The George W. Woodruff School of Mechanical Engineering
2004-2005
Undergraduate Handbook

Programs in
Mechanical Engineering
and
Nuclear and Radiological Engineering

(This Handbook was revised in December 2004. See, in particular, requirements in the undergraduate programs and academics, in rules and regulations).
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STUDENT ORGANIZATIONS

Woodruff School Student Advisory Committee (WSSAC)
Professional Societies
American Nuclear Society (ANS)
American Society of Heating, Refrigerating, and Air Conditioning (ASHRAE)
American Society of Mechanical Engineers (ASME)
SAE International
Society of Manufacturing Engineers (SME)
Honor Societies
Pi Tau Sigma
Gamma Beta Phi
Tau Beta Pi
Student Competition Groups
gt motorsports
GT Off-Road (Mini-Baja Team)
RoboJackets

FACULTY

Acoustics and Dynamics
Automation and Mechatronics
Bioengineering
Computer-Aided Engineering and Design
Fluid Mechanics
Heat Transfer, Combustion, and Energy Systems
Manufacturing
Mechanics of Materials
Microelectromechanical Systems
Nuclear and Radiological Engineering/Medical Physics
Tribology
Academic Professionals
INTRODUCTION

The Woodruff School of Mechanical Engineering
This guide details the bachelor's degree programs in the George W. Woodruff School of Mechanical Engineering at Georgia Tech. The history of Georgia Tech is synonymous with mechanical engineering, which is the oldest degree program on campus. In October 1888, 129 young men registered for the only degree-granting program when the Georgia School of Technology, as the Institute was then called, opened its doors as a School of Mechanical Engineering.

Today, the Woodruff School is the second largest unit of the ten engineering divisions in the College of Engineering. In September 1985 the School assumed the name of one of its most distinguished alumni, Atlanta businessman and philanthropist, George W. Woodruff (class of 1917). The Woodruff School now offers undergraduate programs in mechanical engineering and nuclear and radiological engineering. We are one of the largest producers of bachelor's degrees in mechanical engineering in the country, and the undergraduate program is now ranked 6th in the nation by U. S. News & World Report.

Because of the tremendous impact that mechanical engineering at Georgia Tech has had on the economy of Georgia and the Southeast, in 2000 the American Society of Mechanical Engineers (ASME) designated the Woodruff School a Mechanical Engineering Heritage Site. We are the only educational institution to receive this honor. Since 1971, only 225 sites, landmarks, and collections around the world have been designated by the ASME.

Accreditation
The undergraduate degree programs in the Woodruff School and the College of Engineering at Georgia Tech are accredited by the Accreditation Board for Engineering and Technology (ABET). Our most recent accreditation review was done in 2002. The accreditation reports for our programs may be found at

www.me.gatech.edu/me/academics/abet/index.html

and

www.nre.gatech.edu/me/academics/abet/index.html

In addition, in 2004 the program is undergoing accreditation review by the Southern Association of Colleges and Schools (SACS).

The Undergraduate Handbook
This handbook outlines the procedures that will help you earn a bachelor's degree from Georgia Tech. It can be found in its entirety at

www.me.gatech.edu/me/publicat/handbook/2004

A careful and complete reading of this document is advised. The handbook will be updated yearly, typically before the start of the fall semester. However, any major changes or additions made prior to that time will be posted to our web page (www.me.gatech.edu) with dispatch and an e-mail alert will be sent to all students affected by the change. If you have a question that this handbook does not address, please tell the Office of Student Services. Send suggestions and corrections on this handbook to david.sanborn@me.gatech.edu.
The Georgia Tech General Catalog

Paper copies of the 2003-2005 Georgia Tech General Catalog are available from the Office of Student Services in the MRDC Building, Room 3112, or online at

www.catalog.gatech.edu

Pay particular attention to the general rules and regulations that govern all undergraduate students at Georgia Tech, particularly the section titled Information for Undergraduate Students, which is found at

www.catalog.gatech.edu/non-academic/undergrads

Updates to the Georgia Tech catalog, including changes, additions, and deletions that have gone into effect since the publication of the 2003-2005 catalog may be found at

www.catalog.gatech.edu/updates

If you have a question that the General Catalog does not resolve, please contact the Office of Student Services.

OSCAR

For the listing of all classes to be offered each semester and complete registration information, go to the On-Line Student Computer Assisted Registration (OSCAR). OSCAR may be found on both the Georgia Tech and the Woodruff School web sites.

https://oscar.gatech.edu

The online OSCAR also has instructions, class schedules, and calendar information.

