330	Urban Environmental Geography
GEOG 5210	Global Climate Change
MSE 2160	Elements of Material Science & Engineering
NUCL 3000	Nuclear Principles in Science
NUCL 3200	Radiochemistry

## PETITIONS

Students requesting a variation from the Department required curriculum must submit a petition, along with sufficient supporting documentation, to their Faculty Advisor for approval. Approved petitions must be submitted to the Department Office (2012 MCE) for further processing. Petition forms are located on the Department's website.

The Department cannot waive or make exceptions for courses under the General Education (G.E.) or Bachelor Degree (B.D.) requirements that are required by the University. Petitions for these courses must be filed with University College (450 SSB). If intellectual exploration courses are accepted by the University, then the student may petition the Department to have the same course count towards the Civil Engineering major requirement.



## TECHNICAL ELECTIVES

Diversity in technical elective courses provides the student with a broad understanding of the fields within Civil Engineering and greater employment opportunities. With this understanding, specialization should be pursued at the graduate level. With the exception of Fastrax students, for whom one technical elective is waived, all students are required to take a total of 6 technical elective courses. Additional requirements are as stated below.

All undergraduate students must take, and successfully complete, at least one course in three of the five emphasis areas shown in the heading of the table given in Section 1. Also, at least two design courses, as indicated by (D), must be taken in Section 1. These design courses must be taken from two different emphasis areas. The remaining technical electives may be taken from Section 1 or 2. Only 1 course may be taken from the Management emphasis area. Fastrax students should see the Fastrax section in the Handbook for more information on required Technical Electives.

### Section 1: Primary CvEEN Technical Electives

Environmental	Structures	Geo/Materials	Transportation	Water Resources
CVEEN 5605 Water and Wastewater Treatment	CVEEN 4221 Concrete I (D)	CVEEN 5305 Intro to Foundations (D)	CVEEN 5510 Highway Design (D)	CVEEN 4410 Engineering Hydrology (D)
	CVEEN 4222 Steel I (D)	CVEEN 5570 Pavement Design (D)	CVEEN 5560 Transportation Planning	CVEEN 5420 Open-Channel (D)
		CVEEN 5500 Sustainable Materials		

### Section 2: Other CvEEN Technical Electives

Environmental	Structures	Nuclear Eng	Management (Max 1)	Other
CVEEN 5610 Water Chemistry	CVEEN 5210 Structural Analysis II	NUCL 3100 Neutron Based Engineering	CVEEN 5810 Cost Estimation & Proposal Writing	CVEEN 5110 GIS in Civil Engineering
	CVEEN 5220 Concrete II	NUCL 4000 Nuclear Science & Engineering	CVEEN 5820 Project Scheduling	
	CVEEN 5230 Steel II		CVEEN 5830 Project Management & Contract Administration	
	CVEEN 5240 Timber/ Masonry		CVEEN 5850 Engineering Law & Contracts	

## FUNDAMENTALS OF ENGINEERING (FE) EXAMINATION

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The Department faculty considers the passing of the FE exam to be an important step in an individual's progress towards professional practice. The faculty also considers the passing of this exam as a demonstration of the quality of the basic engineering capabilities of each student. The Department highly encourages students to take the exam prior to graduation, as it is an important step for a career in civil engineering.

Students are encouraged to attend the College of Engineering FE review sessions and take the Department's Engineering Economics, Statics, Strengths of Materials, the Junior level civil courses prior to taking the test.

## FASTRAX

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Fastrax is an accelerated track specially designed to encourage civil engineering undergraduate students with an Engineering GPA of 3.20 or higher to pursue either a non-thesis or thesis master's degree from the Department. Through the Fastrax program, most students can complete their MS degree with one additional year of full-time study beyond the BS degree. Fastrax students are required to take 5 technical electives, instead of 6, and complete a graduate level course (6000 or higher) to count toward their MS degree. Students in Fastrax must complete the Primary Technical Elective courses (Section 1); the course that is waived comes from the other Technical Electives (Section 2). Additional information and application material for this program is available on the Department website.

## GRADUATE LEVEL COURSES

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High achieving undergraduates (Engineering GPA of 3.20 or greater), particularly those considering graduate studies, are strongly encouraged to enroll in 6000 level courses for one or more of their technical electives. The approval to register must be granted by the course instructor and can be received by completing the Enroll in Graduate Course as an Undergraduate form. Students may petition for a 6000 level course to count as a technical elective requirement. The course instructor will determine if the course includes "substantial design content."

Students who are continuing on to graduate school can have a maximum of six (6) credit hours taken as an undergraduate counted toward their graduate degree as long as the courses are not being used for their undergraduate degree.

## UNDERGRADUATE RESEARCH

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The Department encourages undergraduate students to participate in research opportunities on campus. Research may be conducted in both nuclear and civil engineering areas. Students wishing to participate in research should contact the appropriate professor(s) they are interested in working with in the Department.

Students can also participate in the Undergraduate Research Opportunities Program (UROP) to work with faculty mentors on research and earn up to \$1,200 any semester. For more information go to [www.urop.utah.edu](http://www.urop.utah.edu).

## MINOR IN NUCLEAR ENGINEERING

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Students pursuing a BS in Civil Engineering have the opportunity to complete a Minor in Nuclear Engineering. The Minor in Nuclear Engineering has been developed to respond to the expectations of the nuclear industry and government agencies for preparing a new generation of nuclear engineers for diversified jobs in the State of Utah, the Nation, and the World. The Nuclear Minor requires students to complete eight courses as listed below.

Course Number (Semester offered)	Credit Hours	Course Title
NUCL 3000 (Fall)	3	Nuclear Principles in Engineering & Sciences
NUCL 3100 (Spring)	3	Neutron- Based Engineering
NUCL 3200 (Spring)	3	Radiochemistry with Laboratory I
NUCL 4000	3	Nuclear Science & Engineering using TRIGA
NUCL 5999 (Fall/Spring)	1	UNEP Seminar (Complete 2 times)
2, 3 credit hour Elective Courses		

CvEEN students can take two of the required minor courses as technical electives and one may count towards the Additional Science Requirement. Please see the sections on Technical Electives and Additional Science Requirements for a list of these courses. For more information on the minor please visit the Nuclear Engineering website, [www.nuclear.utah.edu](http://www.nuclear.utah.edu), or the Nuclear Engineering Section in this handbook.

## APPLYING FOR GRADUATION

All undergraduate students are required to apply for graduation through the Registrar's Office, Graduation Division. The application deadline is: November 1 for Spring; February 1 for Summer; June 1 for Fall. When applying for graduation students must complete the Graduation Review and follow the procedures listed on the form. The graduation application and graduation review can be found on the Department website.

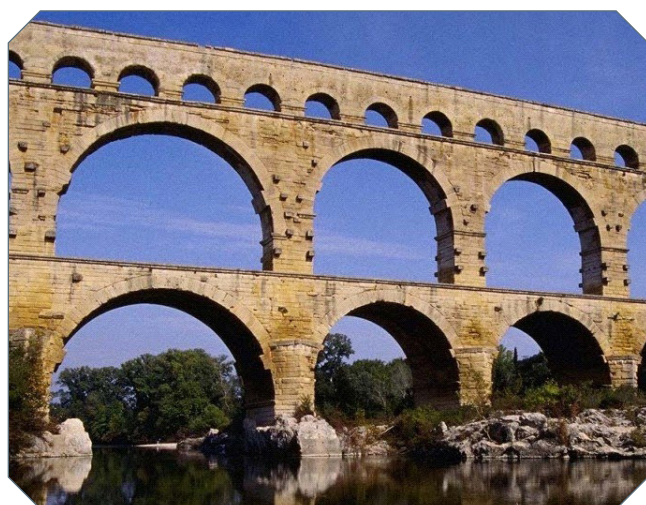
## GRADUATE DEGREES IN CIVIL ENGINEERING

Students enrolling in the Civil Engineering program should make note of the following Department and degree titles:

Department Name:	Civil & Environmental Engineering
Degree Names:	Civil & Environmental Engineering PhD in Environmental Engineering Nuclear Engineering

The Department of Civil & Environmental Engineering offers graduate programs leading to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Civil & Environmental Engineering. The Department supports the Utah Nuclear Engineering Program that awards degrees for a Master of Science (M.S.), and Doctor of Philosophy (Ph.D.) in Nuclear Engineering and a Doctor of Philosophy (Ph.D.) in Environmental Engineering. For more information on these degrees see the Environmental Engineering and Nuclear Engineering sections.

Faculty areas of emphasis include: structural engineering, earthquake engineering, environmental engineering, water resources en-



# Civil Engineering Undergraduate Program-Engineering Math

Freshman		Sophomore		Junior		Senior	
Fall	Spring	Fall	Spring	Fall	Spring*	Fall	Spring
1000 Intro 2	PHYS 2210 <sup>®</sup> Phys for Sci & Engineers I 4	2010* Statics 3	2140* Strength 3	3000 Seminar 0.5	3310/3315 Geotech I 4	4000 Seminar 0.5	4910* Prof Design 3
LEAP 1501 <sup>^</sup> Social & Ethical Engineering 3	LEAP 1500 <sup>^</sup> Humanities for Engineers 4	2130* Statistics/Econ. 4	CS 1000 Eng. Computing 3	3100* Tech. Comm. 3	3610 Enviro. I 3	Technical Elective 3	Technical Elective 3
CHEM 1210 <sup>®</sup> General Chemistry I 4	CHEM 1220 <sup>®</sup> General Chemistry II 4	MSE 2170* Elements of MSE 1.5	CH EN 2300* Thermoo. 2	3210 Structures I 3	Additional Science Requirement <sup>®</sup>	Technical Elective 3	Technical Elective 3
CHEM 1215 <sup>®</sup> General Chemistry Lab I 1	PHYS 2215 <sup>®</sup> Phys for Sci & Engineers Lab I 1	MG EN 2400 Surveying 3	MG EN 1050 Tech. Comm. 2	3410/3415 Hydraulics 4	Technical Elective 3	Technical Elective 3	Intellectual Exploration/ IR 3
MATH 1310 Eng Calculus I 4	MATH 1320 Eng Calculus II 4	MATH 2250 ODE's 4	MATH 3140 Engr Vect Calc & PDE's 4	3510 Materials 3	Intellectual Exploration 3	Intellectual Exploration 3	American Institutions 3
WRIG 2010 or ESL 1060 3			ME EN 2020 Particle Dynamics 2	3520 Transportation 3		Intellectual Exploration 3	

<sup>^</sup>LEAP 1501—Fulfills a Social and Behavioral Science requirement. LEAP 1502-Fulfills a Humanities & Diversity requirement. All transfer students must take these courses unless they have 2 or more Humanities and Social & Behavioral Science Courses.

