

# **Graduate Handbook For Nuclear Engineering**



**University of Pittsburgh**  
<http://www.me.pitt.edu/>

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## **THE NUCLEAR ENGINEERING GRADUATE PROGRAM**

The Department of Mechanical and Materials Science offers graduate studies in advanced nuclear engineering. The graduate faculty is committed to high-quality research and teaching. The curriculum is an integrated program of study in applied sciences, applied mathematics, and modern computational procedures that are relevant to the research emphasis in the department. The research is focused on three major areas: (1) Nuclear Energy Technology (2) Operations and Safety (3) Nuclear Materials (4) Nuclear Modeling and Simulations and (5) Radiology and Radiochemistry.

## **DEGREE PROGRAMS**

An application for the MS program is judged on the student's prior academic record, GRE scores, the accreditation of the prior degree granting school, and the capability of the department to match the applicant's interest with the program. A foreign national student who did not receive his or her Bachelor of Science from an accredited U.S. institution is required to take the TOEFL exam and receive a score of at least 550 (213 for the computer-based exam / 79-80 internet-based exam) or the International English Language Testing System (IELTS) and receive a minimum result of Band 6.5 as well as the GRE. Students with a Bachelor of Science degree in another engineering field, mathematics, or physics will also be considered for the graduate program with the possibility that prerequisite courses may be required. A part-time program is available for students who are employed in local industries. Part-time students usually carry from three to six credits per term in either day or evening classes.

Applicants who do not meet these requirements will be considered on an individual basis with strong emphasis given to academic promise, career orientation, work experience, and preparation in engineering and related disciplines. In some cases, applicants may be admitted provisionally until certain deficiencies in either coursework or academic achievement are satisfied.

### **Master of Science Program**

Upon entering, the student plans a program of study with the aid of the faculty advisor. The course requirements can be met by either the

- (1) Thesis Option (Research M.S.Track):  
21 course credits  
3 ME 2997  
6 ME2999  
30 Credits

Or the

- (2) Non-Thesis Option (Professional M.S.Track): 30 course credits.

### **Thesis Option (Research M.S. Track)**

The research M.S. track is primarily for those students who wish to advance the technology. Students in this track will be advised to take those courses best suited for the research degree. Full time graduate students who are supported by department scholarships must choose the research M.S. track. Each candidate must provide a suitable number of copies of the thesis for review and use as designated by the thesis examining committee, consisting of at least three members of the faculty recommended by the major advisor and approved by the department chair. The major advisor must be a Mechanical Engineering or Material Science Faculty member with an appointment in the Mechanical Engineering and Materials Science Department. Nonnative English speakers are encouraged to take ENGR 2050 Technical Writing (however this course does not count toward graduation). The final oral examination in defense of the master's thesis is conducted by the thesis committee, and a report of this examination signed by all members of the committee must be filed in the office of the dean. After the examination, the approved ETD must be deposited to the ETD Online System where it will be reviewed by the ETD Student Services Staff in the dean's office of the student's school and submitted for microfilming and deposit in the University Library System. A receipt for the ETD processing/microfilming fees and any necessary paperwork must be submitted to the appropriate ETD Staff in the Office of Administration.

## **Non-Thesis Option (Professional M.S. Track)**

The professional MS programs are oriented toward full-time students seeking a career in industry, and part-time students currently working in industry. Full-time GSR-supported students might change to professional M.S. track, upon request/approval by the sponsoring faculty advisor and the graduate program. Professional master's degrees are conferred upon those students who demonstrate comprehensive mastery of their general field of study. The professional master's degrees normally require the satisfactory completion of at least 30 course credits of graduate study approved by the department.

No more than six credit hours may be granted to a student as transfer credit for work done at another accredited graduate institution. (See Acceptance of Transfer Credits section for further detail.) MS/MBA students are limited to transferring six credit hours. All credits earned in the ME master's degree program must be at the graduate level (the 2000 or 3000 series courses).

**Master's degrees are conferred only on those students who have completed all course requirements with at least a 3.00 QPA.**

(Visit <http://www.bulletins.pitt.edu/graduate/index.html>) for further detail.  
<http://www.bulletins.pitt.edu/graduate/index.html>

In either case, students seeking the Master of Science degree in Nuclear Engineering must take at least one of the mathematics courses, **ME 2001, ME 2002 or ME / ECE 2646**. Up to nine (six for MS/MBA students) graduate credits from other engineering, mathematics, or physics departments may be used in fulfilling the remaining course requirements. The MS/MBA students are also required to complete an integrated project course. Please contact the Graduate Director for a copy of the guidelines for the integrated project course.

### **Subject Course List**

#### **Nuclear**

ME 2100 Fundamentals of Nuclear Engineering  
ME 2101 Nuclear Core Dynamics  
ME 2102 Nuclear Plant Dynamics and Control  
ME 2103 Integration of Nuclear Plant Systems with the Reactor Core  
ME 2104 Nuclear Operations Safety  
ME 2105 Integrated Nuclear Power Plant Operations  
ME 2110 Nuclear Materials  
ME 2115 Heat Transfer & Fluid Flow In Nuclear Plants  
ME 2120 Mathematical Modeling of Nuclear Plants  
ME 2125 Case Studies in Nuclear Codes and Standards  
ME 2130 Environmental Issues and Solutions for Nuclear Power

## •New Graduate Courses in Development

•ME 2118: BOILING WATER REACTOR THERMAL-HYDRAULICS AND SAFETY

•ME 2119: PRINCIPLES OF NUCLEAR PROJECT MANAGEMENT

•ME 2126: NUCLEAR QA

## Graduate Certificate in Nuclear Engineering

### Overview

The renaissance of nuclear science and technology in the United States has created a need in the marketplace once again for engineers with nuclear knowledge. The University of Pittsburgh aims to meet these marketplace needs by preparing engineers through the graduate certificate in nuclear engineering.

Classes are taught by current and former nuclear engineers, including faculty with experience conducting commercial nuclear operations programs for Westinghouse and with certifications from the US Nuclear Regulatory Commission.

### Objectives

The objectives of the nuclear engineering certificate are:

To develop the advanced competencies needed by science and engineering graduates to contribute quickly and effectively to the renaissance of nuclear science and technology in the United States and abroad, and

To create a benchmark educational program that can serve as a model throughout academia.

This program provides coursework for graduate level nuclear engineering education with a focus on nuclear operations and safety. The certificate may be combined with graduate courses in any one of the School's seven MS degree programs (Bioengineering, Chemical, Civil, Electrical and Computer, Industrial, Materials Science and Mechanical Engineering) or as a post-baccalaureate certificate. This focus on nuclear operations and safety not only fulfills a recognized educational need, but is also designed to take advantage of unique industrial resources in the Pittsburgh area which will greatly facilitate student learning.

The program will be sufficiently flexible to accommodate students from a wide spectrum of engineering disciplines. Since all nuclear courses are cross-listed as Mechanical Engineering Courses, they count both toward a Nuclear Certificate and a MS or PhD degrees.

### Requirements

**Nuclear Certificates are conferred only on those students who have completed all course requirements with at least a 3.00 GPA.**

All students must successfully complete five of the following nuclear courses in order to earn the graduate certificate:

- **ME2100 Fundamentals of Nuclear Engineering**
- **ME2101 Nuclear Core Dynamics**
- **ME2102 Nuclear Plant Dynamics and Control**

- **ME2103 Integration of Nuclear Plant Systems with the Reactor Core**
- **ME2104 Nuclear Operations Safety**
- **ME2105 Integrated Nuclear Power Plant Operations**
- **ME2110 Nuclear Materials**
- **ME2115 Heat Transfer and Fluid Flow in Nuclear Plants**
- **ME2120 Mathematical Modeling of Nuclear Power Plants**
- **ME2125 Case Studies in Nuclear Codes and Standards**
- **ME2130 Environmental Issues and Solutions for Nuclear Power**

**(Course Descriptions available under Graduate Mechanical Engineering Courses)**

### **Who May Apply**

Practicing engineers currently in or aspiring to a leadership role in the nuclear industry,

Engineering professionals who desire graduate level education in nuclear engineering with a focus on safe nuclear plant operations,

New graduates with a minimum of a bachelor's degree in a technical discipline, and

Professionals who manage multidisciplinary teams for project design or management in the nuclear industry.