Sources of Information

In addition to the General Catalog and the Georgia Tech Web Access System (OSCAR), there are a number of sources of information about Georgia Tech and the Woodruff School that should be of help. Copies of these documents are available in the Office of Student Services or view

www.me.gatech.edu.

as another source of these materials.

Brochures

The Bachelor’s Degree Program in Mechanical Engineering
(This brochure is being revised.)

Facts About the George W. Woodruff School of Mechanical Engineering

The George W. Woodruff School of Mechanical Engineering:
An ASME Mechanical Engineering Heritage Site
The Undergraduate Nuclear and Radiological Engineering Program at Georgia Tech
(This brochure is being revised.)

B.S. Degree in Nuclear and Radiological Engineering and the Academic Common Market (BSNRE/ACM)

Web Sites

The Woodruff School’s Home Page: www.me.gatech.edu
The Woodruff School’s home page allows you to locate all sorts of information about our academic programs, course offerings, research programs, faculty and staff, student organizations, events, and other items. The Undergraduate Programs page should be a first stop as you navigate through the Woodruff School on the Internet. A search engine is also available at the site. For additional information about the Nuclear and Radiological Engineering program, go to

www.nre.gatech.edu

Georgia Tech’s Home Page: www.gatech.edu

E-mail
Announcements are sometimes sent electronically, so it is important that you check your e-mail periodically. The Woodruff School uses this means of communication sparingly, usually when the information requires a timely response. At times, e-mail is used to tell you about a special event or to invite you to attend a social event in the School. You may also send a message to
undergraduate.program@me.gatech.edu
or
undergraduate program@nre.gatech.edu

if you have a general question about something.

**Bulletin Boards**
There are several bulletin boards in Woodruff School buildings. The one located outside the Office of Student Services (in the MRDC Building) is particularly important. Notices concerning class schedules, class cancellations, room assignments, initial class meeting times, program changes and modifications of academic rules and regulations, may be found here first. **It is your responsibility to check this bulletin board frequently.**

**Educational Objectives**
The faculty of the Woodruff School strives to continuously improve our undergraduate programs in Mechanical Engineering and Nuclear and Radiological Engineering. The educational objectives reflect the needs, and have been reviewed to include the Advisory Board, the faculty, and our students. Please send any comments regarding these objectives to david.sanborn@me.gatech.edu.

- To prepare students for successful careers and life-long learning;
- To train students thoroughly in methods of analysis, including the mathematical and computational skills appropriate for engineers to use when solving problems;
- To develop the skills pertinent to the design process, including the students' ability to formulate problems, to think creatively, to communicate effectively, to synthesize information, and to work collaboratively;
- To teach students to use current experimental and data analysis techniques for engineering application;
- To instill in our students an understanding of their professional and ethical responsibilities

**Student and Faculty Expectations**
The students and faculty in the Woodruff School are committed to improving the quality of undergraduate education, including better communications between students and faculty. In this spirit, the Woodruff School Undergraduate Committee, the Woodruff School Student Advisory Committee, and the faculty prepared the following list of expectations.

**Faculty Expectations of Students**

- Review prerequisite course materials,
- Read handout materials provided in class,
- Complete out-of-class assignments on time,
- Come prepared for class,
- Participate in the classroom by asking questions and contributing to any discussion,
- Get help/feedback from the professor as needed, and
- Follow the Woodruff School Honor Code.
Student Expectations of Faculty

- Provide students with written documentation concerning course content and evaluation procedures,
- Set and advertise office hours and be available to students at other times by appointment,
- Put course material in context by relating it to real-world problems and applications, current research, or the content of other courses in the curriculum,
- Respect students and be receptive to their opinions and questions,
- Treat students fairly and equitably,
- Come prepared for class,
- Return graded material in a timely fashion, and
- Set examinations appropriately for the material being tested.

Woodruff School Honor Code

Preamble
Honesty is expected of all students and practitioners of Mechanical Engineering and Nuclear and Radiological Engineering. The Georgia Tech Academic Honor Code was developed by students and faculty to remind everyone of the importance of honesty in their professional lives. It also serves to increase awareness on the part of both students and faculty of the rules regarding academic honesty and the process to be followed when these rules are broken.

You are advised to review the code and bring any questions that you may have to the attention of your instructors. The complete Georgia Tech Academic Honor Code can be found at www.honor.gatech.edu

The following items are taken from this web site:

Students must sign the Honor Agreement affirming their commitment to uphold the Honor Code before becoming a part of the Georgia Tech community. The Honor Agreement may reappear on exams and other assignments to remind students of their responsibilities under the Georgia Institute of Technology Academic Honor Code.