\* Must take 2 of the 3 courses  
ECE 2200: Elec. Eng.  
MSE 2170 Mat'l Science  
CH EN 2300: Thermodynamics

#This course is only for students who complete the Engineering Math Sequence.

<sup>®</sup> Students must take CHEM 1210, CHEM 1215, and PHYS 2210 (offer MATH 1310). Students must take one additional lab course and it is recommended to take PHYS 2215 but they can take CHEM 1215 or CHEM 2015. Additionally, students must take CHEM 1210, or CHEM 2110, or PHYS 1020. Students should check with their faculty advisors to see which of these options is best for their program.

All Students must take 2 Fine Arts, 2 Humanities, and 2 Social & Behavioral Science courses to fulfill the Intellectual Exploration requirements. Associates degrees do not fulfill the department's requirements automatically.

For a list of Technical Election requirements, see the handbook  
or Additional Science Requirement, see the handbook.

\*Must be taken once, in a Fall, Spring, or Summer semester.

CVEEN  
courses

Updated September 3, 2014

engineering, construction materials engineering, geotechnical engineering, nuclear engineering, transportation engineering, engineering management, water, energy and infrastructure sustainability engineering.

All information in this handbook and forms referenced in this document can be found on the Department website, [www.civil.utah.edu](http://www.civil.utah.edu).

## ADMISSION

Admission to the graduate program is based on the applicant's academic records, Graduate Record Exam (GRE), letters of recommendation, personal statement, special aspects of the applicant's professional and educational background, and faculty availability. To apply to the Department, students should reference the application information on the Department website.

Applications are reviewed by faculty in the area of study which the applicant is applying for admission. Once reviewed, the application is returned to the Graduate Admissions Office with a recommendation. The University Graduate Admissions Office makes the final decision on all graduate admissions. All supporting documentation must be to the Department by the dates listed below or your application will not be processed. The Department deadline to apply is as follows:

- December 15th – International students for Fall Semester, to be considered for Funding
- January 15th - Domestic students for Fall Semester, to be considered for funding
- March 1st - All students for Fall Semester, general admission
- February 1st – All students for Summer Semester
- October 1st – All students for Spring Semester

The following minimum requirements shall be met in order to be accepted into the Department of Civil & Environmental Engineering's graduate program:

1. A bachelor degree from an accredited institution of higher learning in one of the branches of engineering or in mathematics, physics, computer science, chemistry, biology, or in a related science field.
2. A minimum grade point average (GPA) of 3.0 (out of 4.0) in the undergraduate degree. A GPA below a 3.0 will be considered on a case-by-case basis.
3. Master of Science applicants must receive a minimum combined score of 300 on the quantitative and verbal sections of the GRE. Doctor of Philosophy applicants must have a minimum of 155 on the quantitative section and a combined score of 300 on quantitative and verbal sections. Professional Track applicants who have graduated from an ABET accredited university with a B.S. degree in engineering and a GPA of 3.20 or higher are not required to take the GRE.
4. Students who have not satisfied the entire minimum course requirements may be admitted to the graduate degree programs but are expected to complete all deficiencies. Grades on all deficient courses shall be a 'B' or better to be considered satisfactory. Deficiencies shall be completed satisfactorily once the student has met the pre-requisite requirements. An extension can be granted by the Graduate Studies Committee for extenuating circumstances.

The requirements given above are minimum standards. Meeting the minimum requirements does not guarantee that an applicant will be accepted into the graduate program. Decisions regarding acceptance or rejection of any applicant are made based on the qualifications of the applicant compared to other applicants, the needs of the Department, any restrictions or restraints under which the Department is operating, and other unnamed considerations.

## International Students

In addition to the general admission requirements, the Department of Civil & Environmental Engineering requires a score of at least 550 on the written, 213 on the computer-based, or 80 on the internet-based Test of English as a Foreign Language (TOEFL). Applicants may also take the International English Language Testing System (IELTS) which requires a score of 7.50. The TOEFL or IELTS are not required for international students who have earned a B.S. or higher degree from an accredited university in the United States. All international students are encouraged to take ESL 1050, Introduction to Expository Composition (for ESL Speakers), and ESL 1060, Advanced Expository Writing (for ESL Speakers).

## FINANCIAL ASSISTANCE

Financial assistance is available to qualified students on competitive basis in the form of teaching assistantships, research assistantships, graduate assistantships, University of Utah research fellowships, industry-sponsored design and research fellowships. The professor in charge of the particular research contract or grant makes decisions regarding sponsored research assistantships. If a student is interested in a teaching assistantship or research assistantship, they will need to apply to the Department by the appropriate deadline or if they are a current student they will need to contact their Advisor directly. Financial support is available to graduate students pursuing research degrees. Those following a professional degree are not eligible for financial support.

Students who work for the Department as a teaching assistant, research assistant, or a graduate assistant may qualify for the Tuition Benefit Program provided they meet the other requirements. Complete requirements can be found at: [www.gradschool.utah.edu](http://www.gradschool.utah.edu).

## MINIMUM COURSE REQUIREMENTS

The undergraduate courses listed below are course requirements for all graduate students. Most students with a B.S. in Civil Engineering will meet these requirements. Students with B.S. degrees in other areas shall take the courses identified in the general section and for their area of emphasis. If students are deficient in any course(s) they will need to be taken during the first semester that the student has the prerequisites. These requirements are outside the graduate program of study. For all descriptions, refer to the University of Utah's General Catalog.

All Students Must Complete:	
Mathematics	
MATH 2250	Ordinary Differential Equations
	A Statistics Course
Sciences	
PHYS 2210	Physics for Scientists and Engineers
CHEM 1210	General Chemistry I
Basic Engineering	
CVEEN 2010	Statics
CVEEN 2140	Strength of Materials
CVEEN 3410/3415	Hydraulics/Hydraulics Lab



**All Students Must Complete:****Mathematics****Graduate Emphasis Areas in Civil Engineering also require:****Environmental/Water Resources**

CVEEN 4410

Hydrology

CVEEN 3610

Intro to Environmental Engineering

**Materials/Pavements**

CVEEN 3510

Civil Engineering Materials

**Structures/Geotechnical**

CVEEN 3210

Structural Load and Analysis

CVEEN 3310/3315

Geotechnical Engineering/Geotechnical Engineering Lab

CVEEN 4221

Concrete I

CVEEN 4222

Steel I

**Transportation**

CVEEN 3520

Transportation Engineering

*Additional undergraduate courses may be required by the supervisory committee depending on the student's area of graduate emphasis and background.*

## DIRECT ADMIT PH.D. PROGRAM

If a Ph.D. is your ultimate degree objective, we encourage exceptionally qualified B.S. students to apply to our direct admit Ph.D. option. The direct admit Ph.D. degree emphasizes scholarly research activities. This option increases your chances of being accepted, reduces your course requirements, and can accelerate your progress towards the Ph.D. degree. If you choose to apply for this option, but your record is not strong enough to merit direct admission into the Ph.D. program, you will automatically be considered for admission to the Master's program.

- Undergraduate students with a 3.50/4.0 grade point average (GPA) and/or in the top 15% of their graduating class may be considered for direct admission into our Ph.D. program.
- GRE new format: Verbal = 150, Quantitative = 166, Analytical Writing = 3.5
- GRE old format: Verbal = 450, Quantitative = 700, Analytical Writing = 3.5
- Minimum of 30 credit hours of graded coursework and 14 credit hours of dissertation.
- Minimum 15 credit hours taken within CVEEN.
- M.S. degree granted after completion of at least 24 hours of coursework, 6 hours of research credit, and submission of one peer-reviewed first-author paper from journal approved by committee.
- A minimum of 2 peer-reviewed papers submitted prior to scheduling your Ph.D. defense.
- Review after 1st year for continuation on Direct Admit track.

Note: GRE scores must have been taken within the last 5 years to be accepted.

## FERPA & UMAIL

The Family Educational Rights and Privacy Act (FERPA) requires faculty and staff to only communicate about a student's education history and plan with the student. If you would like the Department to also communicate with another family member, spouse, or guardian, complete the FERPA release contract that is located on the



## NON-MATRICULATED STUDENTS

Students who do not qualify for admission to The Graduate School may enroll in graduate-level classes on a non-matriculated basis. To apply as a non-matriculated student please use the form located online at [www.admissions.utah.edu/apply/nondegree](http://www.admissions.utah.edu/apply/nondegree).

Once a student is accepted as a non-matriculated student, he/she shall contact the professor teaching the class to receive permission. Once permission is received by the professor forward the email to the Academic Advisor and he/she will assist you in registering for the class.

Courses taken as a non-matriculated student while at the University may count towards a student's graduate program at the discretion of the student's supervisory committee. In addition, a non-matriculated student shall receive a 'B' or better grade in a course to apply that course toward his or her graduate degree. A maximum of 9 non-matriculated credit hours may be applied to a graduate degree. Grades received during non-matriculated status do not guarantee admission into a graduate program. International students on visas are not eligible for non-matriculated status.



## STUDENT FUNDING

Students pursuing a research degree are eligible for all departmental funding. Graduate research assistant and graduate assistant positions are determined by individual faculty members. If a student wishes to be considered for this funding, they need to meet the department application deadline as specified on the website.

Students wishing to be a teaching assistant need to apply by the department application deadline. Recommendations for teaching assistant positions are sent by department research groups shortly after the application deadline. If a student is selected for a teaching assistant position they will need to go through the International Teaching Assistant (ITA) clearance process that the Graduate School administers.

