



UNIVERSITY *of* NEW HAMPSHIRE

MECHANICAL ENGINEERING
UNDERGRADUATE
STUDENT HANDBOOK

Academic Year
2009-2010

WELCOME

On behalf of the faculty and staff, I would like to welcome you to the Mechanical Engineering Department at the University of New Hampshire. The program you are about to begin will be both challenging and rewarding. You will find that in order to be truly successful, it will demand your time, energy, and commitment. For our part, we will make every effort to assure that you are able to complete the program successfully and be ready to begin an interesting and fulfilling career. You will study what at first may seem like a wide range of different subjects, but will finally be recognized as a rather unified set of fundamental principles that are the core of the professional practice of Mechanical Engineering.

We have entered a period of unprecedented competitiveness for the products of our technologies and in order to compete in such an environment our nation must have engineering talent second to none. It is critical to your professional development that you begin with a sound educational experience. You are about to begin a program which will provide that knowledge if you are willing to put in the effort required. The faculty in this department are dedicated to providing the best educational experience possible. We encourage you to take advantage of the resources of the department, the college, and the University in achieving this common goal.

This Handbook will help you to become familiar with the department and its program. It will answer some of your questions. Feel free to ask faculty, staff, or students any other questions you may have. We wish you success and the highest possible level of achievement.

Todd Gross
Professor and Chair

Mechanical Engineering Department Handbook

Preface (Welcome)

I. What is Mechanical Engineering?

1. Mechanics
2. Thermal Sciences
3. Design and Manufacturing
4. Systems and Controls
5. Materials Science

II. The Mechanical Engineering Department at UNH

1. Mission Statement
2. Program Objectives

III. Academics

1. The Curriculum
2. The Progress Sheet
3. Academic Rules and Policies of the ME Department (repeating courses, etc.)
4. Code of Ethics
5. Honors in Major
6. Elective Courses, Structure and Guidelines
- 6a. General Education Requirements specific to ME & the Writing Requirement
- 6b. Technical Elective Requirements

7. Senior Projects
8. Minors
9. Exchange Program, Budapest, Hungary
10. Transferring Credits
11. Graduate School – Early Admission
12. Professional Registration

IV. Facilities and Resources

1. ME *Smith* Computer Cluster
2. Undergraduate Lounge
3. Department Laboratories
- 3a. Other facilities
4. Mailboxes and Buckley Amendment
5. Textbooks
6. Tutoring
7. MaC Center
8. Advising/Counseling
9. Student Advisory Board
10. Student Organizations: ASME, SWB, SAE, τβπ, SWE, Robotics Club

V. Campus Resources

1. University Advising and Career Center
2. Center for Academic Resources
3. Computing and Information Services

VI. Faculty/Staff Profiles

VII. Important UNH Phone Numbers and Web Addresses

I. WHAT IS MECHANICAL ENGINEERING?

Mechanical engineers design, develop, build, and maintain the tools and products of our technological society. Mechanical Engineering has two main stems. One is the broad area of mechanical design. This involves all types of mechanical motion and the forces and energy required for achieving motion. Examples range from the motion in a small and complex high speed machine, such as a dot matrix printer, to the motion of the flaps and other control surfaces on a large airplane wing. The other stem is concerned with energy generation and conversion and is based upon the principles of the thermal and fluid sciences. It includes diverse applications, from gas turbine and rocket engines, to environmental control of building interiors. Other subject areas which support both stems and are frequently an integral part of designs and products are the material sciences and control systems. Both of these areas are included in the education and training of mechanical engineers.

Some mechanical engineers work in specific industries, such as automotive and aerospace. Other mechanical engineers work in subspecialties that span numerous industries. Hydraulic and pneumatic engineers work with any equipment that employs liquid or air forms of motion and force control and energy conversion. Mechanical engineers are involved with fossil fuel, solar, nuclear, wind, and geothermal energy. They are also heavily involved in ocean engineering, environmental control and waste disposal and management.

Today there are mechanical engineers working in areas not traditionally associated with engineering, such as biomechanical engineering, the design of sports equipment, and the understanding of the functioning of physiological systems.

Because of the diversity of the basic subject areas in Mechanical Engineering, the major offers graduates the widest choice of career fields. Some students choose to go on to graduate school to specialize and obtain separate degrees in such diverse fields as patent

law, bioengineering, aerodynamics, ocean engineering, and management.

The program upon which you have embarked at the University of New Hampshire requires significant study in mathematics, computer science, basic sciences such as chemistry and physics as well as basic engineering courses, before reaching the more specialized courses.

I.1. Mechanics

The mechanics program in the Department of Mechanical Engineering is tailored to provide the students with a broad background in the area of classical mechanics. This area of mechanics is concerned with the motion of bodies as well as the relationship between the external loads and the resulting internal forces and deformation of solids such as beams, shafts, struts, columns, and piston rods. A thorough understanding of mechanics is essential in the safe design of buildings, bridges, machinery, automobiles and aircraft as well as to optimize and ensure the reliability of countless commercial products. Undergraduates in Mechanical Engineering are introduced to the area of mechanics in several required courses: ME 525, Statics; ME 526, Mechanics of Materials; and ME 627, Dynamics.

Students who are interested in pursuing their study of mechanics further can do so by taking additional technical electives in their junior and senior years. In particular, students can take ME 629, Kinematics and Dynamics of Machines; ME 786, Introduction to Finite Element Analysis; ME 723, Advanced Dynamics; ME 727, Advanced Mechanics of Solids; and ME 724, Vibration Theory and Applications; and ME 735, Mechanics of Composite Materials.

I.2. Thermal Sciences

The thermal sciences area involves the study of energy conversion and transmission, power generation, the flow of liquids

and gases, and the transfer of thermal energy (heat) by means of conduction, convection and radiation. The flow of fluids and the transmission of heat are involved in virtually all energy conversion devices and systems. One may think of the jet engine as a mechanical device and yet its purpose is to control the flow of air and fuel in such a way that a thrust is developed and an airplane can be propelled forward. The processes involved are a superb example of thermal science processes being controlled by a mechanical device. It is the understanding of these processes that allows one to develop the mechanical device that produces them.

In the study of Mechanical Engineering the thermal sciences encompass a sequence of courses in three separate areas. The sequence starts with ME 503, Thermodynamics, a sophomore spring course. This is followed by ME 608, Fluid Mechanics in the fall of the junior year and then ME 603, Heat Transfer in the spring of the junior year. A fourth course which integrates fundamental principles from each of these courses into the design process is ME 705, Thermal System Analysis and Design offered during the first semester of the senior year.

Students with career interests in the thermal sciences are encouraged to take elective courses such as: ME 707, Analytical Fluid Mechanics; ME 708, Gas Dynamics; ME 709, Computational Fluid Mechanics; and ME 712, Waves in Fluids.

I.3. Design and Manufacturing

While the basic sciences are concerned with the discovery of new knowledge, engineering is concerned with the application of existing knowledge to the design of products and processes which are useful to society. The design process requires a synthesis of creativity, basic scientific knowledge, engineering analysis and project management skills. Good designers must be both creative and analytical. They must combine imagination with mathematics, a difficult but an immensely rewarding task.

Our curriculum is dedicated to providing graduates with a

strong foundation in the basic principles of engineering theory while also ensuring that students know how to apply that theory to real engineering problems. Design coursework starts in the Freshman year in ME 441, Introduction to Engineering Design & Solid Modeling. A series of projects are also used to teach the design process with emphasis on problem identification, criteria generation, brainstorming, decision making, detailed design, economics and project management.

Design projects in fundamental courses and/or open-ended homework problems are used to help students appreciate the importance of learning how to apply fundamental knowledge to real world applications. In ME 643, Elements of Design, students learn how to apply the fundamentals of mechanics to the design of machine elements like gears, bearings, shafts and fasteners. In ME 705, Thermal System Analysis and Design, the fundamentals of the thermal sciences are applied to open-ended design problems. The capstone design experience comes in the Senior year in ME 755-756 or Tech 797, a two semester design project course (see page 14).