### **How to Apply**

At the University of Pittsburgh, any student pursuing a Master's degree in the Swanson School of Engineering may pursue the graduate certificate in nuclear engineering as a focus track. It is also possible for individuals who wish to achieve the certificate only to apply as well (post-baccalaureate certificate). A minimum GPA of 3.0 for undergraduate degree is recommended. To apply, please see below.

### **Graduate certificate of Nuclear engineering Admission Requirements**

United States citizens or permanent residents should follow this procedure:

Print the forms available on the following website:

[http://www.engr.pitt.edu/mems/graduate/nuclear-certificate\\_admissions.html](http://www.engr.pitt.edu/mems/graduate/nuclear-certificate_admissions.html). Indicate certificate (and any other degrees in which you are interested in the application. Return the completed application material with a check or money order (not cash) in the amount of \$50 payable to the University of Pittsburgh (The fee for a Special Student application is \$50). The application fee is non-refundable.

Ask the registrars of all undergraduate and graduate schools attended to send transcripts of records to the School of Engineering Office of Administration, 749 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15261. An official transcript of the undergraduate record is required even though the applicant may not intend to work towards a degree. A graduate of the

University of Pittsburgh need not request the University registrar to send a transcript of the undergraduate record.

Action will be taken after receipt of the completed application materials, including the application fee, and complete transcripts of work done in previous undergraduate and graduate curricula. The deadline for the fall term is March 1; the spring term deadline is July 1; and the summer term deadline is February 1. We ask that International Students send in their application materials at least two months before the posted deadlines. Applications received after the deadline will be considered on an individual basis.

### **Special Student Status**

Students who are seeking advanced degrees but who are unable to meet the deadline for filing all required credentials for admission may be granted temporary admission provided they present acceptable evidence concerning their qualifications for graduate study.

Regular admission must be accomplished within the first term of registration.

Students who are not seeking an advanced degree but who have specific qualifications for one or more courses, including courses required for learning or certification, may register for such courses subject to review by the department and the dean of the school. If a student should apply for admission to a degree program, a maximum of 6 credits may be applied toward a graduate degree.

### **Who to contact**

If you have questions about the curriculum, please contact **Dr. Larry Foulke**, Interim Director of Nuclear Programs, at [lrf4@pitt.edu](mailto:lrf4@pitt.edu) (412) 624-9799.

If you have questions about registration, please contact the Graduate Administrator, **Ms. Carolyn Chuha**, at [cac90@pitt.edu](mailto:cac90@pitt.edu) or (412) 624-9722.

## GRADUATE NUCLEAR ENGINEERING COURSES

### Masters Level Courses

**ME 2001      DIFFERENTIAL EQUATIONS      3 cr.**

Ordinary differential equations; series solutions of differential equations; introduction to partial differential equations.

Prerequisite: MATH0290 or equivalent.

**ME 2002      LINEAR AND COMPLEX ANALYSIS      3 cr.**

Linear analysis including linear algebra, vector spaces and linear transformations, and vector analysis. Complex analysis including analytic functions of a complex variable, infinite series in the complex plane, and conformal mapping. Calculus of variations.

Prerequisites: MATH0280, MATH0290 or equivalent.

**ME 2060      NUMERICAL METHODS      3 cr.**

Introduction to numerical techniques for the solution of linear and non-linear equations, numerical integration and differentiation, interpolation, ordinary and partial differential equations, and eigenvalue problems.

Prerequisites: MATH0290 or equivalent and computer programming experience.

**ME 2085      GRADUATE SEMINAR      0 cr.**

Designed to acquaint graduate students with various subjects in advanced mechanics and current graduate-level research mechanical engineering; aspects of graduate-level engineering and applied mechanics not normally encountered in classes.

**ME 2094      PRACTICUM      1 cr.**

This course is designed to provide students who are engaged in thesis or dissertation research an opportunity to participate in an internship with an external organization (industry or government laboratory). The internship must be related to the thesis or dissertation research. See more detailed description on the following page. Prerequisites: Approval of advisor and Graduate Director.

**ME 2095      GRADUATE PROJECTS      1 to 15 cr.**

A special problem or reading course of individual study guided by the student's major advisor. Topics selected from any phase of mechanical engineering not covered in the regular MS-level courses.

**ME 2097      SPECIAL STUDY      3 cr.**

Special topics of particular importance to an individual's plan of study.

Prerequisite: Approval of advisor.

**ME/ECE 2646 LINEAR SYSTEMS THEORY      3cr.**

Linear spaces and operators, mathematical descriptions of linear systems, controllability and observability, irreducible realization of rational transfer-function matrices, canonical forms, state feedback and state estimators, stability.

Prerequisites: Knowledge of linear algebra, differential equations, and feedback control systems

**ME 2997      MS RESEARCH      3 cr.**

Students prepare a literature survey on a major research problem and submit an outline for future work on the Master of Science thesis.

**ME 2999      MS THESIS      1-12 cr.**





Prerequisite: An undergraduate course in material science or permission of the instructor.

**ME2115 HEAT TRANSFER & FLUID FLOW IN NUCLEAR PLANTS 3 cr.**

This course provides advanced knowledge to promote understanding and application of thermal and hydraulic tools and procedures used in reactor plant design and analysis. It assumes that the student has a fundamental knowledge base in fluid mechanics, thermodynamics, heat transfer and reactor thermal analysis. The focus of the course is on physical and mathematical concepts useful for design and analysis of light water nuclear reactor plants. Applications of mass, momentum, and energy balances are combined with use of water properties to analyze the entire reactor plant complex as a whole. Principles are applied through the application of major industry codes to specific cases.

Prerequisite: An undergraduate course in heat transfer and fluid flow or permission of the instructor.

**ME2120 MATHEMATICAL MODELING OF NUCLEAR PLANTS 3 cr.**

Graduate students will develop the graphics/simulation framework and the underlying mathematical models for simulating nuclear power plants in ME/ENGR2120 mathematical modeling of nuclear plants. Models will be developed in MATLAB/Simulink™ and configured to run on a PC so that students can both examine the mathematical models on which the simulation is based and use the simulation program in the laboratory-like sessions to study the effect of design changes on plant behavior. The simulation model fidelity developed is suitable for educational purposes and provides students with a desktop tool to realistically model and better understand reactor performance under various conditions. While it would not be intended to replace or duplicate the high-fidelity dynamic simulation used in major accident analysis codes such as RELAP, TRAC, and TRACE, the course will provide the student with an introduction and a working knowledge what is embodied in these industry standard codes.

**ME 2125 CASE STUDIES IN NUCLEAR CODES AND STANDARDS 3 cr.**

This course addresses key issues with nuclear power plant systems & component engineering and use of codes & standards and regulations. Students learn from practitioners about the Multi-discipline engineering challenges that govern much of the work done a reactor vendors. The course explains why consensus codes & standards are needed, provides a high level of standards development organizations, and shows how codes & standards promote safe operation of nuclear power plants. Selected codes & standards are examined in detail. The course is taught by senior systems & component designers and codes & standards experts from Westinghouse, Bechtel Bettis, and FENOC. The course addresses current, advanced, and next generation, high temperature reactor needs, including global conformity assessment

**ME2130 ENVIRONMENTAL ISSUES AND SOLUTIONS FOR NUCLEAR POWER 3 cr.**

This course will be developed in conjunction with University of Pittsburgh faculty with an interest in environmental issues impacting the nuclear power industry including School of Engineering faculty involved with the Mascaro Sustainability Initiative, faculty from the Department of Civil and Environmental Engineering and faculty from the Graduate School of Public and International Affairs. The course will address such topics as sustainable energy resources, engineering and societal ethical concerns, risk analysis, and future energy supplies in general and as each of these topics relates to such specific issues as the nuclear fuel cycle, nuclear reactor safety, nuclear waste disposal and transportation, and GEN IV and the hydrogen economy. Students will better understand the socio-economic issues surrounding achieving a sustainable nuclear power future as it impacts fuel acquisition, plant operation and waste disposal.