Honor Agreement: Having read the Georgia Institute of Technology Academic Honor Code, I understand and accept my responsibility as a member of the Georgia Tech Community to uphold the Honor Code at all times. In addition, my options for reporting honor violations as detailed in the code.

Honor Pledge
All students are required, when requested, to attach the following statement to any material turned in for a grade in any course in the Woodruff School:

On my honor, I/we pledge that I/we have neither given nor received inappropriate aid in the preparation of this assignment.

______________________________________________
Signature(s)
An assignment is incomplete without this pledge. It is the responsibility of the faculty member teaching the course to make clear to the students at the beginning of the semester what is considered appropriate and what is not.

**Student Conduct**
In addition to the honor pledge, you should be aware of the rules for student conduct found in the *Georgia Tech General Catalog*. Of particular relevance are those rules that apply to academic misconduct. Please refer to

- [www.deanofstudents.gatech.edu/integrity](http://www.deanofstudents.gatech.edu/integrity)

for the complete information on the code of student conduct.
THE OFFICE OF STUDENT SERVICES

What is the Office of Student Services?
The purpose of the Office of Student Services is to help you graduate with a bachelor's degree in mechanical engineering and/or nuclear and radiological engineering in a timely manner. To make this process as easy as possible, the Office of Student Services provides information about such things as advising, faculty, scholarships, summer internships, and study programs.

Most importantly, please come to the Office of Student Services for any questions you have about the Woodruff School. Our staff will answer inquiries promptly and courteously and provide updated and accurate information about the Woodruff School, the College of Engineering, and the Institute. Any comments you have about the Office of Student Services may be sent to Dr. David Sanborn, Associate Chair for Undergraduate Studies, at david.sanborn@me.gatech.edu or Dr. Wayne Whiteman, Director of the Office of Student Services, at wayne.whiteman@me.gatech.edu.

Hours and Location
The Office of Student Services, which is sometimes referred to as the Academic Office, is located in Room 3112 in the MRDC Building. It is open daily, Monday through Friday, from 8 a.m. to noon and 1 p.m. to 5 p.m.

Staff
Though the Woodruff School is large, we make every attempt to give students a good deal of individualized attention, particularly with regard to advising. Some of our resources are described below:

Dr. David Sanborn, Associate Chair for Undergraduate Studies
MRDC Building, Room 3103
- Oversight of the undergraduate program in the Woodruff School,
- Transfer credit and technical issues,
- Career counseling and advice,
- Ex officio member of the School's Undergraduate Committee,
- Liaison for the undergraduate program with other academic units on the Georgia Tech campus.

Dr. Christopher Lynch, Associate Chair for Administration
MRDC Building, Room 3218
- Responsible for the scheduling of classes, overloads, and registration.

Dr. Farzad Rahnema, Associate Chair of the Woodruff School and Chair of the Nuclear and Radiological Engineering/Medical Physics Program
Neely Building, Room G104
- Administers the NRE/MP program in the Woodruff School.
Dr. Wayne Whiteman, Director of the Office of Student Services  
**MRDC Building, Room 3102**  
- Manages the Office of the Academic Student Services,  
- Assists the Associate Chairs of the Woodruff School,  
- Assists in the advisement of both undergraduate and graduate students.

Ms. Kristi Lewis, Undergraduate Academic Advisor  
**MRDC Building, Room 3108**  
- Advises all undergraduate, prospective, and newly admitted students,  
- Talks with students about scheduling and planning a program of study, setting academic goals, and other concerns regarding the academic programs in the Woodruff School,  
- Participates in various outreach programs, open houses for families of our students, orientation sessions, and advises student groups,  
- Determines if students have fulfilled the requirements for graduation.

Ms. Norma Frank, Academic Advisor I  
**MRDC Building, Room 3112**  
- Supports the School's undergraduate programs in classroom assignments, exam schedules, reporting of grades, registration, and ordering textbooks,  
- Advises students on scheduling issues,  
- Interacts closely with the students and faculty.

Ms. Terri Keita, Academic Assistant II  
**MRDC Building, Room 3112**  
- Greets and assists students, faculty, staff and visitors to the Office of Student Services,  
- Provides general office information to students, faculty, staff, and visitors,  
- Answers telephone queries and schedules appointments.