Students interested in design should consider taking additional courses as part of their technical elective requirements. In the design area these include: ME 442, Manufacturing Engineering and Design; ME 542, Mechanical Dissection; ME 629, Kinematics and Dynamics of Machines; ME 735, Mechanics of Composite Materials; ME 783, Geometric Modeling; ME 785, Solid Mechanics in Manufacturing; and ME 786, Introduction to Finite Element Analysis.

I.4. Systems and Control

Systems and control is an area of study within mechanical engineering that integrates the basic concepts learned in fluids, heat transfer, mechanical dynamics and electrical elements into a methodology that can be used to design complete interdisciplinary systems. Examples include: position control of antennas, modeling of train braking systems, control of a remote manipulator system, elevator speed and positioning, automobile traction control, cruise control, and design of measurement system.

As each area of engineering has become more specialized, it is important to have individuals in industry who can design, analyze and predict the behavior of integrated systems, i.e. systems that may contain mechanical, electrical, thermal and fluid elements. They must understand how to combine or arrange the various system elements, and how to develop mathematical models that relate an output, e.g. car speed to an input, desired car speed set from the cruise control unit.

Specific UNH undergraduate courses provide an introduction to systems and controls. The first course is ME 670, Systems Modeling, Simulation, and Control. This course covers the essentials of system modeling and dynamic response and introduces feedback controls. The first lab course is ME 646, Experimental Measurement and Data Analysis. This is followed by a second lab course, ME 747, Experimental Measurement and Modeling of Complex Systems. This course provides experimental testing and evaluation of basic dynamic systems and control of DC motors.

Students who are interested in pursuing this area of study should consider taking these additional technical electives: ME 723, Advanced Dynamics; ME 724, Vibration Theory and Applications; ME 741, Nonlinear Systems Modeling; ME 743, Satellite Systems, Dynamics, and Control; ME 770, Design with Microprocessors; ME 771, Linear Systems and Controls; ME 772, Control Systems; and ME 773, Electromechanical Analysis and Design.

I.5. Materials Science

Materials science has had a profound influence on the development of our technologically-advanced society. The availability of suitable materials has been critical to the realization of many new engineering concepts. For example, the mass-produced automobile would not have been possible without the availability of low-cost steel, made possible by the development of the Bessemer process for steel-making. The low-cost integrated circuit for electronics devices owes its existence to the availability of ultra-high

purity silicon and the ability to modify the electrical properties of silicon by diffusion and ion implantation. Recent developments in superconductors and magnetic storage devices are also dependent on understanding the behavior of advanced materials. The properties of these and many other materials can only be truly understood through correlation with the structure of the materials. Therefore, the role of the materials scientist is to understand the relationships between the microscopic structure and properties of materials. The Materials Science faculty have special interests in such topics as fracture and fatigue of materials, deformation in composition devices, deformation of materials in composite devices, properties of thin films and coatings, and joining of materials for electronic applications.

Part of the Mechanical Engineering curriculum focuses on Materials Science. The only required course is ME 561, Introduction to Materials Science. This course has both a lecture and a laboratory component. However, there are a number of elective courses available: ME 730, Mechanical Behavior of Materials; ME 731, Fatigue and Fracture; ME 744, Corrosion; ME 760, Physical Metallurgy; ME 761, Diffraction and Imaging Methods in Materials Science; ME 762, Electronic Materials Science and ME 763, Thin Film Science & Technology. A minor is available for those students with a strong interest in Materials Science.

II. THE MECHANICAL ENGINEERING DEPARTMENT AT UNH

The UNH Mechanical Engineering (ME) Department has 16 faculty members, over 380 undergraduate students, and over 50 graduate students in the Masters degree and Ph.D. degree programs. The subject areas taught by the faculty consist of: mechanics; thermal sciences; design and manufacturing; systems and control; and materials science. Please also see our webpage at <http://www.unh.edu/mechanical-engineering/index.html>.

The Mechanical Engineering Office is located in King sbury Hall, Room W101 and is open from 8:00 a.m. to 12:00 noon and from 1:00 p.m. to 4:30 p.m. Monday through Friday. Tracey Harvey and Megan Rand manage the office and coordinate a broad range of services for the faculty and students of the Department. Students are encouraged to contact them during office hours with any concerns or questions.

II.1. Mission Statement

In support of the University and College missions, the Mechanical Engineering Department is dedicated to educating the highest quality engineering professionals and leaders. Our graduates will be prepared to creatively solve engineering problems through the use of analysis, computation, and experimentation. The students completing our program should be well-informed citizens who have the ability to grow intellectually and are able to solve new, challenging problems with self-confidence. We maintain a general and flexible curriculum that prepares students for both industrial practice and graduate education.

II.2. Program Objectives

The goal of the UNH Mechanical Engineering program is to produce graduates that are:

Good Professionals:

1. Skillfully applying the fundamental principles of mathematics, science and engineering;
2. Solving engineering problems by integrating strong design, analysis and experimental abilities with excellent communication skills.
3. Successfully contributing to their respective corporate, government or academic organizations.
4. Demonstrating continuous growth, e.g. by assuming positions of leadership in their profession; by becoming successful entrepreneurs; by successfully completing advanced degrees and professional education.

Good Citizens:

5. Broadly educated citizens of society with an understanding of the impact of engineering solutions in a global/societal context.
6. Demonstrating a high level of personal and social integrity through their ethical behavior and service to their peers, employers, communities, nation and the world.

III. ACADEMICS

III.1. The Curriculum

The curriculum is designed to prepare graduates for either more advanced study or for beginning professional engineering careers. It provides a foundation of knowledge in the basic physical sciences, mechanics of solids and fluids, the thermal sciences, materials science, dynamic systems and controls, and design. Elective courses allow students to gain additional competence in any of these specific areas. Other elective courses in the arts, humanities, and the social sciences are included to provide a liberal education. The order of courses in each of the four years is shown in detail in the University catalog. The standard four year plan is shown below. A minimum of 128 credits is required for graduation.

First Year

Fall

*Gen Ed ____	4 Cr	_____
Math 425	4 Cr	Calculus I
*ME 441	4 Cr	Intro to Eng Design & Solid Modeling
Chem 405	4 Cr	Gen Chem

Sophomore Year

Gen Ed ____	4 Cr	_____
Math 528 or	4 Cr	Multi-Dim Calc
Math 525	6 Cr	Linearity I
Phys 408	4 Cr	Gen Phys II
*ME 525	3 Cr	Mechanics I
Tech Elec	_ Cr	_____

Junior Year

ME 608	3 Cr	Fluid Dynamics
*ME 627	3 Cr	Mechanics III
ECE 537	4 Cr	Circuit & Signals
CS 410,412	4 Cr	Intro C Prog
Gen Ed ____	4 Cr	_____

Senior Year

*ME 755 or	2 Cr	Sr Design Proj
*Tech 797	2 Cr	Ocean Projects
*ME 705	4 Cr	Therm Sys Des
*ME 747	4 Cr	Exp Meas Lab II
Tech Elec	_ Cr	_____
Gen Ed ____	4 Cr	_____

*Writing requirement courses

Spring

*Engl 401	4 Cr	FY English
Math 426	4 Cr	Calculus II
Phys 407	4 Cr	Gen Phys I
Gen Ed ____	4 Cr	_____
Math 527 or	4 Cr	Diff Eq
Math 526	6 Cr	Linearity II
*ME 561	4 Cr	Int to Matl. Sci
*ME 526	3 Cr	Mech II
ME 503	3 Cr	Thermodynamics
ME 603	3 Cr	Heat Transfer
*ME 643	3 Cr	Elem of Design
*ME 646	4 Cr	Exp Meas Lab
*ME 670	4 Cr	Sys Mod, Sim & Ctrl
Gen Ed ____	4 Cr	_____
*ME 756 or	2 Cr	Sr Design Proj
*Tech 797	2 Cr	Ocean Projects
Tech Elec ____	_ Cr	_____
Tech Elec ____	_ Cr	_____
Tech Elec ____	_ Cr	_____

ME Curriculum Chart

The chart below shows the required curriculum for ME majors. Courses are grouped horizontally by semester and vertically by discipline.