The ITA program requires all students to have taken the iBT or ILTS. Students need an iBT speaking score of 25-30 to gain ITA Clearance automatically by attending an orientation workshop. If a student does not have this score, or doesn't have a score, they will need to go through the ITAP Spoken English Evaluation prior to completing the ITA orientation workshop. Students who do not satisfactorily complete the Spoken English Evaluation and the ITA training will be ineligible to receive the teaching assistant position.

*If a student is being paid through the department as a Graduate Research or Teaching Assistant for the department, students must meet with their committee chair to complete the semi-annual Student Performance Review form prior to submitting a registration for both fall and spring semesters. The Student Performance Review form should be submitted with each Registration Approval form for both fall and spring.*

## INTERNATIONAL STUDENTS

The U.S. Immigration and Naturalization Service (INS) has ruled that an international student on an F1 Visa may have up to three years to complete a master's degree and up to six years to complete a Ph.D. Please make sure that you complete



your degree in the amount of time specified to avoid any delay in your education.

## LANGUAGE PROFICIENCY

All graduate students are expected to have or develop a proficiency in both written and oral English. Any student who is found weak in communication in English, as evidenced by speech, written reports, and/or oral presentations, may be required to take additional English or speech course work. Additional language course work does not apply toward degree requirements.

## CONTINUOUS ENROLLMENT

All students must be continuously enrolled for a minimum of three (3) credit hours each semester (full load is considered 9 credit hours) from the time of formal admission through completion of all requirements, comprehensive exam, and thesis/dissertation (if applicable) for the degree they are seeking.

All Graduate Research Assistant (GRA) on payroll during summer semester will need to register for 3 credits of thesis research credits (CVEEN 6970 or 7970) during summer semester. GRA funded students are eligible for only 3 credit hours of tuition benefit. If a student chooses to take a course instead of thesis or dissertation hours, contact the department graduate advisor.

International students shall be registered for 9 semester hours for Fall and Spring semesters. Students who do not register for Fall or Spring semester will need to apply for a Vacation Semester (need to be registered for at least two consecutive semesters before the Vacation Semester). Students who do not take a vacation semester shall register for 3 hours of Thesis Research (CVEEN 6970 or CVEEN 7970) or 9 hours of regular coursework to meet INS regulations; please contact International Student and Scholar Services for further information.

Domestic student wishing to take a leave of absence for fall or spring semester shall complete a Request for Leave of Absence form and have it approved by his/her supervisory committee. The form shall then be submitted to the Department office for further processing. It is recommended that this form be filed before the start of the semester to be missed so a student will know if it will be accepted. The form must be filed before the last day of the semester missed. Domestic students leave of absence can be granted for a maximum of one year. Domestic students who wish to take Summer semester off do not need to file a leave of absence. However, registering for three credits will be required for summer if a student is being paid as a Graduate Research Assistants (GRA).

International students must file for a Vacation Semester if they are not going to register for a semester. If an international student files for a vacation semester for either Fall or Spring they will need to reapply to the University. International students taking a Vacation Semester during summer must register for Fall courses before leaving. If pay is given in summer for a GRA, students must register for 3 credits of thesis research. See the graduate academic advisor for further clarification. If the student does not register he/she will be required to re-apply to the University.

If a student does not comply with the continuous enrollment policy, his/her records will be inactivated. To reactivate a file at a later time, the student needs to reapply for admission to the Graduate School.

## GRADUATE ADVISOR AND SUPERVISORY COMMITTEE

The Academic Advisor will assign a temporary advisor to new graduate students in their specified area of interest. The temporary advisor approves the first semester of the stu-

dent's registration. Students need to set up their supervisory committee during their first semester in the program. If a student does not have their committee set up by the time of registration they will not be given the class numbers and will postpone registration.

### **M.S. Supervisory Committee**

The supervisory committee for an M.S. student consists of three voting members. The Committee Chair of the supervisory committee (also known as Advisor) must be a CvEEN tenure track faculty member. At least one of the other two voting committee members must be a regular CvEEN faculty member. The third voting member can be from within the Department or may be outside the Department. An individual from the engineering industry may be a voting member with approval by the Director of Graduate Studies and the Graduate School.

### **Ph.D. Supervisory Committee**

Ph.D. supervisory committees consist of five voting members. Three of the voting members must be a CvEEN tenure track faculty member or another approved research faculty member. Of these three, the Chair (also known as the advisor) and one other member must be from the student's official area of emphasis. The fourth member is a regular faculty member from another department within the University of Utah. The fifth voting member can be from within the Department or may be outside the Department if this enhances the ability of the committee to supervise the student's work. An individual from the engineering industry may be a voting member with approval by the Director of Graduate Studies and the Graduate School.



## **CURRICULUM DEVELOPMENT PLAN**

All students will need to complete a Curriculum Development Plan (CDP) during their first semester attending the University of Utah. The CDP is intended for the student and advisor to set out a plan for what courses are needed for the degree. The CDP must be completed by the time registration starts for the second semester in the program; permission and class numbers to enroll will not be given until the form has been completed and signed by all committee members. The University does not allow graduate students to take 4000- level or lower courses for graduate credit.

## **PERFORMANCE REVIEW**

All MS Thesis and Ph.D. students are required to meet with their Committee Chairperson to discuss their academic and research progress prior to registering for the next semester. Performance Reviews must be submitted to the Academic Advisor (MCE 2012) to receive registration codes for Fall and Spring semesters, beginning with their second semester.

## **TRANSFER OF GRADUATE CREDIT, CREDIT LIMITATIONS**

At the discretion of the student's supervisory committee, six credit hours of graduate work, taken at other institutions, before admission to the regular graduate degree program in Civil & Environmental Engineering at the University of Utah, may be counted toward the M.S. degree if a minimum grade of "B" was obtained. To receive credit, the student's advisor must submit a letter of support to the Department to have the course(s) petitioned to the Admissions Office. If the petition is accepted students must list the course(s) on his/her Application for Admission to Candidacy form or Program of Study.

Students who attend the University of Utah as an undergraduate may have up to 6 credit hours count towards their graduate degree. The credits shall not have been used to complete the requirements for the undergraduate degree. If a student took courses as an undergraduate and would like to have them count towards their degree, then he or she should complete the University's form, Undergraduate Petition for Graduate Credit. This form is located on the Graduate School website.

## GRADES AND PROBATIONARY STATUS

Candidates for all graduate degrees are required to maintain a 3.0 or higher GPA in course work counted toward the degree. Candidates are also required to make forward progress towards their degree. Failure to do so will result in the student being placed on probation. Only one course (maximum of 4 credit hours) with a grade of C+ or C may be accepted for credit toward a graduate degree. If a graduate student's average GPA in courses on his/her approved CDP falls below 3.0, the student will automatically be placed on probationary status. Please see the Probation form on the Department website.

## APPLYING FOR GRADUATION

All graduate students are required to apply for graduation through the Registrar's Office, Graduation Division. The application deadline is the same as the Admission to Candidacy and Program of Study forms: November 1 for Spring; February 1 for Summer; June 1 for Fall. The application can be found on the Department website.

## MASTER OF SCIENCE

### Overview

The degree of Master of Science is awarded for scholarly achievement from either a program of course work or a program of course work and research. There are two Tracks of Master of Science degree: Professional and Research.

	Professional Track		Research Track
	Engineering Management	Coursework Only	
Credit Hours + Thesis	30	30	24 + 6
Core	15	15 - 30	15 - 24
Electives	15	As Required	As Required

The Professional Track requires 30 hours of coursework. A student works with his or her advisor and committee to create a course plan that focuses on the student's area of emphasis. The Research Track has 24 hours of coursework and 6 hours of research (CVEEN 6970, Thesis Research- Masters) that is conducted with close supervision by the student's advisor and committee and results in a thesis that makes a contribution to the student's area of emphasis.

Ph.D. Proposal students take 24 hours of coursework and 6 hours of CVEEN 7910, Ph.D. Research Proposal. The Ph.D. Proposal track will develop the students proposal with close supervision by the student's advisor and committee. Students in the PhD proposal shall meet the Ph.D. requirements listed in the Doctor of Philosophy section under "Research Proposal."

The University of Utah allows, and the Department encourages, students to use peer-reviewed journal quality articles to fulfill thesis requirements. Masters thesis typically consists of at least one journal quality article. Students pursuing this option will produce a thesis that contains the article(s) with additional explana-



tory material and appendices, as necessary. The student's graduate committee is responsible for evaluating their research and publications and determining if their quality merits the degree sought, regardless of the number or status of the articles. Thesis and dissertations shall still meet all formatting requirements and be approved by the graduate school (See "A Handbook for Theses and Dissertations," published by the Graduate School.) Students are encouraged to see the Thesis Editor as they are getting ready to defend their thesis to avoid formatting errors when submitting their final thesis.

All options allow the student to select coursework from one of two areas. The specific course work is defined for each area of study in the Coursework Listings on the Department website. All students must take a minimum of 15 credit hours of coursework from the Core Electives and a minimum of 21 credits from within Civil courses. Research Track students may count 6 credits of research towards the 21 credit requirement. A maximum of 6 credit hours of coursework from a previous degree may be applied to the Core requirement, but they do not reduce the minimum requirement for the degree. At least 6 credit hours shall be taken from 7000 level courses. Students are allowed to count an Independent Study (CVEEN 7930) towards the 7000 level requirement, if approved by their Supervisory Committee. A maximum of 3 credit hours of Independent Study (CVEEN 6930 or 7930) may be counted towards the M.S. graduate degree.

For all M.S. degrees, the courses listed in the CDP shall meet the requirements for the student's area of emphasis. With adequate undergraduate preparation, requirements for the M.S. degree can be completed within three semesters, depending on how early the student initiates a research program. All work for the degree shall be completed within four years.

The number of credit hours registered for research shall reflect the scope of work, not its duration. M.S. Thesis students will have completed six credit hours of research.

## Required Courses

Students in each emphasis area are required to take certain courses. The courses for each area are listed below:

### Environmental

CVEEN 6610, Water Chemistry  
CVEEN 6650, Bioprocess Design

### Transportation

CVEEN 6560, Transportation Planning

### Water Resources

Coursework decided by the Supervisory Advisory Committee

### Infrastructure Group

All M.S. students within the Infrastructure Group must take a total of two courses selected from the list provided below, with the additional requirement that those two courses must be from two different emphasis areas.