**Academic Advising**  
The Woodruff School is committed to your academic, personal, and professional development. Academic advising is an important part of the process for planning your career at Georgia Tech. To see the Undergraduate Academic Advisor, come to the Office of Student Services to schedule an appointment or to have a walk-in meeting. Otherwise, call (404) 894-3203 (Office) or (404) 894-3205 (Kristi Lewis) to schedule an appointment, or send an e-mail request to glenda.johnson@me.gatech.edu.

Because registering for the correct courses is an important ingredient for academic success, we strongly advise that you schedule a meeting early in the semester to develop a plan for several semesters, especially if you are a co-op student. Note that registration periods are the busiest time for advising.

In addition to the advising services in the Office of Student Services, each undergraduate in nuclear and radiological engineering will also be assigned a faculty advisor/mentor upon entry into the major. The faculty advisor will provide advice about upper-level NRE classes, out-of-class learning, and graduate school and employment information. The chair of the program will send each NRE major a letter that gives the name of the assigned faculty advisor.
THE UNDERGRADUATE PROGRAMS

Degrees
The Woodruff School offers two undergraduate degrees: A bachelor's of science degree in mechanical engineering (B.S.M.E.) and one in nuclear and radiological engineering (B.S.N.R.E.). One hundred and twenty six credits are required for graduation with either degree. Also, with the proper planning you can complete the combined BS/MS program in five years.

What You Need to Know (Educational Outcomes)
The Woodruff School educates students who will become the leaders in industry, government, and academia. We expect our graduates to serve the profession, the state of Georgia, and the country. To do this, our program will teach you:

- An ability to identify and formulate engineering problems and apply knowledge of mathematics, science and engineering to solve those problems;
- A familiarity with statistics and linear algebra, a knowledge of chemistry and calculus-based physics with depth in at least one, and the ability to apply advanced mathematics through multivariate calculus and differential equations;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design a system, component, or process to meet desired needs;
- An ability to function professionally and with ethical responsibility as an individual and on multidisciplinary teams;
- An ability to communicate effectively;
- A knowledge of contemporary issues and the broad education necessary to understand the impact of engineering solutions in a global and societal context;
- A recognition of the need for and an ability to engage in lifelong learning;
- An ability to use the techniques, skills, and modern engineering tools, to include computational tools, necessary for engineering practice;
- An ability to work professionally in both thermal and mechanical systems areas, including the design and realization of such systems (for ME graduates only);
- An ability to apply atomic and nuclear physics, and the transport and interaction of radiation with matter, to nuclear and radiological systems and processes; and an ability to perform nuclear engineering design, to measure nuclear and radiation processes, and to work professionally in one or more of the nuclear or radiological fields of specialization (for NRE graduates only).

Requirements
Regents' Test
Each student in the University System of Georgia must demonstrate proficiency in reading and composition in English by passing the Regents’ Test. You are eligible to take the test after you have earned ten hours of course credit. (If you have earned 45 credit hours and have not passed the Regents' Test, schedule remedial English (ENGL 0012 and/or 0015) in addition to your regular course work.) For nonnative speakers of English, alternative tests are available through the Department of Modern Languages (404-894-7327).

If you need preparation for the Regents' Test, the English Department offers ENGL 0012 and ENGL 0015 and a workshop to improve reading and writing skills. Freshman English courses also include a unit on the Regents’ Test. For further information, view

www.gsu.edu/webfs01/reg/wwwrtp/public_html/passing.htm

Registration
For questions about registration, go to

www.registrar.gatech.edu
or
https://oscar.gatech.edu

Restricted or Graduate Courses
To register for restricted or graduate courses, ask the appropriate department to enter the permit online. Once the permit is obtained, you need to contact the Registrar’s Office at

comments@registrar.gatech.edu

or go to Room 103, Registrar’s Office in the Administration Building, to remove the level restriction, then, you may register.

Holds
If your personal registration shows a hold, check the OSCAR for an interpretation of the particular hold and instructions for its clearance. For a hold in ME or NRE, go to the Office of Student Services.