	Math	Science	Mech.	Thermo-Fluids	Design	Lab & Tech Elect	Gen. Ed.	
Sem. 1 Fresh Fall	Math 425 (4)	Chem 405 (4)			ME 441 (4)		Gen. Ed. (4)	3 Reqd. Courses & 1 Gen. Ed. (16)
Sem. 2 Fresh Spring	Math 426 (4)	Phys. 407 (4)				1 Gen. Ed. (4)	Engl. 401 (4)	2 Reqd. Courses Eng 401 1 Gen. Ed. (16)
Sem. 3 Soph. Fall	Math 528 (4) or Math 525 (6)	Physics 408 (4)	ME 525 (3)			Tech Elect (3-4)	Gen. Ed. (4)	3 Reqd. Courses 1 Tech Elect & 1 Gen. Ed. (18-21)
Sem. 4 Soph. Spring	Math 527 (4) or Math 526 (6)	ME 561 (4)	ME 526 (3)	ME 503 (3)				4 Reqd. Courses (14-16)
Sem. 5 Junior Fall		ECE 537(4) CS 410, 412 (4)	ME 627 (3)	ME 608 (3)			Gen. Ed. (4)	4 Reqd. Courses & 1 Gen. Ed. (18)
Sem. 6 Junior Spring		ME 670 (4)	ME 643 (3)	ME 603 (3)		ME 646 (4)		4 Reqd. Courses (14)
Sem. 7 Senior Fall				ME 705 (4)	ME 755 (2) or Tech 797 (2)	ME 747 (4) 1 Tech. Elect (3-4)	Gen. Ed. (4)	3 Reqd. Courses 1 Tech Elect 1 Gen Ed (17-18)
Sem. 8 Senior Spring					ME 756 (2) or Tech 797 (2)	3 Tech. Elects (9-12)	Gen. Ed. (4)	1 Reqd.Course, 3 Tech Elects & 1 Gen.Ed. (15-18)
An integrated approach to design of fundamental concepts is required in the following courses: ME 441, ME 503, ME 525, ME 526, ME 627, ME 643, ME 670, ME 705, ME 755 and ME 756 or Tech 797.								

III.2. Advising Sheet

As a student progresses through the program it is helpful to maintain a record of courses completed and the associated credits and grades. A departmental advising sheet, set-up to reflect the curriculum requirements in effect when a student begins the program, is maintained in the student's academic file in the ME Office. Planning for the registration and the extent to which graduation requirements have been met are quickly seen by referring to this sheet.

III.3. Academic Rules and Policies of the Mechanical Engineering Department

Predictor Courses: To enter the junior-year courses in the Mechanical Engineering major, students must achieve a minimum grade-point-average of 2.00 with no grade below C- in the following courses: PHYS 407, MATH 426, ME 525, ME 526 and ME 503. These courses are particularly indicative of future success in the junior and senior years and are taken during the freshman and sophomore years.

Junior-Senior Standards: In order to graduate in the Mechanical Engineering major, students must have at least a 2.00 overall grade-point average in all engineering and science courses, including technical elective courses normally taken as department requirements, after the start of the junior year

Petitions: There is a standard petition form used to request a variance in academic policy, e.g. a suspension, an overload, an extension on an incomplete, etc. The petition requires the signature of the instructor, advisor, ME chair and/or college dean. Petitions are available in the ME Office. Requests for dropping a class after the final deadline are usually granted only if there is a compelling non-academic reason. Students should attach any supporting documentation (note from a doctor, etc.) to the petition before submitting it to the Mechanical Engineering Department for signatures.

III.4. Code of Ethics

All ME Students are provided with a copy of Section 9 (Academic Honesty) from the Students' Rights, Rules, and Responsibilities policies. Students are required to read the documents and sign a code of ethics statement which is kept in their academic file located in the ME Office.

III.5. Honors in Major

To achieve the Mechanical Engineering Honors in major, students are required to fulfill the following requirements:

1. Students are required to maintain an overall 3.20 grade-point average and a 3.50 grade-point average in major coursework.
2. Students must successfully complete *three* 600- or 700-level courses along with the companion Honors Seminar (ME 797) for each course. The regular ME course plus the associated Honors Seminar constitutes a complete mechanical engineering honors-course experience.

Each semester, a select number 600- or 700-level course will be available as both regular courses and as part of an honors-course experience. For each of these courses, there will also be a related Honors Seminar open only to qualified students. By registering for the Honors Seminar as well as the regular course, an additional credit will be earned beyond those normally awarded. Honors students will attend the regular meetings and fulfill the usual requirements of these courses and also meet an hour more each week (as part of the seminar) for additional instruction and assignments.

3. Students must successfully complete ME 755H-756H, or TECH 797 as their Senior Design Experience (4 cr.). This requirement will be directed by a faculty advisor and

consist of at least four credits. A written report will be submitted upon completion of research.

Please contact the Honors advisor, Prof. Rob Swift at mrsswift@unh.edu for more information.

III.6. Elective Courses: Structure and Guidelines

In order to complete the Mechanical Engineering program, students must satisfy both University and departmental requirements. Within the framework of both sets of requirements, students have many choices and opportunities to pursue areas or topics of their own particular interests.

III.6a. University General Education Requirements Specific to Mechanical Engineering & the Writing Requirement

The guidelines for satisfying the General Education requirements at the University level are clearly defined in the University Catalog. However, there are certain additional conditions which must be met to satisfy departmental requirements as they apply to the General Education electives. These are as follows:

- 1) From the Biological Science, Physical Science, and Technology offerings, Group 3, one course must be selected from the Biological Sciences. No more than two courses can be taken in any one area.**
- 2) Within the Social Science offerings, Group 7, Mechanical Engineering majors must take either Economics 402, Principals of Economics (Micro) or Resource Economics 411, Resource Economics Perspectives.**

Writing Requirement

Students must complete four “Writing Intensive” courses, including English 401 (First Year Composition), and three additional “writing-intensive” courses, one of which must be in the student’s major, and one of which must be at the 600-level or above.

III.6b. Technical Elective Requirements

The department requires students to pass five technical elective courses of at least three credits each. They must be selected from 600-700 level courses in the College of Engineering and Physical Sciences, except for one course that may be selected from the following 400-500 level courses: ME 442, ME 542, ENE 520, ESCI 501 and ECE 543. Two technical electives can be used for studying a focused area such as a foreign language, or a pre-professional program, or a minor, with mechanical engineering department approval, with the restriction that only one course can be at the 400 or 500 level.

III.7. Senior Projects

The two semester project course sequence ME 755, 756, or Tech 797 must be completed by the end of the senior year by all undergraduates who are planning to receive their bachelors degree in Mechanical Engineering. The purpose of this requirement is to allow every ME graduate to gain experience in a substantial design or experimental research project.

III.8. Minors

The ME curriculum provides enough flexibility to make it relatively easy to minor in a number of other disciplines. Courses used to fulfill a minor may be substituted for two of the five required technical electives with department approval. However, if the minor is not completed then appropriate technical electives must be taken, even if the substitute courses have already been taken. Most minors consist of at least 20 credit hours with a C- or better in each course and a 2.00 grade-point average in courses that the minor department approves.

Courses taken Pass/Fail may not be used for a minor, and no more than 8 credit hours may be used by a student to satisfy major requirements. Students should declare an intent to earn a minor as early as possible and no later than the end of their Junior year. During the final term, a completion of minor form should be submitted to the dean in order to have the minor appear on the student's transcript.

Students can minor in Materials Science and those students interested should contact Prof. Olof Echt at 862-3548, or by e-mail at olof.echt@unh.edu.