## **ME 2094      Practicum**

Having internships with industry and research laboratories provides graduate students a great opportunity to complement their studies with practical training. The course, ME 2094—Practicum, is a formal mechanism for full time graduate students who have obtained an internship with an external organization (industry or government research laboratory) to carry out that internship. The internship must be related to the student's thesis/dissertation research.

### Requirements and restrictions for ME2094:

- The student must be enrolled as a full time graduate student in the Mechanical Engineering Department.
- The student cannot be holding a teaching assistantship or research assistantship in the term the internship is conducted.
- International students must obtain the appropriate employment authorization through the Office of International Services **BEFORE** they may begin paid employment.
- The student must start the internship in the term for which it is registered.
- The internship must last for at least 12 weeks.
- The student must receive approval for the internship by the Graduate Director prior to registering for ME2094.
- The student must be on the MS Thesis or PhD track. If the student switches from the MS Thesis track to the Professional MS track, the ME2094 credits will not count towards his or her MS requirements.
- A student can register for ME2094 three different times for a maximum of three credits (1 credit max per term).
- Faculty advisor must be willing to recommend and oversee the student's internship. Student must submit a report to their faculty advisor at the end of the internship and must receive a satisfactory (S) grade to receive credit.

### Registration Steps for ME 2094:

1. Find a qualifying organization willing to conduct the internship.
2. Obtain Internship Agreement Form and guidelines from the graduate office.
3. Fill out the internship agreement form and have your advisor sign it and then submit it to the Graduate Director. The Agreement Form must include a statement from the employer, and for international students a certification from the Office of International Services indicating that you satisfy the requirements for practical training as set by the University and the Immigration and Naturalization Service.
4. Once the Internship Agreement Form has been approved by the Graduate Director, you can register for ME2094 for the specified term.

## NUCLEAR ENGINEERING FACULTY

The opportunity to work on interesting research problems under the tutelage of experienced and involved faculty is an important feature of graduate study in Nuclear Engineering at the University of Pittsburgh. Our faculty has interests in a broad range of topics. More information can be obtained from the Departmental website: <http://www.engineering.pitt.edu/MEMS/People/Faculty/>.

### Nuclear Engineering Faculty

Minking Chyu, PhD

Leighton Orr Chair Professor and Chairman of Mechanical Engineering and Materials Science

(412) 624-9783

mkchyu@pitt.edu

Ph.D, University of Minnesota, 1986. Heat and mass transfer; turbomachinery.

Daniel Cole, PhD, PE

Associate Professor

(412) 624-3069

dgcole@pitt.edu

Ph.D., Virginia Polytechnic Institute and State University, 1998. Dynamic systems; measurement and control. Professional Engineer.

C. Isaac Garcia, PhD

Research Professor

(412) 624-9731

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PhD, Materials Science and Engineering, University of Pittsburgh, 1982. Alloy design and Thermomechanical processing, Microstructure-Property Optimization, Grain Boundary Engineering.

Mark Kimber, PhD

Assistant Professor

(412) 624-8111

mlk53@pitt.edu

Ph.D., Purdue University, 2008. Thermal Hydraulics; Electronics Cooling.

Jung Kun Lee, PhD

Assistant Professor

(412) 648-3395

jul37@pitt.edu

Ph.D., Seoul National University, 2000. Nanotechnology; radiation effects on Material Properties; Ion beam Synthesis of functional materials.

Jorg Wiezorek, PhD

Associate Professor

(412) 624-5430

wiezorek@pitt.edu

Ph.D., University of Cambridge, Cambridge, UK, 1994. Materials Science & Engineering; Physical Metallurgy & Metal Physics; Phase Transformations; Micro Characterization & Analysis by Diffraction and Spectroscopy; Transmission Electron Microscopy; Scanning Electron Microscopy; Mechanical Behavior; Microstructure Engineering. Analysis by Diffraction and Spectroscopy; Transmission Electron Microscopy; Scanning Electron Microscopy; Mechanical Behavior; Microstructure Engineering.

## **Nuclear Engineering Adjunct Faculty**

Our professional adjunct faculty represent years of experience in the nuclear industry and provide a unique nuclear engineering educational experience.

David Aumiller, PhD

Adjunct Associate Professor

Ph.D., The Pennsylvania State University, 1996.

Dr. Aumiller performs research in the area of thermal-hydraulic code and methods development at the Bettis Atomic Power Laboratory. He has authored papers on topics including constitutive model development, code assessment, and scaling. He has been spent considerable time developing the algorithmic and numerical techniques for the development of coupled code systems.

Ken Balkey, P.E., ASME Fellow

Faculty Lecturer

(412) 374-4633

M.S., University of Pittsburgh, 1980.

Mr. Balkey has over 40 years of experience in the commercial nuclear power industry. He provides consultation and advise technology developments related to Codes and Standards and risk management initiatives. He performed and directed reliability and risk evaluations for nuclear and non-nuclear structures, systems and components over his lengthy career. He has produced more than 140 publications and documents relating to risk evaluations of the integrity of piping, vessels and structures, and the performance of components using state of the art probabilistic assessment techniques. He holds two patents related to reactor pressure vessel integrity and risk-informed inspection of heat exchangers. His honors include ASME's Dedicated Service Award (1991), the Bernard F. Langer Nuclear Codes and Standards Award (2002), the Melvin R. Green Codes and Standards Medal (2008), and several other awards from ASME, Westinghouse, and other institutions.

Bruce Berquist, PhD

Adjunct Associate Professor

(412) 476-6053

Ph.D., University of Pittsburgh, 1979.

Dr. Berquist has 32 years in the Materials Technology Department at Bettis Atomic Power Laboratory with emphasis on the development of new core materials for advanced Naval Reactors applications. He has taught the Materials course for 20+ years at the Bettis Reactor Engineering School (BRES).

Lawrence Corr, PhD

Adjunct Assistant Professor

(412) 624-5430

Ph.D., University of Pittsburgh

Dr. Corr has over 19 years of experience as a U.S. Naval Nuclear officer, at Bettis Atomic Power Laboratory and now as a Nuclear Services Technical Consultant at Westinghouse Electric Company where he provides technical oversight support and technology insight to satisfy internal and external customer needs with a focus on design and design review processes, and he identifies, investigates, provides oversight, and advocates emerging technologies. Dr. Corr is a certified Customer 1st Green Belt for Design (Design for Six Sigma) and is Project Management Institute PM-1 certified.

Heather Detar

Faculty Lecturer

(412) 716-1445

B.S. ME, The Pennsylvania State University, 2005

Mrs. Detar is an engineer in the Risk Applications and Methods Group of the Westinghouse Electric Company. She has over 7 years of experience in the probabilistic risk assessment (PRA) area.

Gary Elder, PhD

Faculty Lecturer

(412) 856-5967

Ph.D., University of Pittsburgh, 1982

Dr. Elder has over 38 years of experience in the Nuclear Industry with Westinghouse Electric Co. This experience has included work in design and development, fabrication of major components, project management, and field inspection and repair services. He currently is Chief Engineer for Nuclear Services where his responsibilities include direction of new product development programs, coordination of responses to various industry critical issues, assuring a succession of Westinghouse technical leaders, and resolution of major technical issues. He has participated in the development of industry guidelines for steam generator and reactor component inspection and maintenance, development of solutions for cracking in alloy 600 materials, the design and maintenance of major components within the nuclear steam supply system, and in the development of equipment reliability and asset management programs for increasing the performance and value of nuclear power plants.

Vinny Esposito, DSc

Adjunct Professor

(724) 327-9593

D.Sc., University of Virginia, 1968.

Dr. Esposito has over 40 years of experience at Westinghouse Electric Company. His experience includes nuclear core thermal hydraulics, safety analysis, fuel design, and numerical analysis. He is the former VP of the Westinghouse Nuclear Fuel Business Unit.