Cross Registration
If you would like to take courses not offered at Georgia Tech, you can do so through the cross-registration program administered through the University Center in Georgia. Contact the Registrar's Office at (404) 894-4150 or view

www.registrar.gatech.edu

Bring the completed form to the Office of Student Services to obtain a signature.
Course Meeting Places
Times and meeting places of classes are listed at

https://oscar.gatech.edu
or
www.registrar.gatech.edu
THE CURRICULUM

The undergraduate curriculum in mechanical engineering covers the fundamental aspects of the field, emphasizes basic principles, and educates you in the use of these principles to solve engineering problems. Emphasis in the freshman and sophomore years is on mathematics, chemistry, physics, introductory mechanics, and engineering graphics, with an introduction to design. The junior and senior years are devoted to the mechanics of materials, applied mechanics, thermodynamics, heat transfer, fluid mechanics, systems and control, design, manufacturing, and the application of fundamentals to the diverse problems of mechanical engineering. The curriculum stresses laboratory work and design projects. You will often work in teams to complete projects. Enhanced computer skills, which are a prerequisite for all junior and senior-level courses, are obtained in courses throughout the curriculum. The design sequence and the lab sequence are required of all undergraduate students. The curriculum by hours and by semester with detailed footnotes for the B.S.M.E. and the B.S.N.R.E programs follow. You may also access this material at

www.me.gatech.edu/me/curriculum/PlanOfStudy.htm
or
www.me.gatech.edu/me/curriculum/NREPlanOfStudy.htm

Prerequisites and Corequisites
The prerequisites and corequisites for each course in ME and NRE are shown after the curriculum charts. Also, prerequisites for each course can be found in the course syllabi accessible from our home page at

www.me.gatech.edu/me/academics

It is your responsibility to check the prerequisites before registering for any course. OSCAR allows you to display course catalog descriptions, including prerequisites, while you are registering. The computer checks prerequisites, only allowing you to register for courses you are prepared to take.

Overloads of Closed Sections and Prerequisite Waivers
To register for a section of a course that is closed, go to the school or department offering the course and request an Overload Permit. For ME or NRE overload permits and prerequisite waivers, go to

www.me.gatech.edu/overload

to obtain and fill out an Overload Request Form.

Technical Electives
Technical electives may be chosen from any course offered in the Colleges of Engineering, Science, or Computing at the 3000 or 4000 level that does not substantially overlap an undergraduate course that you intend to include in your degree petition. Thus, you cannot take electives that overlap either a course required by name and number for your degree or any courses that you intend to use on your degree petition to help meet the elective requirements for your degree. Technical electives cannot be taken for pass/fail grades. These courses have to be taken for a letter grade. Consult with an academic advisor if you have any questions about the suitability of any particular course as a technical elective.
When planning your schedule, it is important that you keep alternatives in mind because a course might be filled, there might be time conflicts, or the class might be canceled if the enrollment is less than 15 students. However, the Woodruff School tries to offer a course when there is sufficient demand, even if the class was not planned for that semester. To request a course, you should act well before the semester begins by circulating a petition and bringing it to the Office of Student Services. Also, be especially careful in planning your electives for your last semester, particularly if it is a summer semester. There are fewer electives offered in the summer.

Elective courses are generally taught once a year or once every two years. To learn which mechanical engineering and nuclear and radiological engineering electives will be offered in a particular semester, check with the Office of Student Services. Listed below are the technical elective course options for ME and NRE.

**Mechanical Engineering Technical Elective Options**

- ME 4041 Interactive Computer Graphics and Computer-Aided Design
- ME 4113 Kinematics and Dynamics of Linkages
- ME 4171 Environmentally Conscious Design and Manufacturing
- ME 4172 Designing Sustainable Engineering Systems
- ME 4189 Structural Vibrations
- ME 4193 Tribological Design
- ME 4211 Manufacturing Engineering and Process Applications
- ME 4213 Materials Selection and Failure Analysis
- ME 4321 Refrigeration and Air Conditioning
- ME 4324 Power Generation Technology
- ME 4330 Heat and Mass Exchangers
- ME 4340 Applied Fluid Mechanics
- ME 4342 Computational Fluid Dynamics
- ME 4447 Microprocessor Control of Manufacturing Systems
- ME 4451 Robotics
- ME 4699 Research Special Problems, Mechanical Engineering
- ME 4757 Biofluid Mechanics
- ME 4758 Biosolid Mechanics
- ME 4760 Engineering Acoustics and Noise Control
- ME 4763 Pulping and Chemical Recovery
- ME 4764 Bleaching and Papermaking
- ME 4775 Polymer Science and Engineering I: Formation and Properties
- ME 4776 Polymer Science and Engineering II: Analysis, Processing and Laboratory
- ME 4777 Introduction to Polymer Science and Engineering
- ME 4781 Biomedical Instrumentation
- ME 4782 Biosystems Analysis
- ME 4791 Mechanical Behavior of Composites
- ME 4793 Composite Materials and Processes
- ME 4794X Composite Materials and Manufacturing
- ME 480X Special Topics, Mechanical Engineering
- ME 481X Special Topics, Mechanical Engineering
- ME 482X Special Topics, Mechanical Engineering
- ME 483X Special Topics, Mechanical Engineering
- ME 4903 Non-Research Special Problems, Mechanical Engineering
### Nuclear and Radiological Engineering Technical Elective Options