### Materials

CVEEN 6225, Concrete Material Science  
CVEEN 6570, Pavement Design  
CVEEN 7560, Advanced Construction Materials



### Structures

CVEEN 6210, Structural Analysis II

CVEEN 6220, Concrete Design II

CVEEN 6230, Steel Design II

### Geotechnics

CVEEN 6310, Foundation Engineering

CVEEN 6330, Soil Dynamics



### Interdisciplinary Track

Students can complete a MS degree that is interdisciplinary. In order to do this track students must petition, in writing, to the Graduate Studies Committee explaining why they would like to complete this track. For more information on this option please see the Academic Advisor.

### **Admission to Candidacy**

A completed Application for Admission to Candidacy for the Master's Degree form containing the student's completed coursework shall be submitted to the Department at least two semesters prior to the semester in which the student expects to complete his/ her graduate study. The plan of study shall meet the requirements of the student's area of emphasis. In addition, satisfactory results shall be achieved in the comprehensive examination, see below for more details. To graduate a specific semester, Candidacy forms must be submitted by November 1 for Spring, February 1 for Summer and June 1 for Fall.

### **Comprehensive Examination**

The comprehensive examination for M.S. Students consists of passing (3) core courses in the student area of emphasis with a grade of "B-". Students who do not pass one or more of their classes will be required to take the written comprehensive exam. Those who are on the Research Track, an oral defense of the students thesis or Ph.D. proposal must also be completed.

In the last semester Thesis Candidates shall:

1. Submit copies of his/her thesis to the members of his/her supervisory committee at least three weeks before the comprehensive examination. Before giving final approval of the thesis, the supervisory committee schedules a public oral examination at which the candidate shall defend the thesis.
2. Pass the oral defense before the end of the semester of graduation. During the oral defense, members of the supervisory committee may ask the student questions related to the thesis, course work and other basic fundamentals.
3. Students are required to defend and submit their thesis to the Thesis Editor by certain dates during the semester they are graduating. Please check the Graduate School website for a list of deadlines

### **Timeline**

This checklist is to be used so you will know when to complete the forms and when they are due:

1. Attend the Department Orientation Meeting.
2. Complete a Supervisory Committee Approval & Curriculum Development Plan (CDP) the first semester in the program. In the CDP determine the 3 courses that will be used for the Comprehensive Exam. To register for the next semester these forms must be submitted before class numbers are given.
3. As needed submit Change of Supervisory Committee Form.
4. As needed submit a Leave of Absence Form, please refer to the Continuous Enrollment section for guidelines.

5. Submit Application for Admission to Candidacy Form & Application for Graduation by:

November 1: Spring Graduation

February 1: Summer Graduation

June 1: Fall Graduation

#6 Is for Non-Thesis Students, 7- 13 is for Thesis students

6. Submit the Report of the Final Examination for the Master's Degree once the Comprehensive Examination courses have been completed.

OR

7. Download "A Handbook for Thesis and Dissertations" ([www.gradschool.utah.edu/thesis/index.php](http://www.gradschool.utah.edu/thesis/index.php)).
8. Schedule the thesis defense with the Supervisory Committee. Submit an acceptable draft of the thesis to the Supervisory Committee at least three weeks before the defense. \*\*Reminder: Students must be registered for at least 3 hours of classes the semester defended. \*\*
9. Once the comprehensive courses and defense are passed, complete the Report of the Final Examination for the Master's Degree.
10. Finalize the Master Supervisory Committee Approval & Final Reading Approval form.
11. Submit the thesis draft to the Thesis Editor. See the Thesis Office website for the exact date for graduate deadlines.
12. Submit final copies to the Thesis Editor.

## DOCTOR OF PHILOSOPHY

### Overview

The degree of Doctor of Philosophy is awarded for scholarly achievement demonstrated by independent research. A Ph.D. candidate shall demonstrate general competence in the subject matter of his/her chosen field and make a significant contribution to the technology through his/her research program.

For a Ph.D. degree program the student's research and the dissertation is the most important part of the degree. The University of Utah allows, and the Department encourages, students to use peer-reviewed journal quality articles to fulfill the dissertation requirement. Dissertations typically consist of at least three journal quality articles. Students pursuing this option will produce a thesis that contains the articles with additional explanatory material and appendices, as necessary. The student's supervisory committee is responsible for evaluating their research and publications and determining if their quality merits the degree sought, regardless of the number or status of the articles. Dissertations shall still meet all formatting requirements and be approved by the graduate school. Students are encouraged to see the Thesis Editor as they are getting ready to defend their dissertation to avoid formatting errors when submitting their final draft.

The time necessary to complete the Ph.D. requirements depends largely on how soon a student initiates research and the degree to which he/she devotes his/her efforts to its pursuit. However, the candidate shall finish his/her dissertation within three years after his/her qualifying examination. Six years is the maximum time allowable for completion of a Ph.D.

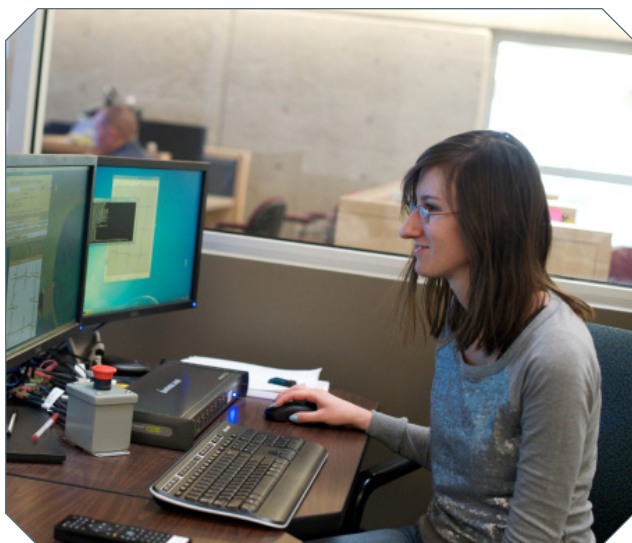
### Residency



The Graduate School requires all Ph.D. students to have at least two consecutive semesters of their program to be spent in full-time academic work at the University of Utah (i.e. Fall-Spring, Spring-Summer, Summer-Fall). Nine credit hours per semester is considered full-time when fulfilling the residency requirement.

## PRELIMINARY EXAM

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### Purpose

The purpose of the Preliminary Examination is to determine the student's overall background and qualifications to continue in the graduate program towards a degree of Doctor of Philosophy. At the time of the examination, the committee shall review the student's curriculum development plan and make any changes deemed advisable.

### Scheduling

The word semester following, denotes either fall or spring semester. The Preliminary Examination is to be taken early in the Ph.D. program so that the Supervisory Committee may change the curriculum development to include needed background and basic courses deemed necessary. An early scheduling also allows a timely determination to be made of the adequacy of the student's understanding of basic principles, synthesis of knowledge, and general academic preparation to successfully pursue the Ph.D. program.

New students enrolled in the Ph.D. program, must take the Preliminary Examination no later than the end of their second semester at the University of Utah. Students who completed their M.S. at the University of Utah may be required by their Supervisory Committee to take the exam no later than the end of the first semester of the Ph.D.-level study. The exam must always be scheduled no later than one semester prior to the expected date of the Qualifying Examination. Students shall be registered for three or more credit hours during the semester of the exam.

If the required date of the Preliminary Examination passes without the examination being attempted, the student must obtain written permission from the Chair of the Department to continue attending civil engineering courses. At the time of taking the Preliminary Examination the student shall have an advisor and Supervisory Committee either proposed or identified.

### Procedure

The examination may be written and/or oral. The student will be told which format will be used and the general topics to be covered before the exam date. The advisor moderates the oral exam, with the Supervisory Committee. The exam shall be open to all faculty. Written examinations may be given to students in groups. The Preliminary Examination addresses prior course work related to each student's major. In many programs, written and primary oral questions will concern material from texts and/or notes which the students have had available for study. Primary questions for an oral exam may be written and given to the student's advisor prior to the examination. Secondary (follow-up) questions are permissible in an oral examination.

### Results

The Supervisory Committee shall determine one of the following: (1) pass the student and recommend a program of study for completing the course work

and for beginning preparations for the Qualifying Examination; (2) recommend a strengthening of the fundamentals in the student's chosen field and outline a course of study for this purpose in which case the examination must be re-taken at a later date as determined by the Supervisory Committee; or (3) terminate the student from the Ph.D. program if they fail twice.

The results of the examination will be recorded in memo format from the advisor, reported to the Department Head, and placed in the student's Departmental file. A student is considered to be a Ph.D. student upon passing the Preliminary Examination.

## COURSEWORK

Ph.D. students are required to take a minimum of 32 total credit hours, beyond a master's degree. A minimum of 18 credits of coursework with twelve (12) hours of coursework at the 7000- level, . Students are allowed to count an Independent Study (CVEEN 7930) towards the 7000 level requirement, if approved by their Supervisory Committee. A maximum of 3 credit hours of Independent Study (CVEEN 6930 or 7930) may be counted towards the Ph.D graduate degree. Students who have completed their master's degree at the University of Utah are allowed to combine 7000 level credits between their Master's and Ph.D. programs. However, this will not decrease the amount of credits required for the degree. The remaining credits may be at the 6000 level from CvEEN or another department. In addition, a minimum of 14 research credit hours for the Ph.D. dissertation shall be earned for the Ph.D. degree. A student's Supervisory Committee can require more hours of a Ph.D. student if they feel it is necessary for them to gain knowledge on their Dissertation topic.

## QUALIFYING EXAM

The purpose of the Qualifying Examination is to determine the student's ability to conduct original and independent research. The content of the Qualifying Examination may include any or all of the following components:

- A written examination
- An oral examination

Additionally, the Qualifying Examination will include a Research Proposal written and presented to the supervisory committee for its consideration and approval. Once the Research Proposal and written/oral examination is passed, the student is advanced to candidacy for the Ph.D. degree and may continue the research component of the doctoral program.