Larry Foulke, PhD

Interim Director, Nuclear Engineering Program

Adjunct Professor & Director of Educational Outreach

(412) 653-0978

Ph.D., Massachusetts Institute of Technology, 1967.

Dr. Foulke is a former President of the American Nuclear Society, a Fulbright Fellow at the Institute for Atomenergi in Kjeller, Norway from 1961 to 1962 and the founder and first Director of the University's Nuclear Engineering Program. He has over 40 years of experience at Westinghouse Electric Company and Bettis Atomic Power Laboratory where he held management business at both organizations. His experience includes nuclear core and plant dynamics, public policy, space-time kinetics, and space nuclear power. He is a registered Professional Engineer in Pennsylvania.

Daniel Gill, PhD

Faculty Lecturer

(412) 476-7714

Ph.D., The Pennsylvania State University, 2009.

Dr. Gill's expertise is in nuclear computational science. He is interested in the development and analysis of advanced numerical methods for the solution of deterministic particle transport problems, particularly iterative and acceleration methods for the solution of the discrete ordinates formulation of the neutron transport equation. Dr. Gill is also interested in the development and analysis of numerical techniques suited for multiphysics simulations in nuclear engineering.

David Griesheimer, PhD

Adjunct Assistant Professor

(412) 624-5430

Ph.D., University of Michigan, 2005.

Dr. Griesheimer for the past 7 years has worked as a physics computer methods developer at the Bettis Atomic Power Laboratory. His specific research interests include computational methods for radiation transport (specializing in Monte Carlo methods), numerical methods, stochastic processes,

high performance computing, and artificial intelligence. Since 2005, his research has focused on the development of an advanced Monte Carlo particle transport solver for nuclear reactor analysis and design applications.

Jason Gruber, PhD

Faculty Lecturer

Ph.D., Carnegie Mellon University. Material Science, 2007

Dr. Jason Gruber is currently employed by Bechtel Marine Propulsion Corporation (Bettis Atomic Power Laboratory) as a Principal Scientist in the Materials Technology department. His current interests include computational materials science, multiscale materials modeling, microstructural science, texture and anisotropy, numerical methods and global optimization. Dr. Gruber is the main developer of the Mesoscale Microstructure Simulation Project (MMSP), a set of high performance codes for microstructure simulation available on [www.matforge.org](http://www.matforge.org).

David Haser

Faculty Lecturer

(412) 367-9177

MBA, Youngstown State University, 2005.

Mr. Haser has 31 years of experience and is the Operations Superintendent of the Beaver Valley Power Station Unit 2 where he is responsible for work management, operations management, outage management, and training. He has SRO License. His experience includes safety culture, plant operation improvements, nuclear plant operations and safety. Professional Engineer.

David Helling

Faculty Lecturer

(724) 722-5301

B.S., Miami University, 1969.

Mr. Helling has over 40 years of experience in the nuclear industry. He began his nuclear career in the United States Navy where he was a nuclear trained officer. He is qualified as Engineer by Naval Reactors. After nearly ten years of navy service, he joined Westinghouse Electric Company where he has served in a number of training and operations related positions. He was the Westinghouse Training Manager from 1992 to 2001. He holds a Senior Reactor Operator certification from the U.S. Nuclear Regulatory Commission. His current title is Senior Training Advisor in the Training and Operational Services group. Dave teaches a wide variety of classes in topics such as instrumentation and control, engineering, plant operations, and leadership and development.

Melissa Hunter, PhD

Adjunct Assistant Professor

(412) 624-5430

Ph.D., The Pennsylvania State University

Dr. Hunter has over 19 years of experience at Bettis Atomic Power Laboratory and Westinghouse Electric Company where she is a Principal Engineer in the Westinghouse Primary Systems Design and Repair - Radiation Engineering and Analysis group. Her expertise includes fluence, heating rate, and radiological source term analyses for power uprates, surveillance capsule dosimetry, and ex-vessel neutron dosimetry. She has also been involved in the development of new and improved innovative methodologies for radiation analyses. Dr. Hunter serves as the lead in evaluating the potential impacts of issues on the analyses of record in the areas of vessel fluence, reactor internals gamma heating rates, radiological source terms, and post-LOCA hydrogen generation.

Jeffrey Lane, PhD

Faculty Lecturer

Ph.D., The Pennsylvania State University, 2009

Dr. Lane is a thermal-hydraulic code and methods developer at Bettis Atomic Power Laboratory, with a current focus is on reactor safety analysis applications. His research interests include: two-phase flow, computational analysis tools, analytical model development, and Best-Estimate Plus Uncertainty (BEPU) methodologies. He was a Naval Nuclear Propulsion Rickover Fellow.

Justin Pounders, PhD

Faculty Lecturer

Ph.D., Georgia Tech University

Dr. Pounders works at the Bettis Atomic Power Laboratory in the area of multiphysics methods development. He is generally interested in computational methods development for reactor physics problems. His most recent research efforts have been in the areas of neutronic homogenization and equivalence methods in plant simulations, transient multiphysics code coupling, and tightly-coupled multiphysics computations.

Donald Scheef

Faculty Lecturer

(724) 722-5318

M.S., Purdue University, 1972

Mr. Scheef has 44 years in nuclear science and technology, 32 of these in the commercial nuclear power industry. He has been a commissioned officer in the US Navy (reserve) for 5 years and employed by Westinghouse Electric for 32 years. He has been a licensed SRO for Westinghouse Nuclear Training Reactor for 7 years, certified SRO instructor for Westinghouse-designed PWR power plants, qualified control room engineer for fuel handling activities at commercial PWRs, lead instructor for engineering support training courses.

Richard Siergiej, PhD

Adjunct Associate Professor

(412) 476-7587

Ph.D., Lehigh University, 1992

Dr. Siergiej is presently employed by the Bettis Atomic Power Laboratory and previously worked at the Westinghouse Science and Technology Center. His interests are computer simulation and modeling, advanced energy conversion technologies, semiconductor physics, fabrication, and materials, and next generation instrumentation and control system.

Rachel Slaybaugh, PhD

Faculty Lecturer

Ph.D., University of Wisconsin-Madison, 2011

PhD, University of Wisconsin - Madison, 2011 Dr. Slaybaugh's thesis research was developing acceleration methods for massively parallel deterministic neutron transport codes. Her focus was on fixed source solvers, eigenvalue solvers, and preconditioners that could efficiently scale to hundreds of thousands of cores. Dr. Slaybaugh is currently working with hybrid (deterministic-monte carlo) methods for shielding applications at Bettis Atomic Power Laboratory. She worked as a research reactor operator for two years at Penn State and also has a certificate in Energy Analysis and Policy from UW.

## **EXPERIMENTAL & COMPUTATIONAL FACILITIES**

**(LATER)**

To obtain more information on the research of the Mechanical Engineering and Materials Science Department, including an up to date list of laboratories, please visit the webpage:  
[http://www.engineering.pitt.edu/MEMS/Research/Research\\_Default/](http://www.engineering.pitt.edu/MEMS/Research/Research_Default/) .

## GENERAL INFORMATION

The general regulations governing graduate study can be found in the graduate bulletin:

<http://www.bulletins.pitt.edu/graduate/regulations.htm>. Much information is repeated below for your convenience, or where the department imposes stricter guidelines.

**Admission** – Applications for admission are encouraged from all persons with a genuine interest in advanced engineering study. Each application will be judged on its own merits. For the applicant who is a recent graduate of an Accreditation Board for Engineering and Technology (ABET) accredited school, admission will be granted on the basis of the undergraduate scholastic record. Usually an applicant with a B average (cumulative quality point average of 3.0/4.00) or better will be granted admission. The Graduate Record Examination (GRE) is required by the Mechanical Engineering Department. Applicants should check each program's specific requirements. Applicants who do not meet these requirements may be considered on an individual basis with strong emphasis given to academic promise, career orientation, work experience, and preparation in engineering and related disciplines. In some cases, these applicants will be required to correct deficiencies in preparation for the graduate program.