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRE 4234</td>
<td>Nuclear Criticality Safety Engineering</td>
</tr>
<tr>
<td>NRE 4266</td>
<td>Light Water Reactor Technology</td>
</tr>
<tr>
<td>NRE 4404</td>
<td>Radiological Assessment and Waste Management</td>
</tr>
<tr>
<td>NRE 4430</td>
<td>Nuclear Regulatory Requirements</td>
</tr>
<tr>
<td>NRE 4610</td>
<td>Introduction to Plasma Physics and Fusion Engineering</td>
</tr>
<tr>
<td>NRE 4699</td>
<td>Research Special Problems, Nuclear and Radiological Engineering</td>
</tr>
<tr>
<td>NRE/MP 4750</td>
<td>Radiation Imaging</td>
</tr>
<tr>
<td>NRE 4770</td>
<td>Nuclear Chemical Engineering</td>
</tr>
<tr>
<td>NRE 480X</td>
<td>Special Topics in Nuclear and Radiological Engineering</td>
</tr>
<tr>
<td>NRE 4903</td>
<td>Non-Research Special Problems, Nuclear and Radiological Engineering</td>
</tr>
</tbody>
</table>
BSME CURRICULUM BY HOURS

BASIC SUBJECTS
- Physics: 8
- Mathematics: 16
- Chemistry: 4
- Science: 3

HUMANITIES AND SOCIAL SCIENCES
- English: 6
- History/Political Science: 3
- Humanities: 3
- Economics: 3
- Social Science: 6
- Ethics: 3

PHYSICAL EDUCATION
- Health/Fitness: 2

ENGINEERING FUNDAMENTALS
- Statistics: 3
- Graphics: 3
- Materials: 3
- Mechanics: 9
- Computing: 3
- Eng. Economics: 1
- Electrical Eng.: 5

ME CORE
- Numerical Methods: 3
- Thermodynamics: 3
- Manufacturing: 3
- Fluids: 3
- Design: 12
- Heat Transfer: 3
- Laboratories: 5
- System Dynamics and Control: 4

ELECTIVES
- Technical Electives: 6

TOTAL HOURS = 126
<table>
<thead>
<tr>
<th>BSME CURRICULUM BY SEMESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRESHMAN YEAR</strong></td>
</tr>
<tr>
<td><strong>1st Semester</strong></td>
</tr>
<tr>
<td>Calculus I (MATH 1501)</td>
</tr>
<tr>
<td>Calculus II (MATH 1502)</td>
</tr>
<tr>
<td>English Composition I (ENG 1101)</td>
</tr>
<tr>
<td>English Composition II (ENG 1102)</td>
</tr>
<tr>
<td>General Chemistry (CHEM 1310)</td>
</tr>
<tr>
<td>General Physics I (mechanics) (PHYS 2211)</td>
</tr>
<tr>
<td>Hist/Poly Sci Requirement (^1)</td>
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<tr>
<td>Intro to Computing (CS 1371)</td>
</tr>
<tr>
<td>Intro to Eng. Graphs. &amp; Vis. (ME/CE 1770)</td>
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<td><strong>1st Semester</strong></td>
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<td>Mechanical Eng Systems Lab (ME 4053)</td>
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<td>Experimental Eng. Lab (ME 4055)</td>
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<td>3-0-3</td>
<td>Energy Systems Analysis &amp; Design (ME 4315)</td>
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<tr>
<td>Economics Social Science(^1)</td>
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<td>Capstone Design (ME 4182)</td>
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<td>Fluid Mechanics (ME 3340)</td>
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<td>Engineering Ethics (^1) (Social Science or Humanities)</td>
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<td>Manufacturing Processes &amp; Eng. (ME 4210)</td>
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<td>Mechanics of Materials (ME 3201)</td>
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<td>16-3-17</td>
<td><strong>12-4-14</strong></td>
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\(^1\) Choose from:

- HIST 2111: The United States to 1877
- HIST 2112: The United States Since 1877
- POL 1101: Government of the United States
- PUBP 3000: American Constitutional Issues
- INTA 1200: American Government in Comparative Perspective

\(^2\) CS 1321 or COE 1361 were accepted through spring 2004.