The Ocean Engineering Department also offers a minor in Ocean Engineering. Students interested in this should contact Professor Ken Baldwin at 862-1898, or by e-mail at kcb@cisunix.unh.edu.

III.9. Exchange Program, Budapest, Hungary

UNH and CEPS offers students an opportunity to spend the fall semester of the junior year in Budapest, Hungary studying engineering, mathematics, and physical sciences at the Technical University of Budapest (BUTE). This is a UNH managed program (http://www.unh.edu/cie/studyabroad/programs_managed.html).

The program allows students to be exposed to foreign culture and language by living in another country and interacting with students from all over the world. This experience helps students to achieve international proficiency, indispensable with the advent of internationalization of science, engineering jobs and the global market economy. Participation in the program advances opportunities for worldwide careers in engineering, science, and technology.

Students follow a similar schedule to the UNH schedule and all courses are taught in English. Students are required to have a cumulative grade-point average of 2.5 to participate in this program. For more information, check out the website <http://www.ceps.unh.edu/academics/budapest.html> or contact Prof. Robert Jerard, Study Abroad advisor, at robert.jerard@unh.edu.

Other Study Abroad Opportunities

Other opportunities exist for ME students to spend a semester abroad at another institution. Several of our students have spent a semester in Australia. Although there was no formal program in place, they were able to work out a schedule that would still allow

them to graduate on time. Also, one student spent her summer in Scotland conducting research on an International Research Opportunity Program (IROP) grant at the Heriot-Watt University. To find out more about international opportunities, students should contact the Center for International Education (Hood House, room 223).

III.10. Transferring Credits

The Office of Admissions evaluates transfer credits before a student's matriculation at UNH. The admissions officer determines which courses fill group categories of the general education requirements, lists other courses which are accepted for credit, and courses which are accepted as block credits. If students or their advisors disagree with the evaluation, they may petition the General Education Committee through the CEPS Dean's Office.

When a transfer student is accepted in Mechanical Engineering, the department transfer student advisor and chair, Professor Todd Gross, will determine which transfer courses fill the major program requirements. Courses with grades below 'C' will not be given transfer credit. Professor Gross can be reached via e-mail at todd.gross@unh.edu.

Credit Evaluation

The Credit Evaluation Form lists all courses and/or credits that a newly-admitted student has successfully completed at another institution or through DCE that have been accepted as coursework or credit by the Office of Admissions at UNH.

The credit evaluation lists total credits accepted, courses that fulfill our General Education Requirements, other courses accepted, class standing, completion of the foreign language requirement and block credits awarded.

Normally, a credit evaluation is only issued to transfer students, but in some cases it is used for new freshmen who have

earned advanced standing.

The Revision of Credit Evaluation Form may be used when the Office of Admissions has received additional information on a transfer student's previous coursework that affects the original evaluation.

Transfer Credits for Continuing Matriculated Students

Students who wish to take a course at another school and transfer the credit must complete a Transfer Credit Prior Approval Form available in the ME Office. A copy of the course description from the school where the student wishes to take the class must be attached to the form. The Registrar's Office, the department's transfer advisor, and the CEPS Dean's Office must approve the request. The student will receive credit when the transcript is forwarded. If students do not get approval before taking the course, they may not get credit for the course. The criteria for transfer credits are as follows:

- A course taken at another institution may not be used under the University repeated course rule.
- Courses that transfer do not affect the UNH cumulative grade-point average.
- Transfer courses must have a grade of 'C' or better to receive credit.
- Credit will not be awarded for any course taken the semester immediately following any academic suspension or dismissal from UNH.
- A course taken for three semester hour credits at another institution will be worth three credits in transfer to UNH.
- Courses measured in quarter hours, term hours, or course units will be converted to semester hours as a basis for determining the UNH award.

III.11. Graduate School – Early Admission

UNH students can apply for early admission to the UNH Graduate School (http://www.gradschool.unh.edu/home/admit_policy.html) during their senior year. Students who apply are required to have a 3.2 cumulative grade-point average. Early admission allows students to receive dual graduate credit for three 700 level CEPS courses (up to 12 credits) taken during their senior year. The ME Graduate Program coordinator is Prof. Igor Tsukrov.

III.12. Professional Registration

The Fundamentals of Engineering or FE exam is given in October and April every year. This is a day-long examination covering science, chemistry, electrical engineering and computer science at the level students will have experienced these topics in their undergraduate courses. The FE exam is the first step toward registration as a professional engineer. The best time to take the FE exam is in a student's senior year as familiarity with the various topics is at its best. All students are urged to take the FE exam either in the fall or spring. Applications, exam dates, and deadlines are available via the FE website at www.state.nh.us/jtboard/home.htm . The College of Engineering and Physical Sciences (CEPS) offers a refresher course during the spring semester (TECH 601).

IV. FACILITIES AND RESOURCES

IV.1. ME *Smith* Computer Cluster

The Mechanical Engineering computer cluster is located in room W114. There are a number of PC workstations running SolidWorks and other modern engineering software. The cluster is open 24 hours, 7 days a week.

IV.2. Undergraduate Lounge

The undergraduate lounge is located in Kingsbury, room W136. This lounge is available to ME students 24 hours, 7 days a week and offers students a quiet place to work on various assignments.

IV.3. Department Laboratories

There are several undergraduate laboratories in the department (see below).

LAB	LOCATION
Computational Mechanics Lab	Kingsbury Hall, S212
Design & Manufacturing Lab	Kingsbury Hall, S215
Engine Test Lab	Kingsbury Hall, S109 & S109A
ME Fluids Lab	Kingsbury Hall, S113
Thermodynamics Lab	Kingsbury Hall, S125
Senior Project Room	Kingsbury Hall, S162
Product Development Lab	Kingsbury Hall, S211
Systems & Control Lab	Kingsbury Hall, S221
Materials Science Lab	Parsons Hall, 250

IV.3a. Other Facilities

Other laboratory and analysis facilities that are used by the Mechanical Engineering undergraduate students and faculty include:

LAB	LOCATION
Jere Chase Ocean Engineering Lab	24 Colovos Rd
CEPS Machine Shop	Kingsbury Hall, S161

IV.4. Mailboxes and Buckley Amendment

Student mailboxes (individual folders contained in a large filing cabinet) are located in the Mechanical Engineering Computer Cluster (Kings W114). Each student is assigned a separate folder. It is recommended that students check their folder on a regular basis for notices, announcements, and returned assignments. Students who wish to receive their homework assignments, quizzes, exams, and reports via their student folder must complete a Buckley Amendment form which is available from the ME Office. This form is usually distributed during Wildcat Days at the beginning of the fall semester to all new incoming students. All new transfer students receive the form in their folder.

All UNH students are also assigned a University mailbox which is located on the second floor of the Memorial Union Building (MUB). For more information about these mailboxes please visit: http://www.unhmub.com/gss/index.htm#slideframe_23.

IV.5. Textbooks

Students are advised not to buy any textbooks until they are enrolled in their courses. Textbooks cannot be returned for full price if they have been written in. Textbooks can be purchased in a variety of ways, and it is up to each individual. Local bookstores are:

- **Durham Book Exchange**
36 Main Street, Durham, NH
- **UNH Bookstore**
2nd Floor of the Memorial Union Building (MUB)

The University has also introduced a new service that allows students to search by class or instructor to find books for the upcoming semester. This service can be accessed through Blackboard.

IV.6. Tutoring

Students who are experiencing academic difficulties can obtain help through a number of tutoring programs. For math courses, the Math Department runs a tutoring program at the MaC Center (see below). The Tau Beta Pi honor society also runs a tutoring program which covers many freshman/sophomore courses. Tutoring is also available through the Center for Academic Resources (2-3698). The ME Department also employs tutors to help students in chemistry, physics, calculus and ME courses. Students who need help should contact Tracey Harvey or Megan Rand in the ME Office. A list of tutors is also available in the ME Student Blackboard group.