### Admission Procedures

#### (1) United States citizens or permanent residents should follow this procedure.

- a. Apply on-line at: <https://app.applyyourself.com/?id=up-e> or write or telephone the departmental Graduate Administrator or Coordinator for the application material.
- b. Return any hand-completed application materials (<http://www.engr.pitt.edu/admissions/graduate/download.html>) with a check or money order (not cash) in the amount of \$50 payable to the University of Pittsburgh (The fee for a Special Student application is \$50.00). The application fee is not returnable.
- c. Ask the registrars of all undergraduate and graduate schools attended to send transcripts of records to the School of Engineering Office of Administration, 749 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15261. An official transcript of the undergraduate record is required even though the applicant may not intend to work towards a degree. A graduate of the University of Pittsburgh need not request the University registrar to send a transcript of the undergraduate record.
- d. Ensure that your letters of reference make it to the University, since this can hold up the admissions process.

Action will be taken after receipt of the completed application materials, including the application fee, and complete transcripts of work done in previous undergraduate and graduate curricula. The deadline for the fall term is March 1; the spring term deadline is July 1; and the summer term deadline is February 1. We ask that International Students send in their application materials at least two months before the posted deadlines. Applications received after the deadline will be considered on an individual basis.

#### (2) All international student applications are processed for academic qualifications by the School of Engineering and for non-academic qualifications by the Admissions Officer, Office of International Services (OIS). The document needed to apply for a non-immigrant visa will be issued only after the applicant has been admitted and has provided evidence of adequate financial support and English language proficiency. International applicants should follow this procedure:

- a. Direct preliminary inquiries concerning graduate programs, research, and financial aid to the departmental Graduate Coordinator. Applications for graduate study are available from the graduate coordinator and the School of Engineering Office of

Administration, 749 Benedum Hall, Pittsburgh, PA 15261. Students can also apply online at: <https://app.applyyourself.com/?id=up-e>.

**The non-refundable application fee for international students is \$50.**

- b. The applicant will receive notification from the Engineering Office of Administration concerning the evaluation of academic qualifications.
- c. If the academic evaluation by the department is favorable, the International Student Admissions Officer will review non-academic qualifications to determine eligibility for a visa document.

**This procedure is also for any international applicants who are already in U. S. A.**

The University reserves the right, even after the arrival and enrollment of a student from another country, to require, at his or her own expense, individual curricular adjustments whenever particular deficiencies or needs are found. This could include enrollment without credit in additional course work in English as a foreign language or in courses prerequisite to his or her regular plan of study. New students from abroad are encouraged to use the services of OIS to help them in their own adjustment to the United States and to facilitate their total educational experience.

**English Language Proficiency** – Graduate students must possess sufficient knowledge of English to study without being hindered by language problems, to understand lectures, and to participate successfully in class discussions. The determination that the applicant has sufficient proficiency is made by the admitting department or school, subject to University-wide minimum standards determined by the University Council on Graduate Study.

The Test of English as a Foreign Language (TOEFL) must be taken if the applicant's native language is not English. A minimum score of 550 (213 on the computer-based test / 80 on the internet-based test) or higher on the TOEFL is required for admission to graduate study. The International English Language Testing System (IELTS) may now be substituted for the TOEFL. A minimum result of Band 6.5 is required on the IELTS. The requirement to take the TOEFL may be waived if the applicant has achieved a satisfactory score on other tests of English proficiency such as the IELTS or has received a degree from an accredited institution in the United States.

In special cases, a school or department may admit a student who has not demonstrated minimum proficiency in English. Upon arrival, students with TOEFL scores less than 550 (213 on the computer-based test / 80 on the internet-based test) or IELTS scores less than Band 6.5 **will not be permitted to register** until they have taken the on-campus administered Michigan Test of English Proficiency.

If remedial courses in English as a foreign language are recommended as an outcome of the Michigan Test of English Proficiency, the department or school must ensure that the recommendations are followed. All students with a TOEFL score less than 600 (250 on the computer-based test / 100 on the internet-based test) or less than Band 7 on IELTS must take the Michigan Test of English Language Proficiency upon arrival. Although the registration of only those with TOEFL scores less than 550 and IELTS scores less than Band 6.5 will be blocked.

In keeping with the University policy on Certification of English Language Fluency for Teaching, students who are not native speakers of English and are appointed as teaching assistants or teaching fellows are required to take a test of their spoken English **upon arrival**. Individuals are given non-teaching assignments and are required to take special course work until they attain passing scores. An unsatisfactory score at the time of reappointment is sufficient cause for non-renewal.

Original results of the Test of English as a Foreign Language (TOEFL) should be sent directly to the University of Pittsburgh by the Educational Testing Service. Copies of TOEFL test results are not acceptable. For information or an application for the TOEFL, you may contact the Educational Testing Service, P.O. Box 6151 Princeton, New Jersey 08541-6151, USA. (E-mail: [toefl@ets.org](mailto:toefl@ets.org); website: [www.toefl.org](http://www.toefl.org)). The institutional code for the University of Pittsburgh is 2927 and the department code for the School of Engineering is 69. International English Language Testing System (IELTS) is jointly managed by: University of Cambridge ESOL Examinations, British Council, and IDP: IELTS Australia. For more on IELTS , please visit the website: <http://www.ielts.org>.

**Financial Aid** – Admission to the graduate program does not imply the granting of financial aid. This is done separately, and an applicant interested in obtaining financial aid should request information directly from the department. The following types of aid may be available:

- (1) **Fellowships** are awarded to students of outstanding ability. The financial aid is usually an unrestricted grant.
- (2) **Teaching Assistantships and Teaching Fellowships** are awarded to exceptionally well-prepared students in return for assistance in laboratories, recitation sections, and other teaching duties. Partial or full tuition scholarships are also provided.
- (3) **Research Assistantships** are awarded to students for assistance on research programs. Partial or full tuition scholarships are also provided.

When an award for financial aid is made by the department, the terms and conditions are specified. Applications for financial aid should be received as early as possible.

**For information on student loans, contact the University Office of Admissions and Financial Aid, Alumni Hall – 4227 Fifth Avenue, University of Pittsburgh, Pittsburgh, PA 15260 (624-7488).**

## Tuition Costs and Fees

**Note:** *The University reserves the right to change the tuition rates and fees at any time without notice in advance.*

**Tuition rates** vary with each school within the University. Graduate students are invoiced per credit for the first one to eight credits and the full-time flat rate for nine to 15 credits. No student is permitted to register for more than 15 credits without specific permission from the dean of the school in which the student is pursuing a degree. If granted, the student will be assessed the flat rate plus a per-credit charge for each credit over 15.

**Graduate School Tuition** – Graduate students registered for 9 to 15 credits in the Fall and Spring Terms are regarded as **full-time**, and are assessed the current “flat” tuition rate for the Swanson School of Engineering. The Academic Year 2011-12 Tuition Rates are (Please refer to website: <http://www.ir.pitt.edu/tuition/tuitionrates.php> for more information):

<b>Resident Tuition, Per Term:</b>	<b>\$ 10,775.00</b>
<b>Non-Resident Tuition, Per Term:</b>	<b>\$ 17,645.00</b>

**Additional Fees that are applicable to students regardless of Pennsylvania or Out-of-State Residency include:**

<b>Student Activity Fee</b>	<b>\$ 80.00</b>
<b>Student Health Fee</b>	<b>\$ 85.00</b>
<b>Computing and Network Services Fee</b>	<b>\$ 175.00</b>
<b>Security, Safety, and Transportation Fee</b>	<b>\$ <u>90.00</u></b>
	<b>\$ 430.00</b>

Graduate Students registered for fewer than 9 credits are considered **part-time** and are billed on a per-credit basis.