\(^3\) Choose from:

- HPS 1040: Health Concepts & Strategies
- HPS 1062: Fitness Concepts: Running
- HPS 1063: Fitness Concepts: Swimming
- HPS 1064: Fitness Concepts: Cross Training

\(^4\) Choose one from:

- ECON 2100: Economic Analysis & Policy Problems
- ECON 2105: Principles of Macroeconomics
- ECON 2106: Principles of Microeconomics

\(^5\) To fulfill the ethics requirement, choose one of these courses:

- HTS 2084: Technology and Society (Social Science)
- PST 3109: Ethics for the Technical Professions (Humanities)
- PST 4176: Environmental Ethics (Humanities)
- INTA 2030: Ethics in International Affairs (Social Science)

\(^6\) Technical Electives may be selected from any course offered in the Colleges of Engineering, Science, or Computing at the 3000 or 4000 level that does not substantially overlap an undergraduate course which you intend to include in your degree petition. Thus, you cannot take electives which overlap either a course required by name and number for your degree or any courses which you intend to use on your degree petition to help meet the elective requirements for your degree. You should consult with your Undergraduate Advisor if you have any questions about the suitability of any particular course as a technical elective. These courses must be taken for a letter grade.
# Pre/Corequisites for ME Courses

You must complete satisfactorily the appropriate prerequisites or their equivalents before enrolling in any ME course. Corequisites may be taken simultaneously.

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BSNRE CURRICULUM BY HOURS

BASIC SUBJECTS
Physics: 11
Chemistry: 4
Mathematics: 19
34 hrs.

HUMANITIES AND SOCIAL SCIENCES
English: 6
Ethics: 3
Economics: 3
History/Political Science: 3
Social Science: 6
Humanities: 3
24 hrs.

PHYSICAL EDUCATION
Health/Fitness: 2
2 hrs.

ENGINEERING FUNDAMENTALS
Materials: 3
Mechanics: 6
Computing: 3
Eng. Economics: 1
Electrical Eng.: 5
18 hrs.

NRE CORE
Thermodynamics: 3
Fluids: 3
Heat Transfer: 3
Radiation Protection: 3
Reactor Engineering: 3
Radiation Fundamentals: 3
Radiation Sources & Applications: 3
Design: 4
Reactor Physics Lab: 2
Radiation Physics: 3
Radioactive Materials: 3
Reactor Physics: 4
Introduction to NRE: 2
39 hrs.

ELECTIVES
Technical Electives: 9 hrs.
9 hrs.

TOTAL SEMESTER HOURS = 126
# BSNRE Curriculum by Semester

## Freshman Year

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<th>Course</th>
<th>1st Semester</th>
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<td>Calculus I (MATH 1501)</td>
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<td>Calculus II (MATH 1502)</td>
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<td>English Composition I (ENG 1101)</td>
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<td>English Composition II (ENG 1102)</td>
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<tr>
<td>General Chemistry (CHEM 1310)</td>
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<td>General Physics I (mechanics) (PHYS 2211)</td>
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<td>Calculus III (MATH 2401)</td>
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<td>Differential Equations (MATH 2403)</td>
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<td>General Physics II (mag/optics) (PHYS 2212)</td>
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<td>Circuits and Electronics (ECE 3710)</td>
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<td>Intro to Mechanics (statics/def bods) (ME 2211)</td>
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<td>Intro to Modern Physics (PHYS 2213)</td>
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<td>NRE Fundamentals (NRE 3212)</td>
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## Junior Year

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<td>Fluid Mechanics (ME 3340)</td>
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<td>Radiation Protection Eng. (NRE 3316)</td>
<td>3-0-3</td>
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<tr>
<td>Radiation Physics (NRE 3301)</td>
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<tr>
<td>Nuclear Radiation Detection (NRE 3112)</td>
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<td>2-3-3</td>
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<td>Instrumentation &amp; Electronics Lab (ECE 3741)</td>
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<td>Essentials of Eng. Economy (ISyE 3025)</td>
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<td>Energy Conversion &amp; Mechatronics (ECE 3301)</td>
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<td>Heat Transfer (ME 3345)</td>
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<td>Classical Mathematical Methods in Eng. (MATH 4581)</td>
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## Senior Year