IV.7. MaC Center

The Math Department offers help with calculus courses. Students are strongly encouraged to seek help with their homework and to ask questions at the MaC Center located at the bottom of Christensen Hall. The Center opens the beginning of the second week of classes and is open on Monday and Wednesday from 1-9 p.m., Tuesday and Thursday from 9-5 p.m., Friday from 1-5 p.m. and on some Sundays. For more information, students should contact the MaC Center at 862-3576.

IV.8. Advising/Counseling

Each student is assigned an advisor who is a faculty member in the department. Students should consult their advisor for academic information, scheduling details and referrals for additional advising and counseling. Faculty advisors are responsible for signing all documents, such as the registration form, etc. Students wishing to change advisors may do so at any time simply by contacting the department secretary after consulting the prospective new advisor. There is also a counseling center at Schofield House, 2-2090.

IV.9. Student Advisory Board

The department established its first Student Advisory Board (SAB) in the spring 2005 semester. The purpose of the Student Advisory Board is to document feedback from students for accreditation purposes as well as for the department, and to try and integrate the different classes (first year, sophomores, juniors and seniors). The Board convenes once per semester. SAB members are also invited to participate in the ME Industrial Advisory Board (IAB) meeting held in March of each year. Fellow ME students are encouraged to contact the SAB representatives with their concerns or comments so that they can be discussed at the semi-annual meetings.

Student Advisory Board Members:

First Year:

TBA

TBA

Sophomores:

Caleigh McPherson

caz62@unh.edu

Thomas Provencher

trv25@unh.edu

Juniors:

Patrick Kilar

ptd8@unh.edu

Corey Snelling

cmk58@unh.edu

Seniors:

Vanessa Kohler

vln2@unh.edu

Daniel Madnick

dek4@unh.edu

IV.10. Student Organizations

American Society of Mechanical Engineers (ASME)

Faculty Advisor: John Nolin

john.nolin@unh.edu

862-2516

There is a student section of the American Society of Mechanical Engineers (ASME) in the department. Each year a program of invited speakers, films, and field trips is organized by the student officers. All students are encouraged to join ASME as student members and to upgrade their status to full membership upon graduation. Upon joining, students receive the monthly Mechanical Engineering magazine which contains articles of interest in many of the branches of contemporary mechanical engineering. ASME also sponsors many conferences and workshops nationally each year that are valuable learning experiences.

Students Without Borders (SWB)

Faculty Advisor: Kevin Gardner

kevin.gardner@unh.edu

<http://www.unh.edu/ewb>

862-4334

Student Officers:

Leader: Amanda Loughlin

ala24@unh.edu

Secretary: Kelly Mercer

kej24@unh.edu

Treasurer: Max Pilsmaker

mwf5@unh.edu

The UNH Students Without Borders Chapter is a student chapter of the national organization of Engineers Without Borders. The mission of Students Without Borders-UNH is to establish an organization that encourages, supports, and implements environmentally and economically sustainable technical projects in disadvantaged communities nationally and internationally, while developing globally responsible and knowledgeable students.

Society of Automotive Engineers (SAE)

Faculty Advisor: May-Win Thein

mthein@unh.edu

862-1158

The UNH Chapter of the Society of Automotive Engineers (SAE) provides students with an opportunity to explore the fields of transportation and aerospace engineering with others who share similar interests. This is a student organization which works closely with a faculty advisor to arrange tours, guest speakers, and student projects related to these fields. Student members also receive a monthly magazine and newsletter published by SAE as well as notifications of conferences and publications related to the transportation industry. The cornerstone of the UNH SAE Chapter is the Formula SAE project.

FSAE: A student team designs, builds and competes with mini Formula-1 racing cars. Over 140 universities were involved in last year's competition. The cars have to meet several requirements specified by the SAE, such as a maximum engine displacement (610 cc). Strict safety requirements are established by the SAE and are enforced in the design and the competition. See the FSAE web page at www.unh.edu/fsae/

AERO: The Society of Automotive Engineers (SAE) sponsors an annual competition at the university level for students to design, build and compete with a remote controlled airplane. The airplane should lift as much weight as possible. Accurately predicting the lifting capacity of the airplane is an important part of this exercise. The UNH Aero Team was formed in academic year 2007-2008.

Tau Beta Pi ($\tau\beta\pi$)

Faculty Advisor: Michael Carter

mike.carter@unh.edu

862-4328

There is an active chapter of Tau Beta Pi, the engineering honor society, in the College. Outstanding students from all four engineering departments who meet the rigorous academic standards are eligible. The society performs a number of community outreach projects each year. They have also established the Outstanding

Engineering Teacher's Award which is given to one faculty member in each engineering department on an annual basis.

Society of Women Engineers (SWE)

Faculty Advisor: May-Win Thein

www.unh.edu/swe/

mthein@unh.edu

862-1158

The Society of Women Engineers is a not-for-profit educational and service organization. SWE is the driving force that establishes engineering as a highly desirable career aspiration for women. SWE empowers women to succeed and advance in those aspirations and be recognized for their life-changing contributions and achievements as engineers and leaders. SWE maintains an active student section on campus. Outreach programs to local high schools and seminars by outside speakers are included in their yearly activities.

Robotics Club

Faculty Advisor: Brad Kinsey

bkinsey@unh.edu

862-1811

The mission of the UNH Robotics Club is to provide an educational and inspirational experience for UNH students by using *FIRST* programs as an outlet for students to apply their classroom knowledge and gain real-world experiences, and to provide a service to the community. The members of the UNH Robotics Club engage in *FIRST* programs by acting as positive role models, sharing their appreciation of science and technology with 9-18 year olds. This allows the middle and high school students to experience science and technological fields and envision these fields in their future.

(The Student Society Room (located in Kingsbury N118) is the main office of the τβπ, SWB, and SWE organizations.)

V. CAMPUS RESOURCES

V.1. University Advising and Career Center

<http://www.unh.edu/uacc>

The University Advising and Career Center (UACC) assists current students and alumni of UNH to identify, explore, and implement their educational and career goals. UACC hosts numerous job fairs and resume reviews throughout the academic year as well as providing other services including academic advising, job search support, interest assessments, and internship information. Students interested in learning more about the services offered by the UACC can visit the center in Hood House.

V.2. Center for Academic Resources

<http://www.cfar.unh.edu>

The Center for Academic Resources (CFAR) offers UNH students a variety of services designed to help improve their academic skills. CFAR offers instructions in time management, note-taking, and test-taking skills, as well as services including drop-in tutoring for selected courses, study groups, and information sessions on the Graduate Record Exam (GRE). CFAR's office is located in Wolff House.

V.3. UNH Computer and Information Services (CIS)

<http://www.cis.unh.edu>

CIS is responsible for the many programs and services used at UNH including CIS UNIX, Blackboard, and Webmail among others. CIS helps students and faculty with accounts, Blackboard, and e-mail. Students who have any questions or experience any technical problems are encouraged to call the CIS Helpdesk at 862-4242.