**Summer Term/Summer Sessions** – Students registered during the summer term and/or summer sessions will be billed on a **per-credit basis only, regardless of the number of credits taken.**

### **Diversity and Sexual Harassment Training**

The Mechanical Engineering and Materials Science Department is pleased to provide diversity training to its graduate students through the Swanson School of Engineering Office of Diversity. **All students are expected to participate in diversity and sexual harassment training the first time that it is offered after enrolling in classes.** More information can be received from the Diversity Program Assistant at [eodadmin@engr.pitt.edu](mailto:eodadmin@engr.pitt.edu) or 412 624-9842.

**Graduate Housing** – There is no residence hall on campus for graduate students for the fall and spring terms. Accommodations are available throughout the summer term. Rates are available upon request from the University Housing and Food Services Office, which is located in the Litchfield Towers, Tower A, (412) 648-1100. The University has established a meal plan for which any registered student is eligible. Students may obtain board-plan information by contacting the Housing and Food Services Office.

**Housing Resource Center**, 127 North Bellefield Avenue (412) 624-6998, provides community listings of private rooms and apartments for rent continually throughout the year. The Housing Resource Center is open between 8:00 am and 4:30 pm, Monday through Friday. HRC website <http://www.ocl.pitt.edu/>, phone: 412-624-6998, or e-mail: [hrc@bc.pitt.edu](mailto:hrc@bc.pitt.edu) HRC lists University-owned efficiencies and one- and two-bedroom apartments for rent. As well as informative information concerning housing outside of University-owned property.

**Student Status – Continuing Student** is a student who was registered in the same academic center at the same level for any term within the last calendar year.

**New Student** is a student who is registering for the first time, or one who is registering in a different academic center (including regional campuses) or level from his/her last registration, regarding the registration process.

**Re-Admitted Student** is a student who has previously registered but not within the last calendar year. The student shall be considered the same as a new student registering for the first time, regarding the registration process.

**Provisional Status** – Students who are admitted to the program under provisional status must satisfy the conditions of his/her provisions to remove certain deficiencies in either coursework or academic achievement before being changed to full status.

**Special Student Status** – Students who are seeking advanced degrees but who are unable to meet the deadline for filing all required credentials for admission may be granted temporary admission provided they present acceptable evidence concerning their qualifications for graduate study. Regular admission must be accomplished within the first term of registration.

Students who are not seeking an advanced degree but who have specific qualifications for one or more courses, including courses required for learning or certification, may register for such courses subject to review by the department and the dean of the school. If a student should apply for admission to a degree program, a maximum of 6 credits may be applied toward a graduate degree.

**Inactive Status** - Students who have not registered for at least three (3) credits (eligible doctoral students at least one (1) credit of full-time dissertation study) during a 12-month period will be transferred automatically to inactive status and must file an application for readmission to graduate study (application fee required) before being permitted to register again. Students on inactive status cannot apply to graduate or take preliminary or comprehensive examinations. Also, students on inactive status are not eligible to use University facilities and should not expect to receive counseling from the faculty or active supervision by their advisor and committee.

**Readmission** – Readmission is not automatic nor does it necessarily reinstate the student to the academic status enjoyed prior to becoming inactive. When readmitted, the student must be prepared to demonstrate proper preparation to meet all current admission and degree requirements.

**Registration Process** – After being admitted to a graduate program, students may register for classes with their academic advisor. The registration period for a term or session is published in the University's Schedule of Classes (see [http://www.registrar.pitt.edu/schedule\\_of\\_classes.html](http://www.registrar.pitt.edu/schedule_of_classes.html)), in course descriptions, on calendars (including the University's Academic Calendar at [www.pitt.edu/~provost/calendar.html](http://www.pitt.edu/~provost/calendar.html)), and in numerous other publications.

Students registering for the first time are advised to complete registration well before the beginning of the term. Typically, the first day of classes is the last day for students to register. After the start of classes, registration for new and continuing students is permitted only in unusual circumstances and only with the written approval of the dean and the payment of a late registration fee.

Your registration will be processed in the Office of Administration, 253 Benedum Hall. Students are required to have the signature of their academic advisor on the registration form. The student's signature on the registration form creates a financial obligation to the University of Pittsburgh. Once students have registered, they may view their class schedules online at <http://my.pitt.edu>.

#### **Registering for Full-Time Dissertation Study**

Doctoral students who have completed all credit requirements for the degree, including any minimum dissertation credit requirements, and are working full-time on their dissertations may register for Full-Time Dissertation Study, which carries no credits or letter grade but provides students full-time status. Students so enrolled are assessed a special tuition fee but are still responsible for the full-time computer and network, security/transportation, student health, and activity fees. Students must consult with the dean's office of their school for permission to register for full-time dissertation study.

**Registering for Two Independent Degree Programs Simultaneously** – Students may pursue two independent graduate degrees simultaneously in two different schools within the University (joint degree) or two different departments within the same school (dual degree). Normally, such students should be enrolled for no more than a total of 15 credits per term. Special approvals and regulations apply before a student is allowed to register for courses in pursuit of two independent graduate degrees. See discussion in Special Academic Opportunities for further detail.

**Registering for Cooperative, Dual-Degree, and Joint-Degree Programs** – Dual- and joint-degree programs result in two degrees being awarded. Requirements for these programs include all or most of the requirements of two distinct academic degree programs. Dual programs exist within a single school; joint programs exist between two or more schools; cooperative programs are administered by two or more institutions. Before registering for courses in pursuit of a cooperative, dual-degree, or joint-degree program, a student must be admitted to both programs. See discussion in Special Academic Opportunities for further detail.

**Cross-Registration** – Carnegie Mellon University, Duquesne University, the Pittsburgh Theological Seminary, Robert Morris University, and the University of Pittsburgh offer graduate students the opportunity for cross-registration in graduate programs in the five institutions in the fall and spring terms. Credits earned by cross-registration in graduate courses at Carnegie Mellon, Duquesne University, the Pittsburgh Theological Seminary, and Robert Morris University, when approved in advance by the student's graduate advisor, are accepted as University of Pittsburgh credits for the purpose of the calculation of the quality point average and the completion of degree requirements. Each department at each institution retains the authority to establish the prerequisites for admission and the maximum enrollment in its own courses and to grant priority in registration to its own graduate students.

**Cross-registration is only available in the fall and spring terms.** Only full-time students may cross-register. Students who cross-register do not pay tuition to the host institution; however, they are responsible for any additional fees associated with the course such as laboratory fees, books, and the like. During the summer, students may attend one of the above colleges as guest students, but they must pay that institution's tuition and fees. Students are discouraged from cross-registering during their term of graduation to avoid any delays in the receipt of course credit needed to graduate. Students should meet with their advisor before they cross-register. See also Cross-Registration Credit or visit the Pittsburgh Council of Higher Education (PCHE) (<http://www.pchepa.org>) for organization history and available program information.

**Auditing Courses** – With the consent of the school and instructor, students may audit a course and receive an N grade with the consent of the instructor and school offering the course. However, to audit a course, a student must register and pay tuition for the course. The N grade is not counted toward graduation or the QPA.

**Adding and Dropping Courses** – Students may add and drop courses only during the add/drop period. The dates for the add/drop period are listed in the University's Schedule of Classes, in course descriptions, on calendars (including the University's Academic Calendar at [www.pitt.edu/~provost/calendar.html](http://www.pitt.edu/~provost/calendar.html)), and in numerous other publications. Students who no longer wish to remain enrolled in a course after the add/drop period has ended may resign from the University or withdraw from the course.

**Resigning from the University for a Specific Term** – If students decide to drop all of their courses after the add/drop period has ended and before 60 percent of the term or session has been completed, they must resign from the University for that term. Official resignation from the University requires students to contact the Student Appeals Office. Students have several options. They may resign in person, by mail, or by calling 412-624-7585, where students may leave a message 24 hours a day, including weekends and holidays. An R grade will appear on the student's academic transcript. Tuition is prorated from the date of the student's notification to the Student Appeals Office of the student's desire to resign, unless 60 percent of the term has been completed, in which case there is no refund.