### Scheduling

Students must have passed the Preliminary Examination to become eligible for the Qualifying Examination which should be scheduled no earlier than one semester after the Preliminary Examination date and no later than two semesters prior to the expected final examination date. Students shall be registered for three or more credit hours during the semester of the exam.

### Procedure

The student shall present a written research proposal to each Supervisory Committee member at least three weeks prior to the exam. This document shall be written in a scholarly manner and include a history of the problem, the proposed scope of the investigation, and a statement of the original research contribution.

The exam consists of a formal presentation by the student followed by questions from the Supervisory Committee. The Supervisory Committee determines if the



candidate: (1) has sufficient ability and comprehensive knowledge to conduct the research, (2) has reviewed the literature sufficiently, (3) has proposed research which has a scope worthy of a Ph.D. degree, and which should produce an original and acceptable research contribution.

The student determines the current state of knowledge and identifies unsolved aspects of a topic to do for a research proposal. In consultation with his/her advisor, he/she selects one of the unsolved problems and develops an idea, which might lead to an acceptable solution by means of experimental and/or analytical research. The student then prepares a written proposal, which presents the research problem and a proposed approach to the solution. The proposal should be double spaced and approximately 20 typewritten pages. Additional details of literature review, methodologies, preliminary results, and others requiring additional space may be included as appendices not subject to the page limit.

The student is to get the proposal to the committee members two or three weeks before the proposal defense. Ordinarily the research proposal will be organized as follows:

1. Abstract
2. Introduction
3. Literature Survey
4. Proposed Research Program
5. Nomenclature
6. References

All members of the student's Supervisory Committee, or in the case of necessary absences, substitutes pre-approved by the Graduate School, shall participate in the Qualifying Examination.

## Results

The Supervisory Committee shall (1) approve the research proposed, (2) approve the research proposed with revisions, (3) reject the research proposed with specific reasons given and recommendations, or (4) terminate the student from the Ph.D. program. Results 1 and 2 constitute passage; results 3 and 4 constitute failure. A student is considered to be a Ph.D. Candidate upon passing the Qualifying Examination.

## PROGRAM OF STUDY

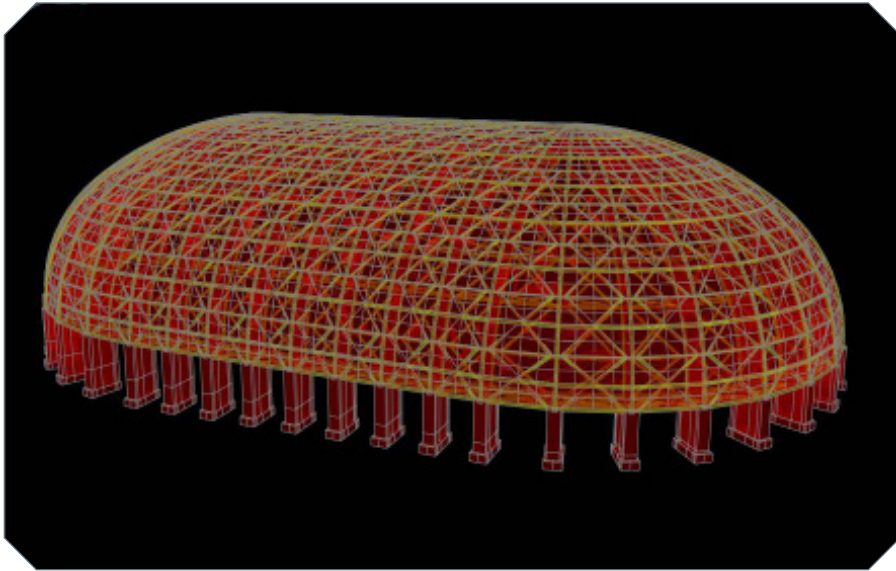
The Graduate School requires students' to submit their Program of Study, to their appropriate department, two months prior to the start of their final semester. The Program of Study must include a record of all the courses taken for the Ph.D. degree. Refer to the section on coursework for minimum requirements. A completed Program of Study form is to be submitted to the Academic Advisor:

November 1 for Spring  
February 1 for Summer  
June 1 for Fall

## DISSERTATION

At the dissertation defense, the candidate formally presents the research in a forum open to all members of the University community and the public at large and defends the research and conclusions against any challenge.





The candidate shall submit an acceptable draft of the dissertation to their advisor at most two years after the qualifying exam. It is assumed that the student has consulted regularly with the advisor in the course of preparing his/her dissertation so that the contents of the dissertation have already been approved.

Detailed instructions concerning the dissertation and the time schedule that shall be followed during the semester of intended completion of the Ph.D. requirements are given in the University of Utah Graduate School Handbook.

## PRESENTATION, EXAMINATION, AND DEFENSE

The student shall consult with the committee advisor to schedule the dissertation defense at least six weeks before the end of the semester the candidate intends to graduate. Candidates shall be registered for three or more credit hours during the semester they defend. The student shall provide a copy of the dissertation to each committee member at least three weeks before the examination date. The copy given to committee members should be a clean, typed copy of the dissertation so that their comments and corrections can be incorporated into the dissertation prior to typing of the final manuscript.

The chair of the student's Supervisory Committee shall introduce the candidate and outline the defense procedure. The candidate shall then present the doctoral research findings to the Supervisory Committee and public. After the presentation, questions will be invited from all present.

As with the Preliminary and Qualifying Examinations, all Supervisory Committee members, or in cases of necessary absences, pre-approved substitute members, shall participate in the final examination.

After the open question-and-answer period, the Supervisory Committee may reconvene in a closed session.

The Supervisory Committee may:

1. Accept the Dissertation as presented, thereby declaring that the candidate has successfully defended the doctoral research and declares the defense complete.
2. Require modification of the Dissertation, giving conditional acceptance.
3. Modification of the Dissertation, and a second defense.

In the event of a Candidate failing a second defense, he or she shall be dismissed from Candidacy.



## PH.D. REQUIREMENTS FOR CANDIDATES WITHOUT A MASTER'S DEGREE

All entering graduate students with a BS degree in Civil Engineering or a related field who express a desire to pursue the Ph.D. program are first admitted to the M.S. program. Admission to Ph.D. candidacy without a master's degree is facilitated through application to the Departmental Graduate Studies Committee after a minimum of 18 graduate credits have been taken as a master's candidate. The Graduate Studies Committee will evaluate the application based on:

1. A written statement containing a brief outline of the PhD Dissertation proposal.
2. The recommendation of the Master's committee.
3. The recommendation of the potential Ph.D. advisor.

If approved, the student will be subject to the regulation and requirements of the Ph.D. program. As a minimum, a student will be required to complete 42 hours of approved coursework and 14 hours of dissertation credits.

## TIMELINE

This checklist is to be used so you will know when to complete forms and when they are due:

1. \_\_\_\_ Attend the Department Orientation Meeting
2. \_\_\_\_ Complete Preliminary Examination during first two semesters. \*\*Students need to be registered for 3 hours the semester they complete their Preliminary Exam.\*\*
3. \_\_\_\_ Complete a Supervisory Committee Approval & Curriculum Development Plan (CDP) the first semester in the program.
4. \_\_\_\_ As needed, submit Change of Supervisory Committee Form.
5. \_\_\_\_ As needed, submit a Leave of Absence Form, please refer to the Continuous Enrollment section for guidelines.
6. \_\_\_\_ Download "A Handbook for Thesis and Dissertations" [www.gradschool.utah.edu/thesis/index.php](http://www.gradschool.utah.edu/thesis/index.php).
7. \_\_\_\_ Complete the Qualifying exam. \*\*Students need to be registered for 3 hours the semester they complete their Qualifying Exam.\*\*
8. \_\_\_\_ Submit the Program of Study & Graduation Application.
9. \_\_\_\_ Schedule the dissertation defense \*\*Reminder: Students must be registered for at least 3 hours of classes the semester defended. \*\*
10. \_\_\_\_ Complete the Ph.D. Supervisory Committee Approval & Final Reading Approval.
11. \_\_\_\_ Submit the dissertation draft to the Thesis Editor.
12. \_\_\_\_ Submit the final dissertation to the Thesis Editor.

## ENVIRONMENTAL ENGINEERING PROGRAM

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### Coursework

Students wishing to pursue a Doctor of Philosophy degree in Environmental Engineering must have a master's degree from a related science or engineering field. For the Doctor of Philosophy degree, students are required to complete a minimum of 18 credits in science or engineering related coursework; post Master's degree, of graduate coursework approved by their supervisory committee. A minimum of 6 credits of advanced level graduate coursework is required.

In addition, students will be required to complete a minimum of 14 Dissertation Research Hours (CVEEN 7970) and be registered for a minimum of 3 credits during the semester of their Qualifying and Final Oral Examinations.

### Supervisory Committee

Ph.D. Supervisory Committees will consist of five voting members. At least three of the voting members must be tenure track affiliated environmental engineering faculty. The fourth member must be a regular faculty member outside the environmental program area. The fifth member can be from within the program or outside the program if this enhances the ability of the committee to supervise the student's work. An individual from the engineering industry may be a voting member with the approval by the Graduate School.

The student's supervisory committee reserves the right to approve or disapprove any changes in the Curriculum Development Plan of the student.

### Degree Requirements

Students are required to complete a Qualifying Examination and a Final Oral Examination prior to graduating. For further information please visit the Department website or contact the Academic Advisor.



# ENVIRONMENTAL ENGINEERING PROGRAM

# NUCLEAR ENGINEERING PROGRAM

## Welcome to the Nuclear Engineering Program at the University of Utah (UNEP)

Nuclear industry, national laboratories, government agencies, nuclear power plants and associated facilities, as well as universities, are facing a huge wave of retirees in addition to the renaissance of nuclear engineering and science that is bringing a new demand for long-term, profitable nuclear engineering careers both as workers and as entrepreneurs. Although the standard nuclear engineers are expected to have a college degree in nuclear engineering, the 21<sup>st</sup> century projects a demand for different profiles; more diversified and broad knowledge gained through dual degrees, such as a combination of a major in any relevant discipline with the minor in nuclear engineering. The relevant disciplines are mainly: civil and environmental engineering, chemical engineering, computer engineering, materials engineering, mechanical engineering, electrical engineering, bioengineering, computer science, physics, and chemistry. An even higher demand is for students in the other disciplines to complete master and or doctoral degrees in nuclear engineering. The nuclear engineering jobs are found not just in nuclear industry, at nuclear power plants, or national labs, but nuclear engineers are in demand in nuclear medicine, radiopharmaceutical industry, space engineering, homeland security, waste management, and the fuel cycle (to mention just a few).