VI. FACULTY/STAFF PROFILES

Faculty	Office	Phone Ext.	E-Mail Address
Todd Gross ME Dept. Chair	KING W101A	862-2445	todd.gross@unh.edu
Kenneth Baldwin	Jere Chase O.E. Lab	862-1898	kcb@unh.edu
Barbaros Celikkol	KING W123	862-1940	celikkol@unh.edu
Greg Chini	KING W113	862-2633	greg.chini@unh.edu
Diane Foster	KING W107	862-3089	diane.foster@unh.edu
Barry Fussell	KING W121	862-1807	barry.fussell@unh.edu
Robert Jerard	KING W111	862-4299	robert.jerard@unh.edu
Brad Kinsey	KING S256	862-1811	bkinsey@unh.edu
Joseph Klewicki	KING W289	862-1781	joe.klewicki@unh.edu
James Krzanowski	PARS 238	862-2315	jamesk@unh.edu
John McHugh	KING W119	862-1899	jpm@unh.edu
M. Robinson Swift	KING W115	862-1837	mrsswift@unh.edu
May-Win Thein	KING W117	862-1158	mthein@unh.edu
Igor Tsukrov	KING W105	862-2086	igor.tsukrov@unh.edu
Chris White	KING S254	862-1495	chris.white@unh.edu
Martin Wosnik	KING S252	862-1891	martin.wosnik@unh.edu
Instructors	Office	Phone Ext.	E-Mail Address
Don MacPherson	None	None	dm@hydrocompinc.com
Staff	Office	Phone Ext.	E-Mail Address
Sheldon Parent	KING S171	862-1945	sparent@unh.edu
Richard Haney	PARS 250	862-1335	ehaney@unh.edu
Tracey Harvey	KING W101	862-1353	tracey.harvey@unh.edu
Megan Rand	KING W101	862-1352	megan.rand@unh.edu
WEB			
www.unh.edu/mechanical-engineering/			

Dr. Kenneth C. Baldwin
Professor

e-mail: kcb@cisunix.unh.edu

Web: www.unh.edu/mechanical-engineering/People/baldwin-html

Office: Jere Chase Ocean Eng Lab
862-1898

Prof. Kenneth Baldwin graduated from Northeastern University in Boston, MA with a BS in Mechanical Engineering in June 1973. Subsequently he received an MS in Mechanical Engineering from the University of New Hampshire and a Ph.D. in Ocean Engineering from the University of Rhode Island. His pursuit of the MS degree at UNH influenced a change in direction towards Ocean Engineering. While finishing his dissertation at URI he worked for one year at the Naval Underwater Systems Center in Newport, RI. His research and teaching interests are broad. He has worked in marine geoacoustics, collision tolerant aides to navigation and recently, marine mammal bioacoustics.

He has been very active in establishing the Center for Ocean Engineering at UNH and has been its Director since the beginning of the first MS program in Ocean Engineering in 1984. He is married to Clare McBane. They have two children, Hannah and Sam. Outside of academic life, ice hockey consumes much of his free time as both children and Prof. Baldwin play. Beyond that, being on, at, or near the water, fresh or salt, is important to him and his family.

Dr. Barbaros Celikkol
Professor*Office: KN W123 - 862-1940**e-mail: celikkol@cisunix.unh.edu*
*Web: www.unh.edu/mechanical-
engineering/People/celikkol.html*

Prof. Barbaros Celikkol received his Ph.D. in Physics at UNH in 1972. He usually teaches courses in the Mechanics and Ocean Engineering areas. His research is in Ocean Engineering topics such as environmental modeling, oil spill response planning, high current boom and skimmer design, off-shore fish cage and ocean fish farming system design.

His current projects are: Open Ocean Aquaculture, Environmental Modeling and Oil Spill Response Technology. For more information on these projects, please see these web pages:

<http://ooa.unh.edu/>

<http://derya.unh.edu/>

Dr. Gregory P. Chini

Associate Professor

Office: KN W113 - 862-2633

e-mail: greg.chini@unh.edu

Web: www.unh.edu/mechanical-engineering/People/chini.html

Prof. Greg Chini received his M.S. and Ph.D. degrees in Aerospace Engineering from Cornell University in 1996 and 1999, respectively, and his B.S. degree in Aerospace Engineering from the University of Virginia in 1993. He joined the Mechanical Engineering faculty at UNH in 1999. Since then, Prof. Chini has also worked as a visiting researcher in the Division of Applied and Computational Mathematics at the California Institute of Technology and in the Theoretical Mechanics Division of the School of Mathematical Sciences at Nottingham University (UK). In 2007, Prof. Chini was appointed founding Co-Director of the CEPS Ph.D. program in Applied Mathematics.

Prof. Chini's research interests are in the allied fields of fluid dynamics and physical applied mathematics. His research involves the mathematical modeling of geophysical, environmental, biological and industrial flows. The existence and stability of coherent features (e.g. nonlinear waves, vortices, and boundary layers) in such flows are of particular interest. Using hybrid analytical-numerical techniques (e.g. asymptotic and spectral methods), he aims to develop simplified models of complex fluid-mechanical systems; these models are used for identifying key physical processes and for purposes of prediction, design, and control. His specific areas of interest include:

- Geophysical (especially Oceanographic), Environmental, Biological and Industrial Fluid Dynamics
- Mathematical Modeling, Asymptotic Analysis, Bifurcation Theory, Physical Applied Mathematics, Numerical Solution of PDEs
- Nonlinear Dynamics, Transport, and Mixing in Turbulent Convection and Boundary Layers
- Surface-Tension Driven Flows of Biological Thin Films, Pulmonary Alveolar Mechanics.

For more information, please see the Center for Fluid Physics web page at: www.cfp.unh.edu

Prof. Chini teaches undergraduate courses in Fluid Dynamics (ME 608) and Thermodynamics (ME 503) along with several advanced fluid dynamics and applied mathematics courses, including Waves in Fluids (ME 7/812), Viscous Flow (ME 909), and Asymptotic Methods (IAM 995).

Dr. Diane Foster *email: diane.foster@unh.edu*
Associate Professor *Web:*
[http://www.unh.edu/mechanical-](http://www.unh.edu/mechanical-engineering/people_d_foster.html)
Office: KN W107 – 862-3089 [engineering/people_d_foster.html](http://www.unh.edu/mechanical-engineering/people_d_foster.html)

Prof. Diane Foster recently joined the Mechanical Engineering faculty at UNH (fall 2008). She received her BS degree in Mechanical Engineering from the University of Massachusetts, Amherst in 1989, her MS degree in Mechanical Engineering from the University of Maine, Orono in 1991, and her Ph.D. degree in Civil Engineering (Ocean Engineering Program) from Oregon State University in 1996. Prior to joining UNH, Prof. Foster was an associate professor in the Department of Civil and Environmental Engineering and Geodetic Science at the Ohio State University in Columbus.

Prof. Foster's research interests include:

- Fluid-Sediment Interactions in Coastal Environments
- Ocean bottom boundary layer and sediment dynamics
- Fluid-Structure-Sediment of submarine objects (ie mines, piers)
- Optical and Wireless sensor development for ocean applications
- Suspension and Transport of Mixed-Grain Sediment

Prof. Foster teaches OE and ME courses which include Coastal Engineering and Processes (OE 757) and Heat Transfer (ME 603).

Dr. Barry K. Fussell
Professor

Office: KN W121 - 862-1807

e-mail: barry.fussell@unh.edu

Web: www.unh.edu/mechanical-engineering/People/fussell.html

Prof. Barry Fussell received his PhD from Ohio State University in 1987 specializing in dynamic systems and controls. He joined the Mechanical Engineering faculty at UNH in 1987 and has pursued research in electromechanical analysis and design, as well as modeling and control of machining operations. His electromechanical work is concentrated on brushless, stepper and induction motors; which has been funded mainly through industry. His smart machine research has been funded by NSF, Air Force, SME and industry. Prof. Fussell, along with Prof. Jerard, comprises the faculty of the Design and Manufacturing Lab at UNH. For more information, please visit the Design & Manufacturing Lab website (www.unh.edu/dml).

He has taught the following courses: ME 646 - Experimental Measurement & Data Analysis, ME 670 - Systems Modeling and Controls, ME 723 - Advanced Dynamics, ME 747 - Complex Systems and Measurements, ME 741 - Nonlinear Modeling, ME 770 - Design with Microprocessors, ME 771 - Linear Systems and Control, ME 772 - Controls Systems, ME 773 - Electromechanical Analysis and Design, ME 951 - Advanced Control Systems I and ME 955 - Filtering and Estimation.

In his "spare" time Prof. Fussell likes to run, bike, swim, and compete in triathlons (during the summer of course), and in the winter he sticks to skiing, snow shoeing, and winter hiking. He also likes to sail upon occasion.