After the 60 percent point of the term or session has passed, students who wish to terminate their registration may process withdrawal from all classes only with the permission of their academic dean. If the reason for withdrawal is medical or psychological in nature, the academic dean may consult with the director of the Student Health Service prior to making a determination. There is no financial adjustment associated with this procedure, which results in the assignment of W grades for the courses.

**Monitored Withdrawal from a Course** - After the add/drop period has ended, students may withdraw from a course that they no longer wish to attend by completing a Monitored Withdrawal Request form in the office of the school offering the course. Students must process the Monitored Withdrawal Request form within the first nine weeks of the term in the fall and spring. Because summer sessions vary in length, students should check the summer Schedule of Classes for those deadlines. Students should check with the school offering the course for the last day to submit a Monitored Withdrawal Request form. The grade W will appear on the student's grade report and transcript. **There is no financial adjustment to students' tuition or fee obligations involved in withdrawing from courses**, but withdrawing may jeopardize satisfactory academic progress, financial aid, and assistantships or fellowships.

**Transfer Procedure** – The application of a graduate student from another graduate school is treated in the same way as a new application, and the same procedure for application is followed. This includes the transfer into an engineering graduate program from another school in the University of Pittsburgh. After a transfer application is formally accepted, the student may apply for transfer of graduate credits from another accredited institution to the University with the major adviser's recommendation and the dean's approval. **However, no transfer credit will be accepted for courses in which grades lower than B, or its equivalent, has been received or which are no longer considered as graduate-level courses by the department.** A graduate student may apply for a maximum of six (6) transfer credits toward the MS degree. No more than 30 credits may be accepted for a master's degree awarded by another institution to meet the minimum credit requirement for the Ph.D. degree. However, in recognition of graduate study beyond the master's degree successfully completed elsewhere, up to twelve (12) additional credits may be accepted at the time of admission to meet the minimum credit requirement. Thesis and dissertation credits are not transferable.

**Online Courses** - Two courses (six credits total) may be taken from an appropriate academic program. These courses must be:

1. Appropriate for the student's academic program and typically not available on the Oakland campus
2. Approved by the graduate coordinator and then approved by the Associate Dean for Academic Affairs

**Grading – Quality Point Average (QPA) and Grade Point Average (GPA)** are numerical indications of a student's academic achievement. QPA is the average of letter grades earned toward a degree. GPA is the average of total letter grades earned.

**Academic Standards** – An average of at least B (QPA=3.00) is required in the courses that make up the program for any graduate degree. Students with full graduate status are automatically placed on probation whenever their cumulative QPA falls below 3.00. Each school determines the restrictions placed on a student on probation.

A student on provisional or special status or on probation is not eligible to take the PhD preliminary evaluation or the MS or PhD comprehensive examination, or to graduate.

**Grading System** – **The University of Pittsburgh has a standard letter grade system (see Letter Grades below). Some additional grading options are available in some courses as determined by the school and the instructor (see sections below on University Grading Options and Other Grades). Students are subject to the grading system of the school in which they are taking the course.**

## University Grading Options

Individual schools may elect to offer one of the following grade options for its courses:

LG	Letter Grade
H/S/U	Honors/Satisfactory/Unsatisfactory
S/N	Satisfactory/Audit
LG and H/S/U	Letter Grade and Honors/Satisfactory/Unsatisfactory
LG and S/N	Letter Grade and Satisfactory/Audit

From among the grading options approved by the school, each department identifies those it deems acceptable for its courses. Furthermore, course instructors may specify, within the grading options approved by the school and department, which grading options may be selected by students taking their course.

Students should choose a grading option from those listed with the course in the Schedule of Classes. Grade Option/Audit Request forms for graduate courses are required by the School of Engineering. Forms are available in Mechanical Engineering, 648 Benedum Hall and the Office of Administration, 253 Benedum Hall.

Students receive the grade H or S for satisfactory work and U for unsatisfactory work. The grades H and S are counted toward graduation but not the student's QPA. The grades N and U are not counted toward graduation or the QPA. The S grade indicates adequate graduate attainment; in evaluating thesis or dissertation research, an instructor may only use the S/N grading option. All thesis/dissertation credits remain Incomplete, "I" grade until the student successfully defend his/her thesis/dissertation.

## Letter Grades

The University's letter grade system for graduate courses is as follows:

Grade	Quality Points
A+ =	4.00
A =	4.00 Superior Attainment
A- =	3.75
B+ =	3.25
B =	3.00 Adequate graduate-level attainment
B- =	2.75
C+ =	2.25
C =	2.00 Minimal graduate-level attainment
C- =	1.75
D+ =	1.25
D =	1.00

D- = 0.75

F 0.00 Failure

**Other Grades: Incomplete, Withdraw, Resign** – Upon a student's completion of a course, one of the grades listed below may appear on the student's transcript in lieu of one of the options selected by the student and/or instructor under University Grading Options. None of these grades carries quality points. Students should consult with their individual school for information on any school-specific regulations regarding these grades.

**G Grade** – The G grade signifies unfinished course work due to extenuating personal circumstances. Students assigned G grades are required to complete course requirements no later than one year after the term in which the course was taken. After the deadline has passed, the G grade will remain on the record, and the student will be required to reregister for the course if it is needed to fulfill requirements for graduation.

**I Grade** – The I grade signifies incomplete course work due to nature of the course, clinical work, or incomplete research work in individual guidance courses or seminars.

**W Grade** – The W grade signifies that a student withdrew from the course. See Monitored Withdrawal from a Course for more information.

**R Grade** – The R grade indicates that a student has resigned from the University.

**Z Grade** – The Z grade indicates that an instructor has issued an invalid grade.

**Repeating Courses** – A student may repeat any course in which a grade of B- or lower is received if an authorization to repeat the course is given by the student's advisor and/or department. A school may restrict the type and/or number of different courses that may be repeated during one degree program. The grade earned by repeating a course is used in lieu of the grade originally earned, although the original grade is not erased from the transcript. No course may be repeated more than twice. No sequence course may be repeated for credit after a more advanced course in that sequence has been passed with a B or higher grade. The repeated course must be the same as that in which the original grade was earned. In extenuating circumstances, a department chair, with the dean's approval, may substitute another course of similar content. Grades of W, R, or N reported for the repeated course will not be counted as a course repeat. To initiate only the last course grade being computed in the QPA, a Course Repeat form must be filed with the dean's office.

**Changing Grades** – The instructor of a course may change a student's grade by submitting a Change of Grade Card. All grade changes require the authorization of the dean of the school from which the original grade was issued. While each school may determine a time limit for grade changes, they should be processed no later than one year after the initial grade was assessed. Changes in I grades are exempt from this one-year policy.

**Grade Report** – At the end of each term, a grade report is prepared by the Office of the University Registrar and mailed to the student, provided that all charges have been paid. This report shows credits carried, the grade received in each course, and quality points earned. Shortly after the term ends, students can also access their grades online via the secure server at <http://student-info.pitt.edu>.

**Grade Access** - Grades are available through the University Portal at approximately 10:00 am the morning after the day grades are due in the Registrar's Office. Grade information, including grade changes, will continue to be available online using the Student Services *Community* in <http://my.pitt.edu>. If one of your instructors submits grades after the established deadline, your record will not reflect a grade for that course until the next posting date. Questions about the actual grade awarded should be directed to the individual instructor or the department chairperson. Once grades have been posted, update requests must be submitted via Grade Change Request forms and processed through the proper Deans Office. Changes will appear as they are received and processed in the Office of the University Registrar.

To access your record on the web, log on to Student Self Service through <http://my.pitt.edu> and follow the menu path: **My Communities>Student Self Service>View my Grades**

If grade verification is needed for employer reimbursement, or for any other reason, you can obtain a copy of your transcript in G-3 Thackeray Hall. You can also visit the University Registrar's Office website for more information on how to obtain a transcript by mail.

If you have any outstanding financial obligations to the University, you will not be able to view your record online, or obtain a transcript until payment arrangements are completed.