Our program is unique in offering a comprehensive but condensed minor in nuclear engineering, that can be completed in 3 semesters, and a unique graduate program with various options (the graduate program has been revised and the updated Graduate Program Handbook is available at <http://www.nuclear.utah.edu/nep.html> ). The program houses great laboratories and facilities. The facilities includes one of thirteen (13) TRIGA reactors operating at a university in the nation. The program also offers professional training to be a Senior Reactor Operator (SRO). This is one of our major advantages in preparing graduates for nuclear workforce; a hands-on experience and practical understanding of nuclear engineering field is as well supported through the advanced laboratory equipment and novel safety related software training tools. As you can see the Utah Nuclear Engineering Program is the place to be.

Welcome!!



*Tatjana Jevremovic, PhD  
Chair Professor and Director  
Utah Nuclear Engineering Program (UNEP)*

## UNEP MISSION

*The mission of the UNEP is to provide the highest quality environment in fostering education, research, and training in nuclear engineering by creating opportunities for creative and critical thinking in building technically challenging, innovative, and leadership skills in our students, as well as, in assuring life-long learning skills are supported by experiential training and hands-on schooling for innovation to our profession in benefiting the State of Utah, Nation and the World.*

## UNEP VISION

*The faculty and staff of the Nuclear Engineering Program at the University of Utah (UNEP) are committed to excellence in providing and sustaining high quality education, research and training programs with the forefront achievements in preparing nuclear engineers to provide effective, yet innovative solutions to the national and world's challenges in sustaining safe and reliable energy generation, advancing human health condition, and safeguarding the nation, in care for all segments of contributing to advanced and safe human lives.*

*Graduate students together with UNEP staff and faculty, strive collegially to inspire, teach, and train the next generations of nuclear engineers through the exploration of innovative ideas, solutions, and creation of new technologies in support of positive change of improved conditions for sustainable, safe, and healthy human lives.*

## PROGRAM HISTORY

*The nuclear engineering program at the University of Utah was established over 40 years ago with the goal to provide engineering education to students that would enable the State of Utah to grow and contribute to the overall national need for nuclear engineers.*

*The Nuclear Engineering Program underwent a dramatic transformation in the Fall of 2009 with the goal to expand the Program curriculum and develop new research endeavors attractive to current student generations while addressing the needs and expectations of the today's nuclear industry in the nation and world-wide. The Program includes:*

- Nuclear Engineering Minor developed in 2009 and approved by the Board of Regents in May of 2010; the Program started in Fall of 2010 with the goal to provide a unique education for engineers in demand by the State, nation and the world;*
- Senior Reactor Operator Training Program established in 2010 with the goal to prepare the students in obtaining their licenses to operate our TRIGA reactor;*
- Graduate Program Curriculum advanced in spring of 2010 to meet the challenges of the 21st century nuclear industry and national needs including but not limited to: safe, secured and green energy; advancement in medicine; materials science and engineering; space science and engineering; nuclear forensics; radiochemistry; nuclear detections; and agriculture. From a handful number of graduate students in Fall 2009, the UNEP graduate student body increased to 35 as of Fall 2013.*
- Outreach Program revitalized in reaching students from elementary to high school students, other universities, governmental organizations, industry and first responders in the region and beyond.*

## UNEP COURSES

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The graduate curriculum and the optional courses for the Minor in Nuclear Engineering are enriched with a number of courses. These courses are modern, and they fulfill the expectations of the government agencies in preparing the new generation of nuclear engineers. With these changes our program is filling the competency gaps in nuclear engineering and science education for the 21<sup>st</sup> century:

- (a) Nuclear principles in engineering and science, a basic and introductory course in nuclear engineering minor or MS studies, connects the concepts in physics, quantum mechanics, radiation transport, mathematics, computational science and engineering, chemistry, civil engineering, concrete industry, environmental engineering, mechanical engineering, electrical engineering, biology, bioengineering, nuclear medicine and health physics;
- (b) Fundamental principles and concepts of neutron based engineering with hands-on-experience related to medical sciences (such as but not limited to cancer diagnostics and cancer treatment), nuclear engineering power including design, modeling, and visualizations of nuclear and neutron transport processes in nuclear power, and research reactor devices, neutron detections, neutron radiography practical use of our research reactor, in analyzing elemental compositions of any sample you may wish to bring to us and many more;
- (c) Knowledge to safeguard-related technologies, nuclear forensics and special nuclear material detections;
- (d) Basic knowledge and experimental learning pertaining to radiochemistry and radioactive waste engineering;
- (e) Theoretical, computational, and experimental understanding of reactor physics using TRIGA reactor and modern technologies;  
TRIGA providing endless opportunities for cutting edge research, training
- (f) and hands-on experimental learning.

## NUCLEAR ENGINEERING MINOR

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There are currently less than 50 universities in the United States that offer undergraduate or graduate degrees in Nuclear Engineering. The University of Utah is the only university in Utah currently providing a Nuclear Engineering degree.

### About the Minor

The Minor in Nuclear Engineering was developed to respond to the expectations imposed by the nuclear industry and government agencies in preparing a new generation of nuclear engineers for diversified jobs in the state of Utah, nation and the world. Our program is unique because of facilities housed by UNEP: the research reactor TRIGA, radiochemistry laboratories, optical microscopy laboratory, nuclear forensics laboratory, nuclear detection laboratory, radiation measurement laboratory and advanced computational platform available to all students.

### Requirements for Nuclear Engineering Minor at UNEP

The UNEP minor in Nuclear Engineering requires eighteen (18) course credit hours and two (2) UNEP Seminar credit hours. The Minor contains four (4) core courses, a total of 12 credit hours, and two more courses, a total of six (6) credit hours, either from the list of UNEP courses or major courses approved by the UNEP Director. Check with your department to see if any of the core courses may be counted towards your technical electives.



Core Courses			
Course Number [Offered]	Credit Hours	Course Title	Grade
NUCL 3000 [Fall]	3	Nuclear Principles in Engineering & Science	
NUCL 3100 [Spring]	3	Neutron-Based Engineering	
NUCL 3200 [Spring]	3	Radiochemistry with Laboratory I	
NUCL 4000 [Fall/Spring]	3	Nuclear Science and Engineering using TRIGA	
NUCL 5999 [Fall/Spring]	1	UNEP Seminar	
NUCL 5999 or 6999 [Fall/ Spring]	1	UNEP Seminar	

## UNIQUE OPPORTUNITIES FOR MINOR STUDENTS AT UNEP OR ANY OTHER UNDERGRADUATE STUDENTS

There are currently less than 50 universities in the United States that offer undergraduate or graduate degrees in Nuclear Engineering. The University of Utah is the only university in Utah currently providing a Nuclear Engineering degree.

### Safety Culture Certificate(s)

From Fall 2012, UNEP became the only program in the nation that houses a nuclear reactor research facility that operates under the Corrective Action Program platform. The same platform that is used at nuclear power plant facilities. Under the DevonWay "Track & Trace" system, the UNEP trains students in tracking every action at the facility associated with the operation of the reactor, class labs, faculty and students' research, and the operation and use of the associated labs. The dynamic learning activity is a newly developed approach to train UNEP students in safety pertaining to nuclear industry, nuclear research, and nuclear training. Students may receive certificates of importance for their future jobs.

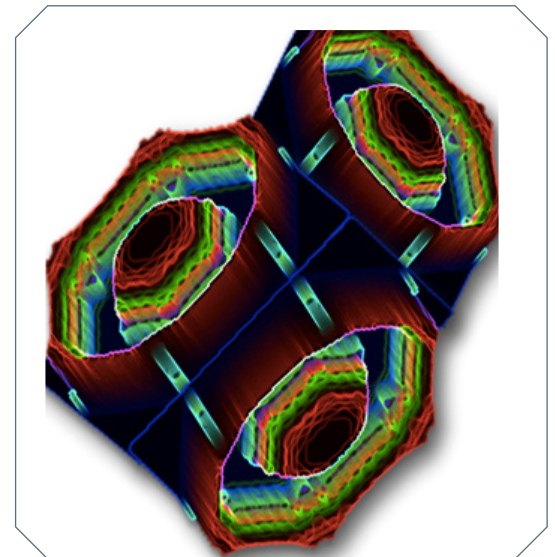
### Reactor operator license (RO/SRO)

Students may obtain a license to operate our reactor. These two classes (NUCL6060 and NUCL6061) may count toward the Minor degree. The U.S. Nuclear Regulatory Commission issues the license after the exam is passed.

Students only interested in training for the RO/SRO license are encouraged to contact the UNEP Director for more details.