Dr. Todd S. Gross
Professor & Chair

e-mail: todd.gross@unh.edu
Web: www.unh.edu/mechanical-engineering/People/gross.html

Office: KN W101A - 862-2445

Prof. Gross received his PhD in Materials Science and Engineering from Northwestern University in 1981 and his BS in Metallurgy and Materials Science in 1975 from Carnegie-Mellon University. His research interests are mechanical behavior of materials, behavior of material systems, scanning probe microscopy, nanoindentation, and sensors for machining. His current research is in field assisted nanopatterning, mechanical behavior of carbon/carbon composites, solid state sensors for atmospheric sensing, and wireless machining force sensors.

Prof. Gross teaches ME 561 - Introduction to Materials Science, ME 730/MS 830- Mechanical Behavior of Materials, ME 731/MS 831 - Fracture and Fatigue of Engineering Materials and ME 744/OE 844 - Corrosion. He also advises senior design projects.

Dr. Robert B. Jerard
Professor

Office: KN W111 - 862-4299

e-mail: robert.jerard@unh.edu

Web: www.unh.edu/mechanical-engineering/People/jerard.html

Prof. Robert Jerard has been a member of the UNH Mechanical Engineering Department since 1987. He previously held positions at the University of Connecticut, Dartmouth College, and Boston University's Overseas Program in Ramstein, Germany. He teaches and performs research in the field of Computer Aided Design and Computer Aided Manufacturing (CAD/CAM). Students receive a taste of his project-oriented approach to education in ME 441, Design and Solid Modeling, a required first year level course.

Prof. Jerard also maintains an active research program; his most recent work being related to Computer Aided Manufacturing (CAM).

Prof. Jerard received his undergraduate education at the University of Vermont in Mechanical Engineering where he was also captain of the ski team in his senior year, with a specialty of ski jumping. He then went to MIT for graduate work where his Master's Thesis was concerned with the mechanical design of an artificial arm for above-elbow amputees.

Dr. Brad Lee Kinsey
Assistant Professor

Office: KN S256 - 862-1811

e-mail: bkkinsey@unh.edu

Web: www.unh.edu/mechanical-engineering/People/kinsey.html

Prof. Brad Kinsey joined the faculty of the Mechanical Engineering Department in the fall of 2001. He received his BS degree from the University of Michigan in 1992. After working for three years in the automotive industry, he began his graduate work at Northwestern University where he received his Master's and Ph.D. degrees in 1998 and 2001 respectively. His research is in the area of bulk deformation processes at multiple size scales, from nano- to macroscale.

Prof. Kinsey teaches ME 441 – Introduction to Design and Solid Modeling, ME 643 – Elements of Design, ME 785/885-Solid Mechanics in Manufacturing, and ME 795/895 – Computer Aided Engineering.

Outside of school, Prof. Kinsey enjoys spending time with his wife Susan and their three children, Emma, Julia, and James.

Dr. Joseph (Joe) C. Klewicki
Dean, CEPS
Professor of Mechanical
Engineering

e-mail: joe.klewicki@unh.edu
Web: www.unh.edu/mechanical-engineering/People/klewicki.html

Office: CEPS Dean's Office, KN W289 - 862-1781

Dr. Joe Klewicki joined UNH as Dean of CEPS in 2005. Previously, he held the position of chair in the Mechanical Engineering Department at the University of Utah. He received his Ph.D. degree in Mechanical Engineering at Michigan State University in 1989. He received his MSME degree in Mechanical Engineering from the Georgia Institute of Technology in 1985, and his BSME degree in Mechanical Engineering from Michigan State University in 1983.

Dean Klewicki's areas of specialization are in experimental methods in fluid mechanics, turbulent and unsteady flows, vorticity dynamics, and boundary layers.

For more information on his research, please see his web page at:

www.unh.edu/mechanical-engineering/People/klewicki.html

Dr. James E. Krzanowski
Professor*Office: PARS 238 - 862-2315**e-mail: jamesk@cisunix.unh.edu
Web: www.unh.edu/mechanical-engineering/People/krzanowski.html*

Prof. James E. Krzanowski specializes in the field of materials science. Prof. Krzanowski received his B.E. degree from Stevens Institute of Technology and his M.S. and Ph.D. degrees from M.I.T. Before coming to UNH, he held engineering and research positions with IBM and the U.S. Army Materials Research Laboratory. His research interests are currently focused on the development and fabrication of thin-film coatings. Work is currently being carried out to develop a simple process for coating materials with titanium carbide, a hard, wear-resistant material. The mechanical properties of metallic thin films and multilayers are also being investigated. Prof. Krzanowski also specializes in the use of advanced methods for characterizing the properties of materials, such as electron microscopy, atomic force microscopy and x-ray diffraction.

Prof. Krzanowski teaches materials science courses in the Department, including ME 561-Introduction to Materials Science, ME 760-Physical Metallurgy, ME 761-Diffraction and Imaging Methods in Materials Science, ME 762-Electronic Properties of Materials, and ME 763-Thin Film Science & Technology.

Dr. John P. McHugh
Associate Professor
Office: KN W119 - 862-1899

e-mail: jpm@cisunix.unh.edu
Web: www.unh.edu/mechanical-engineering/People/mchugh.html

Prof. John McHugh has interests in fluid mechanics and applied math. He received BS, MS and Ph.D. degrees from the University of Michigan, Ann Arbor, before joining the faculty at UNH. He has held full-time positions at the David Taylor Research Center and the Offshore Company prior to the PhD. He has also held visiting positions at the Air Force Geophysics Laboratory, the Jet Propulsion Lab at Cal Tech and MIT.

Prof. McHugh is primarily interested in analytic and computational solution to physical problems. His current research topics include internal waves in the atmospheres of Earth and the outer planets, origins of the deep ocean circulations, spray formation near a solid body, coating flows over compliant surfaces and non-linear waves on the surface of a fluid.

Prof. McHugh teaches courses in fluid mechanics, thermodynamics, and math. This includes ME 603 - Heat Transfer, ME 608 - Fluid Mechanics, ME 707/807 - Analytical Fluid Dynamics, ME 709/809 - Computational Fluid Dynamics and ME 909 - Viscous Flow.

Dr. M. Robinson Swift
Professor*Office: KN W115 - 862-1837**e-mail: mrsswift@cisunix.unh.edu**Web: www.unh.edu/mechanical-engineering/People/swift.html*

Prof. M. Robinson Swift's teaching activities have generally been in the mechanics and ocean engineering areas. At the present time, he is teaching ME 526-Mechanics II, and regularly offers ME 7/827-Advanced Mechanics of Solids, and OE 7/854-Ocean Waves and Tide. ME 922-Continuum Mechanics, ME 926-Theory of Elasticity, OE 954-Ocean Waves and Tides II, and OE 956-Dynamics of Moored Systems are also given depending on student interest. He is coordinator of Ocean Projects, Tech 797 - a senior design course alternative that offers financial support for projects in the marine area. He also serves as the Honors-in-Major coordinator for Mechanical Engineering.

Prof. Swift is professionally active in conducting research in Ocean Engineering. Projects include aquaculture fish cage and feed buoy design and analysis, compliant ocean structures, estuarine tidal dynamics, tidal energy, oil spill response and non-point source pollution. He has often offered senior projects in these areas thereby including undergraduates in the research and development experience.

Dr. May-Win Thein
Associate Professor

Office: KN W117 - 862-1158

e-mail: mthein@cisunix.unh.edu

Web: www.unh/mechanical-engineering/People/thein.html

Professor May-Win Thein received her B.S. and M.S. Degrees in Mechanical Engineering from Lehigh University in 1991 and 1992, respectively. She received her Ph.D. in Mechanical Engineering from Oklahoma State University in 1999. She holds memberships in Sigma Xi, Tau Beta Pi, Pi Tau Sigma, Phi Eta Sigma, AIAA, ASME (Dynamics Systems and Control Division), IEEE (WIE, AESS, Control Systems Society), SAE, and SWE.