**Probation, Suspension, and Dismissal** – Students who fail to make satisfactory progress may be subject to academic probation and/or suspension and dismissal. Students who have completed at least 9 quality point credits and whose QPA falls below 3.00 will be placed on academic probation by the dean of the school. After a certain period of time on academic probation (the period is determined by the School of Engineering), a student is subject to academic suspension and restricted from registering for classes in that school. Students on probation are not eligible to take the PhD preliminary evaluation or the MS or PhD comprehensive examination, or to be graduated.

**Effect on Financial Aid and Scholarships** – Conditions for loan eligibility and many scholarships (including those for teaching assistants, teaching fellows, graduate student assistants, and graduate student researchers) usually require students to complete a specified number of credits each year and maintain a specified quality point average (QPA: credits counted toward the degree). Questions about the effect of unsatisfactory academic standing on loans should be directed to the Office of Admissions and Financial Aid in Alumni Hall (4227 Fifth Avenue) at 412-624-7488. Questions about the effect of unsatisfactory academic standing on scholarships, including teaching and research assistantships, should be directed to the department.

**Statute of Limitations** – The purpose of the statute of limitations is to ensure that a graduate degree from the University of Pittsburgh represents mastery of current knowledge in the field of study. Individual schools within the University may adopt policies that are more stringent, but not less, than those stated here.

All requirements for MS degrees must be completed within a period of four consecutive calendar years from the student's initial registration for graduate study; all professional master's degrees, within five years. Dual degrees and joint degrees that require course work in excess of 50 credit hours may be granted a longer statute of limitations by the University Council on Graduate Study.

From the student's initial registration for graduate study, all requirements for the PhD degree must be completed within a period of 10 years, or within eight years if the student has received credit for a master's degree appropriate to the field of study. A student who is unable to complete all degree requirements within a five-year period after passing the comprehensive examination may be re-examined at the discretion of the department or school. Programs for professional doctoral degrees,

for which the majority of candidates pursue part-time study while working full-time within their chosen disciplines, may be granted a longer statute of limitations by the schools offering the degrees.

Under exceptional circumstances, a candidate for an advanced degree may apply for an extension of the statute of limitations. The request must be approved by the department or departmental committee (master's or doctoral) and submitted to the dean for final action. Requests for an extension of the statute of limitations must be accompanied by a departmental assessment of the work required of the student to complete the degree as well as documented evidence of the extenuating circumstances leading to the requested extension. Students who request an extension of the statute of limitations must demonstrate proper preparation for the completion of all current degree requirements.

**Leave of Absence** – Under special conditions, graduate students may be granted one leave of absence. A maximum leave of two years may be granted to doctoral students or one year to master's students. The length and rationale for the leave of absence must be stated in advance, recommended to the dean by the department, and approved by the dean. If approved, the time of the leave shall not count against the total time allowed for the degree being sought by the student. Readmission following an approved leave of absence is a formality.

### **Registration Status at Graduation**

**All graduate students must register for at least 1 credit or full-time dissertation study during the 12-month period preceding graduation (that is, must be on active status) and must be registered for the term in which they plan to graduate.** In exceptional circumstances, students who complete all the degree requirements at the end of a term but graduate in the next term may petition the dean of the school for a waiver of this registration requirement. Waivers may be obtained by submitting a written request to the Office of Administration. The request should be based on extenuating circumstances, e.g., inability of the student's dissertation committee to meet during the final term when a student has given reasonable notice or the student has completed all degree requirements in a previous term. Waivers will not be granted to students who are inactive. The requirement that a student be on active status cannot be waived.

**Application to Graduate** – Students must file an application for graduation in the department or the Office of Administration (253 Benedum) early in the term in which graduation is expected. Each school establishes its own deadline by which students must apply for graduation. Students should check with the graduate secretary for the deadline. As noted above, students must be active.

Prior to the end of the term in which they graduate, all doctoral candidates must submit to the dean's office a completed Survey of Earned Doctorates.

If your graduation is postponed, you must reapply through the department or the Office of Administration (253 Benedum) by completing another Graduation Application.

**Certification for Graduation** – The Graduate Faculty of the department or program evaluates the performance of the student. If that performance is satisfactory, a report should be submitted to the dean certifying that the candidate has satisfactorily completed all departmental requirements for a graduate degree. The dean, after confirming that the overall school and University requirements have been met, certifies the candidate for graduation.

### **Commencement**

The University of Pittsburgh holds one annual commencement. It usually occurs on the last Sunday in April and is held at the Petersen Events Center. Students who graduate within a graduation year are invited to attend. A graduation year encompasses June, August, December of one year and April and May of the following year. (Example: June through December of 2002 and April and May of 2003 graduates will be invited to the 2003 Annual Commencement.) The Office of Special Events makes all of the arrangements for commencement. A "Graduation Central" is held approximately two weeks prior to commencement. Students are able to pick up their regalia, tickets, and other information regarding Commencement during this two-day event. You should contact the Office of Special Events, if you have any questions concerning commencement. Their address is 1200 Bruce Hall; their telephone number is (412) 624-7100.

**Transcripts** – An academic transcript serves as a permanent record of a student's academic progress. The transcript is a cumulative record of the student's QPA, as well as a record of the department, title, and grade for each course in which the student has enrolled. Students may request an official transcript that bears the seal and the signature of the University registrar. Upon graduation, the transcript reflects a student's degree and date; major; and, if applicable, honors, area of concentration, and minor.

**Official Transcripts** – Official transcripts are available from the Transcript and Certification Office in G-3 Thackeray Hall. Each page of your entire University of Pittsburgh transcript is included. The transcript is printed on security paper and bears the seal and signature of the University Registrar.

There will no longer be a \$3.00 fee for transcripts for students and alumni, but companies requesting your transcript must still pay the fee. However, current fees for services will still be assessed to all other groups and individuals. There is a fee of \$20.00 for overnight delivery within the continental United States (This fee is subject to change). International fees vary. If express fees are not paid within ten working days, there is an additional \$10.00 service fee. **Transcripts cannot be faxed.**

*If you have an outstanding financial obligation to the University, your transcript will be withheld until your account is paid in full.*

**REQUEST IN PERSON** – To request a copy of your official transcript in person, you must complete and sign a Transcript Request form available in the Transcripts and Certification area in G-3 Thackeray Hall. You may use this form to designate the address to which your transcript should be sent. All transcript requests submitted in person **require photo identification.**

**REQUEST BY MAIL** - To order a copy of your transcript, please fill-out and mail the [printable Transcript request form](http://www.registrar.pitt.edu/transcripts.html) available on (<http://www.registrar.pitt.edu/transcripts.html>). If you are requesting overnight service, please make your check or money order payable to the *University of Pittsburgh*. Transcripts cannot be accepted by telephone or e-mail.

**Unofficial Transcripts** – As a currently registered student, you are entitled to a copy of your unofficial transcript. Your unofficial transcript contains the same information as the official transcript, but it is printed on white paper and does not bear the seal and signature of the University Registrar. To obtain your unofficial transcript, **you must make your request in person** in G-3 Thackeray Hall and present your valid University ID card at the time.

**Diplomas** – Your diploma, along with a complimentary official copy of your final transcript, will be mailed to you at no charge approximately four weeks after the end of your term of graduation. We will use the address on your Graduation Application unless you change it. See the online printable [Address Change Form](http://www.pts.pitt.edu/mailev/customer/change.html) available on (<http://www.pts.pitt.edu/mailev/customer/change.html>). Check your transcript carefully. Any discrepancies should be brought to the attention of the appropriate office immediately.

Additional copies of your diploma may be purchased any time after graduation. Requests for additional diplomas can be made by completing the online printable Diploma Reorder Form available on (<http://www.registrar.pitt.edu/diplomas.html>), print it, and deliver it to G-3 Thackeray Hall or mail it, with required payment, to:

Diplomas  
Office of the University Registrar  
G-3 Thackeray Hall  
University of Pittsburgh  
Pittsburgh, PA 15260

The fee for each diploma, including mailing, is \$25.00. The fee for Professional or University Honors College diplomas is \$50.00. The reorder process takes approximately four weeks. Diplomas will be in the current style and font and bear the signatures of the current administrators.