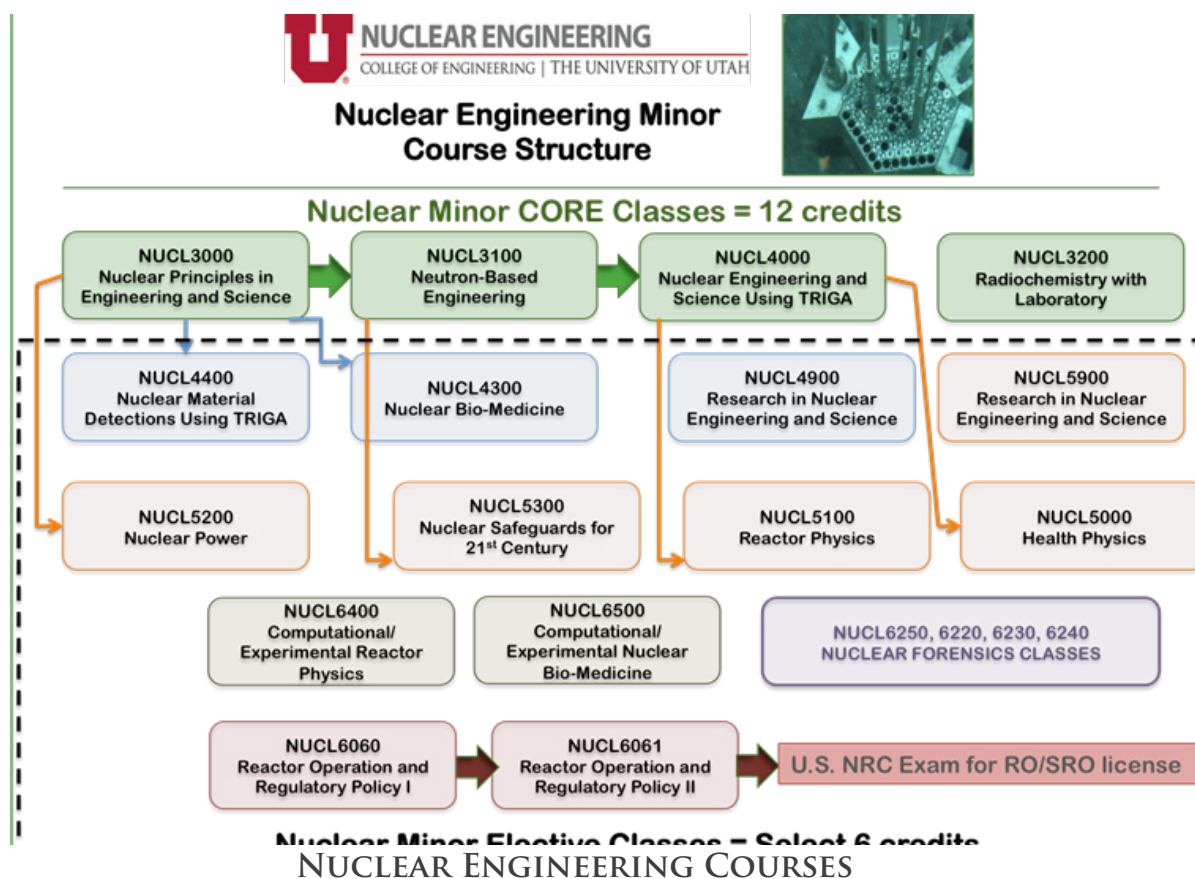
### Reactor operator license (RO/SRO)

At UNEP we provide the students with the unique opportunity to perform research and become members of our on-going research team projects. Two classes, NUCL4900 and NUCL5900, both titled: 'Research in Nuclear Engineering', provide undergraduate students with a variety of research topics ranging from numerical, theoretical, and experimental projects in using our facilities. Students who develop good research results are always encouraged to attend the American Nuclear Society Student Conference (at a minimum) to present their results. Such travels are fully funded by the American Nuclear Society Utah Student Chapter.



## NUCLEAR ENGINEERING MINOR FLOWCHART

The following chart is the course structure for students wishing to complete the Minor In Nuclear Engineering:



The following are courses that the Nuclear Engineering Program teaches for Undergraduate and Graduate students.

NUCL 3000/5030: Nuclear Principles in Engineering and Science  
 NUCL 3100/5031: Introduction to Neutron-Based Engineering  
 NUCL 3200/5032: Radiochemistry with Laboratory I  
 NUCL 4000/6040: Nuclear Engineering & Science Using TRIGA  
 NUCL 5999/6999/7999: UNEP Seminar Series

NUCL 4200: Radiochemistry with Laboratory II  
 NUCL 4300: Nuclear Bio-Medicine  
 NUCL 4400: Nuclear Material Detections Using TRIGA  
 NUCL 4900: Research in Nuclear Engineering & Science

NUCL 5000: Health Physics  
 NUCL 5100: Reactor Physics  
 NUCL 5200: Nuclear Power  
 NUCL 5300: Nuclear Safeguards for 21<sup>st</sup> Century  
 NUCL 5900: Research in Nuclear Engineering & Science

NUCL 6100: Nuclear Environmental Engineering  
 NUCL 6200: Nuclear Material Detections Using TRIGA II  
 NUCL 6300: Radioactive Waste Engineering  
 NUCL 6400: Computational Reactor Physics  
 NUCL 6500: Computational/Experimental Nuclear Bio-Medicine  
 NUCL 6060: Reactor Operation and Regulatory Policy I\*  
 NUCL 6061: Reactor Operation and Regulatory Policy II \*

\*In preparation for SRO License

## NUCLEAR ENGINEERING GRADUATE PROGRAM

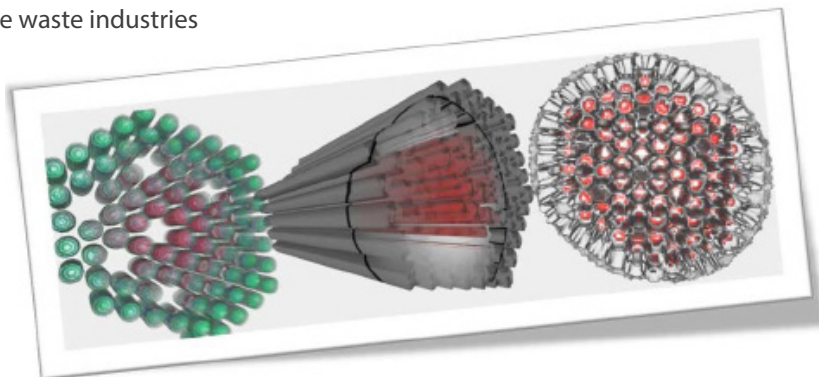
UNEP offers an independent graduate program in nuclear engineering. The 21st century nuclear engineers need to have cross-disciplinary skills. The University of Utah Nuclear Engineering Program curriculum assures a broad understanding of basic engineering principles with applications in nuclear engineering. The program is challenging, multidisciplinary, and research-oriented. UNEP is passionate about the nuclear engineering discipline, and we are focused on discovery and innovation, built on a foundation of knowledge and skills.

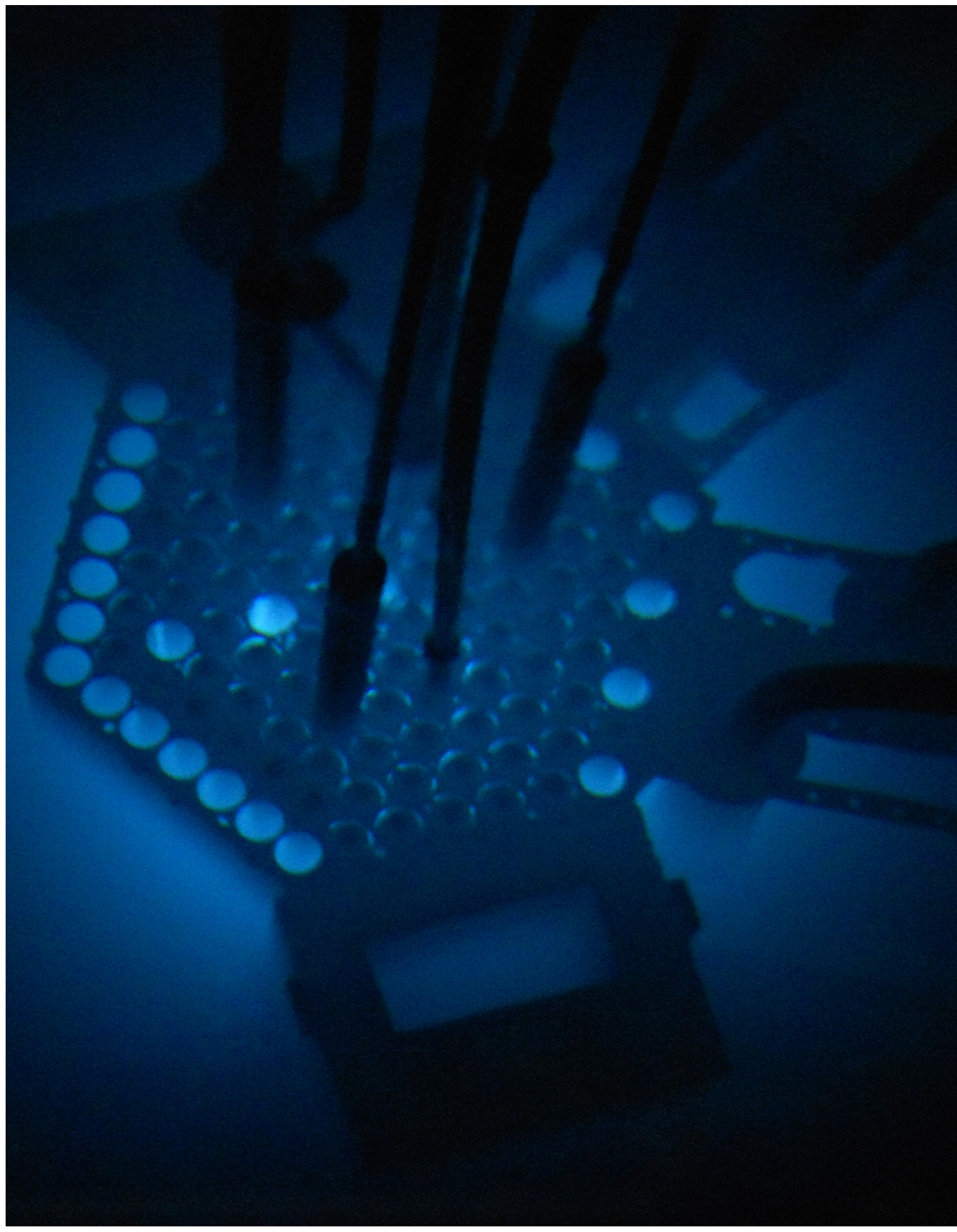
UNEP has developed a nuclear engineering curriculum that fills critical educational and competency gaps for engineers and scientists involved in the nuclear power and radioactive waste industries, nuclear medicine, homeland security, radiation, and nuclear materials detection. UNEP has an undergraduate minor and a graduate program in nuclear engineering. The requirements for Master of Science (MS) and Doctor of Philosophy (Ph.D.) degrees are established to meet the expectations of nuclear industry in the state of Utah, the nation, and the world.