Professor Thein's field of specialization is in the area of System Dynamics and Control. Her studies involve nonlinear estimation and control with particular emphasis on spacecraft orbit and attitude determination and control system applications. Her current research includes:

- Gyroless observer-based attitude and nutation control for spin-stabilized spacecraft
- Relative position estimation and control for precise formation flying spacecraft about the L2 Libration point of the Earth/Moon and Sun system
- Lunar and extraterrestrial surface navigation and determination with limited sensors
- Experimental analysis and verification of dynamics for spin-stabilized spacecraft
 - Flexible boom dynamics
 - Observer-based nutation control
 - On-board orbital feedback control
- Feedback control of fish cage systems for open aquaculture
- Variable structure system applications to state estimation and control of deterministic systems

Professor Thein teaches ME 670 (Systems Modeling, Simulation, and Control), ME 747 (Experimental Measurements and Modeling of Complex Systems), ME 7/843 (Satellite Systems, Dynamics, and Control), ME/ECE 944 (Nonlinear Control Systems), and other special topics courses relating to advanced control techniques and spacecraft dynamics and control. Professor Thein also serves as the faculty advisor to several UNH organizations, including the UNH Precision Racing Team, the UNH Chapter of the Society of Women Engineers, and UNH WildCatSat CanSat Team.

Dr. Igor I. Tsukrov
Professor

Office: KN W105 - 862-2086

e-mail: igor.tsukrov@unh.edu
Web: www.unh.edu/mechanical-engineering/People/tsukrov.html

Prof. Igor Tsukrov received his BS/MS degree in Applied Mechanics from Dnepropetrovsk University, Ukraine, and his MS and Ph.D. degrees in Mechanical Engineering from Tufts University. He has worked in industry for Parker Hannifin Corporation performing finite element simulations of new composite materials, and for AIR Inc. modeling damage to structures due to natural disasters (tornadoes, earthquakes, etc.)

Prof. Tsukrov's area of expertise lies in the field of Micromechanics and Fracture of Composite Materials, Computational Solid Mechanics and Finite Element Method. His current research projects are:

- Multi-scale study of Carbon/Carbon Composites
- Finite element modeling of offshore fish cage/mooring systems and ocean energy installations
- Development of stress-based failure criterion to improve sheet metal forming
- Biomechanical modeling to predict impact stresses on a North Atlantic Right Whale due to collision with a vessel

He currently teaches ME 735 - Mechanics of Composite Materials, ME 786/886 - Introduction to Finite Element Analysis, ME 935 - Micromechanics of Composite and Porous Materials, and ME 986 - Advanced Finite Element Analysis.

Prof. Tsukrov enjoys hiking in the summer, downhill skiing in the winter, and playing tennis. If he only had more free time...

Dr. Chris White
Assistant Professor
Office: KN S254 - 862-1495

e-mail: chris.white@unh.edu
Web: http://www.unh.edu/mechanical-engineering/people_c_white.html

Professor Christopher White received his BS. and MS degrees in Mechanical Engineering from the State University of New York at Stony Brook and his Ph.D. degree from Yale University. From 2001-2004 he was a Postdoctoral Research Fellow at Stanford University in the Department of Mechanical Engineering. Following his post-doctoral work, he joined Sandia National Laboratories as a Senior Member of the Technical Staff in the Combustion Research Facility. His principal duties at Sandia included lead investigator in the Advanced Hydrogen Fueled Engine Laboratory. In late 2006, he joined the University of New Hampshire as an Assistant Professor of Mechanical Engineering.

Prof. White currently teaches ME 646 - Experimental Measurement & Data Analysis and will teach classes in fluid mechanics, heat transfer and experimental methods in engineering. His research interests include experimental fluid mechanics, combustion, energy conversion technologies, and alternative energy. For information on Prof. White's research, please visit the website for the Center for Fluid Physics (CFP) at cfp.unh.edu. The CFP is a collaborative cross-disciplinary group of fluid dynamics researchers at UNH.

Dr. Martin Wosnik
Assistant Professor
Office: KN S252 - 862-1891

e-mail: martin.wosnik@unh.edu
Web: http://www.unh.edu/mechanical-engineering/people_m_wosnik.html

Professor Martin Wosnik joined the Mechanical Engineering faculty at UNH in the spring of 2008. He received a BS equivalent in Mechanical Engineering at the Technical University of Darmstadt, Germany, and received his MS degree in Aerospace Engineering and his Ph.D. degree in Mechanical Engineering from the University at Buffalo, The State University of New York. He worked as Assistant Research Professor in the Thermo and Fluid Dynamics Section at Chalmers University of Technology in Gothenburg, Sweden, then as Research Associate at St. Anthony Falls Laboratory at the University of Minnesota. Before coming to New Hampshire, Prof. Wosnik was Senior Flow Engineer at Alden Research Laboratory in Massachusetts, a national flow engineering firm conducting a wide variety of hydraulic studies for electric power utilities, architect-engineering firms, equipment manufacturers, and governmental agencies.

Prof. Wosnik's research interests are in the area of fluid and thermal science and engineering, and include hydrodynamics, cavitation and bubbly flows, turbulent boundary layers, hydraulic modeling, ocean renewable energy and other energy applications. For more information, please visit his web page.

Prof. Wosnik teaches fluid and thermal sciences courses, including ME 705 Thermal System Design, ME 895/795 Experimental Fluid Dynamics, ME 795/895 Renewable Fluid Energy and ME 906 Convection Heat Transfer.

Mr. Sheldon Parent
Information Technologist II

e-mail: sparent@cisunix.unh.edu

Office: KN S227 - 862-1945

Sheldon maintains the technical equipment and supplies necessary for the operation of the Mechanical Engineering labs. He is also responsible for the maintenance, upkeep and software library pertaining to the ME Department computers. Sheldon is also in charge of the Mechanical Engineering Shop, and is available for support to the department and students.

Mr. Richard Haney
Materials Technician

Office: PARS 250 - 862-1335

e-mail: erh1938@yahoo.com

Web: www.unh.edu/mechanical-engineering/People/haney.html

Richard was born in northern New Hampshire; went to Plymouth State College and has taught Physics, Chemistry and Biology in Portsmouth and Claremont, New Hampshire. He has worked at the Portsmouth Naval Shipyard in the Apprentice Training Program, and as a Radiation Monitor. He is in charge of the Materials Testing Laboratory in Parsons Hall. He also assists in the undergraduate labs and helps with graduate student projects. He maintains and builds equipment for the lab and maintains a safe and healthy environment.

VII. Important UNH Phone Numbers and Web Addresses

Center for Academic Resources	862-3698	www.cfar.unh.edu
Center for Undergraduate Research	862-4323	www.unh.edu/undergrad-research
CEPS Academic Affairs Office	862-1783	www.ceps.unh.edu
Mechanical Engineering Department	862-1352	www.unh.edu/mechanical-engineering
Computing & Information Services	862-4242	www.cis.unh.edu
Connor's Writing Center	862-3273	www.unh.edu/writing/connors
Counseling Center	862-2090	www.unhcc.unh.edu
Disability Services for Students	862-2607	www.unh.edu/disabilityservices
Health Services	862-1530	www.unh.edu/health-services
Honors Program	862-3928	www.unh.edu/honors-program
Libraries Main (Dimond) CEPS (Kingsbury)	862-1535 862-1196	www.library.unh.edu
MUB (Memorial Union Building) Information Center	862-2600	www.unh.edu/mub
Registrar's Office	862-1500	www.unh.edu/registrar
SHARPP (Sexual Harassment & Rape Prevention Program)	862-3494	www.unh.edu/sharpp
Student Organization Services	862-4764	www.unhmub.com
Student Senate	862-1494	www.unh.edu/student-sentate
Telecom	862-1030	www.cis.unh.edu
University Advising and Career Services	862-2064	www.unh.edu/uacc
University Police/Security/ Escort Services	862-1427	www.unh.edu/upd EMERGENCY DIAL 911