### Research Focus Areas

The following are research areas in which the UNEP is currently participating. If you have a specific area that you are interested in and you do not find it listed below you can check out the program website or email the UNEP Director at: [tatjana.jevremovic@utah.edu](mailto:tatjana.jevremovic@utah.edu).

- Advanced reactor modeling, simulations, visualizations
- Experimental nuclear engineering
- FPGA design for neutronics simulations and modeling
- Nuclear materials detection
- Development of detectors
- Novel approaches in advancing cancer treatment
- Retrospective dose methodologies
- Radiation hardening
- Nuclear sensors
- Radiochemistry
- Radiobiology
- Environmental transport and monitoring of radionuclides
- Nuclear forensics
- Nuclear safeguards
- Commercial Neutron Activation Analysis (NAA)
- Modern teaching methods for Nuclear engineers
- Radiation transport
- New materials for nuclear power and radioactive waste industries
- Space Engineering
- Novel nano- nuclear engineering applications





## LIST OF COURSES OFFERED

The following is the current list of courses being offered by the CvEEN Department. To find the course descriptions please go to the Online Course Catalog off of the University of Utah website, [www.utah.edu](http://www.utah.edu).

1000 Introduction to Civil and Environmental Engineering  
2010 Statics  
2020 Dynamics  
2130 Statistics/Economics  
2140 Strength of Materials  
2240 Surveying and Global Positioning  
3000 Junior Seminar  
3100 Technical Communication for Engineers  
3210 Structural Loads and Analysis  
3310 Geotechnical Engineering I  
3410 Hydraulics  
3510 Civil Engineering Materials  
3520 Transportation Engineering  
3610 Introduction to Environmental Engineering  
4000 Senior Seminar  
4221 Concrete Design I  
4222 Steel Design I  
4410 Engineering Hydrology  
4890 Cooperative Education  
4910 Professional Practice and Design  
4999 Honors Thesis/Project  
5110 GIS Applications in Civil & Environmental Engineering  
5210 Structural Analysis II  
5220 Concrete Design II  
5230 Steel Design II  
5240 Reinforced Masonry/Timber Design  
5305 Introduction to Foundation Engineering  
5420 Open-Channel Flow  
5510 Highway Design  
5555 Engineering Seminar  
5560 Transportation Planning  
5570 Pavement Design  
5605 Water and Wastewater Treatment Design  
5610 Water Chemistry and Laboratory Analysis  
5810 Cost Estimating and Proposal Writing,  
*is made possible by an endowment from the Clyde Companies*  
5820 Project Scheduling,  
*is made possible by a partial endowment from Jacobsen Construction*  
5830 Project Management and Contract Administration,  
*is made possible by an endowment from Floyd & Jeri Meldrum*  
5850 Engineering Law and Contracts  
5920 Special Topics (1 to 4)  
5930 Independent Study (1 to 5)  
6110 GIS Applications in Civil & Environmental Engineering  
6120 Numerical Methods Applications in CvEEN  
6210 Structural Analysis II  
6220 Concrete Design II  
6225 Concrete Material Science  
6230 Steel Design II  
6240 Reinforced Masonry/Timber Design  
6250 Dynamics of Structures and Earthquake Engineering  
6260 Applied Probability and Statistics  
6270 Computer-Aided Structural Analysis  
6305 Introduction to Foundation Engineering

# LIST OF COURSES

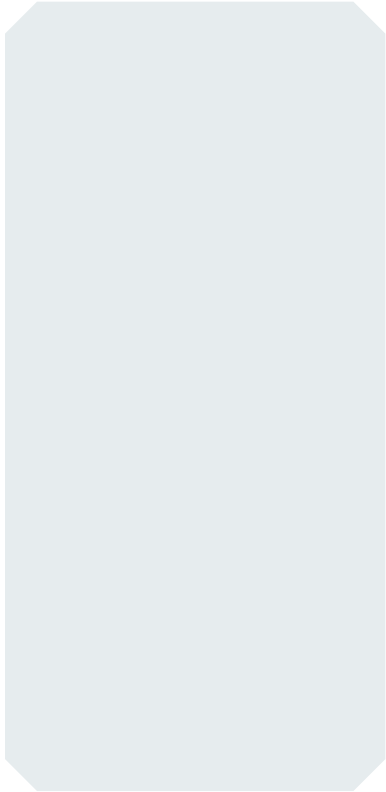
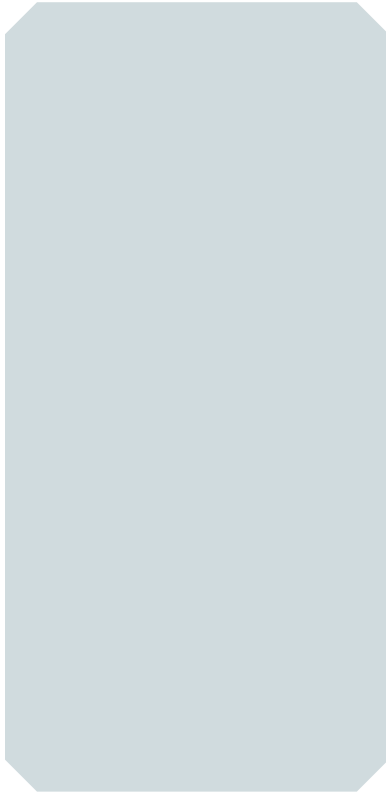


6310 Foundation Engineering  
 6330 Soil Dynamics  
 6340 Advanced Geotechnical Testing  
 6350 Soil Improvement and Stabilization  
 6410 Watershed Modeling  
 6430 Stormwater Management and Design  
 6440 Water Distribution Systems Design  
 6450 Snow Hydrology  
 6460 Sustainable Urban Water Engineering  
 6470 Surface Water Quality Prediction and Assessment  
 6480 Hydrotopia: Water Management in the West  
 6490 Water and Wastewater Lab Practices  
 6510 Highway Design  
 6525 Highway and Traffic Engineering  
 6530 Quantitative Methods in Transportation Operation  
 6550 Pavement Distress and Rehabilitation  
 6555 Engineering Seminar  
 6560 Transportation Planning  
 6570 Pavement Design  
 6600 Solid and Hazardous Waste Engineering  
 6603 Biochemical Engineering  
 6605 Water and Wastewater Treatment Design  
 6610 Water Chemistry and Laboratory Analysis  
 6630 Environmental Bioremediation  
 6640 Environmental Laboratory Analysis  
 6650 Design of Biological Treatment Processes  
 6660 System Dynamics and Environmental Policy  
 6810 Cost Estimating and Proposal Writing,  
       *is made possible by an endowment from the Clyde Companies*  
 6820 Project Scheduling,  
       *is made possible by a partial endowment from Jacobsen Construction*  
 6830 Project Management and Contract Administration,  
       *is made possible by an endowment from Floyd & Jeri Meldrum*  
 6850 Engineering Law & Contracts  
 6920 Advanced Topics (1 to 6)  
 6930 Advanced Independent Study (1 to 5)  
 6970 Thesis Research: Master's (1 to 9)  
 6980 Faculty Consultation (1 to 3)  
 7225 Prestressed Concrete Design  
 7230 Advanced Topics in Steel Design  
 7235 Bridge Design  
 7240 Structural Dynamics  
 7250 Structural Earthquake Engineering  
 7255 Advanced Dynamics of Structures  
 7260 Seismic Rehabilitation of Reinforced Concrete Buildings  
 7310 Advanced Foundation Engineering  
 7330 Geotechnical Earthquake Engineering  
 7360 Advanced Soil Mechanics  
 7410 Flood Modeling and Simulation  
 7420 Water Resources Field Measurements  
 7430 Advance Subsurface hydrologic Modeling  
 7440 Urban Watershed Management  
 7450 Carbon Sequestration Engineering and Science  
 7470 Systems Analysis Applications in Water Resources and Environmental Engineering  
 7520 Transportation Safety  
 7540 Intelligent Transportation Systems  
 7545 Transportation Modeling  
 7560 Advanced Construction Materials  
 7570 Pavement Maintenance and Rehabilitation  
 7580 Advanced Technical Communication

7590 Public Transportation Systems  
 7610 Advanced Bioprocess Systems  
 7620 Physical and Chemical Treatment Processes for Water Quality Control  
 7630 Wastewater Treatment and Microbiology Lab  
 7660 Water Reuse for Stainability  
 7680 Design of Municipal Water and Wastewater Treatment Systems  
 7690 Design of Industrial Water and Wastewater Systems  
 7910 PhD Research Proposal (1-9)  
 7920 Advanced Topics (1 to 6)  
 7930 Advanced Independent Study (1 to 5)  
 7970 Thesis Research: Ph.D. (1 to 9)  
 7980 Faculty Consultation (1 to 3)  
 7990 Continuing Registration: Ph.D.

The following is the current list of courses being offered by UNEP. To find the course descriptions please go to the Online Course Catalog off of the University of Utah website, [www.utah.edu](http://www.utah.edu).

3000 Nuclear Principles in Engineering and Science  
 3100 Introduction to Neutron-Based Engineering  
 3200 Radiochemistry with Laboratory I  
 4000 Nuclear Engineering & Science Using TRIGA  
 4300 Nuclear Bio-Medicine  
 4400 Nuclear Material Detections using TRIGA, I  
 4900 Research in Nuclear Engineering & Science  
 5000 Health Physics  
 5030 Nuclear Principles in Engineering & Science  
 5031 Introduction to Neutron-Based Engineering  
 5032 Radiochemistry with Lab I  
 5100 Reactor Physics  
 5200 Nuclear Power  
 5300 Nuclear Safeguards for 21st Century  
 5900 Research in Nuclear Engineering and Science (1-3)  
 5999 UNEP Seminar Series  
 6040 Nuclear Engineering and Science Using TRIGA  
 6060 Reactor Operation and Regulatory Policy I  
 6061 Reactor Operation and Regulatory Policy II  
 6100 Nuclear Environmental Engineering  
 6400 Computational Reactor Physics  
 6500 Computational/Experimental Nuclear Bio-medicine  
 6970 Thesis Research- Masters (1-9)  
 6999 UNEP Seminar Series  
 7100 Nuclear Instrumentation with Labs  
 7200 Radiation Transport  
 7970 Thesis Research- PhD (1-9)



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