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<td>Radiation Sources &amp; Applications (NRE 4328)</td>
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<td>Radiation Physics Lab (NRE 4206)</td>
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<td>Nuclear Reactor Physics (NRE 4204)</td>
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1. Choose from:
   - HIST 2111 The United States to 1877
   - HIST 2112 The United States Since 1877
   - POL 1101 Government of the United States
   - PUBP 3000 American Constitutional Issues
   - INTA 1200 American Government in Comparative Perspective

2. CS 1321 or COE 1361 were accepted through spring 2004.

3. Choose from:
   - HPS 1040 Health Concepts & Strategies
   - HPS 1062 Fitness Concepts: Running
   - HPS 1063 Fitness Concepts: Swimming
   - HPS 1064 Fitness Concepts: Cross Training

4. Choose from only one:
   - ECON 2100 Economic Analysis & Policy Problems
   - ECON 2105 Principles of Macroeconomics
   - ECON 2106 Principles of Microeconomics

5. Technical Electives may be selected from any course offered in the Colleges of Engineering, Science, or Computing at the 3000 or 4000 level that does not substantially overlap an undergraduate course which you intend to include in your degree petition. Thus, you cannot take electives which overlap either a course required by name and number for your degree or any courses which you intend to use on your degree petition to help meet the elective requirements for your degree. You should consult with your Undergraduate Advisor if you have any questions about the suitability of any particular course as a technical elective. These courses must be taken for a letter grade.

6. To fulfill the ethics requirement, choose one of these courses:
   - HTS 2084 Technology and Society (Social Science)
   - PST 3105 Theories of Ethics (Humanities)
   - PST 3109 Ethics for the Technical Professions (Humanities)
   - PST 3127 Science Technology and Human Values (Humanities)
   - PST 4176 Environmental Ethics (Humanities)
   - INTA 2030 Ethics in International Affairs (Social Science)

You cannot get credit for both ECON 2100 and ECON 2105 or ECON 2106.
**Pre/Corequisites for NRE Courses**

You must complete satisfactorily the appropriate prerequisites or their equivalents before enrolling in any NRE course. Corequisites may be taken simultaneously.

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COURSES

All courses in Mechanical Engineering and Nuclear and Radiological Engineering are described in the Georgia Tech General Catalog at.

www.catalog.gatech.edu/programs/coe/mechanical.php#memajor
and
www.catalog.gatech.edu/programs/coe/mechanical.php#nremajor

In addition, go to
www.me.gatech.edu/me/academics

to view the courses and syllabi.

[Note: All required courses must be taken for a letter grade.]

Required Courses in Mechanical Engineering
The Mechanical Engineering Program tries to offer its required courses, as given below, every semester.

ME/CEE/AE 1770 Introduction to Engineering Graphics and Visualization
Introduction to engineering graphics and visualization including sketching, line drawing, and solid modeling. Development and interpretation of drawings and specifications for product realization

ME 2016 Computing Techniques
An introduction to the use of computers and MATLAB programming for the solution of mechanical engineering problems. Topics include: sources of errors in computing, the use of modular software design, basic numerical methods, and signal processing.

ME 2110 Creative Decisions and Design
To learn fundamental techniques for creating, analyzing, synthesizing, and implementing design solutions to open ended problems with flexibility, adaptability, and creativity through team and individual efforts.

ME 2202 Dynamics of Rigid Bodies
Kinematics and dynamics of particles and rigid bodies in one, two, and three dimensions. Work-energy and impulse-momentum concepts

ME 2211 Introduction to Mechanics
Forces and moments; equilibrium in two and three dimensions; multforce members; friction; stress and strain; axially loading, torsion, and bending of beams.

ME 3015 System Dynamics and Control
Dynamic modeling and response of systems with mechanical, hydraulic, thermal and/or electrical elements. Linear feedback control systems design and analysis in time and frequency domains.

ME 3056 Experimental Methodology Laboratory
Introduction to basic instrumentation used in mechanical engineering, including calibration, use, precision, and accuracy. Consideration of errors, precision, and accuracy in experimental measurements.

ME 3180 Machine Design
The selection, analysis, and synthesis of springs, joining and fastening methods, bearings, shafts, gears, and other elements. Design of assemblies. Computer based methods.
ME 3201 Mechanics of Materials
Analysis of stress and strain applied to beams, pressure vessels, and combined loading; problems involving resistance of materials to plastic deformation, fracture, fatigue, and creep.

ME 3322 Thermodynamics
Introduction to thermodynamics. Thermodynamic properties, energy and mass conservation, entropy and the second law. Second-law analysis of thermodynamic systems, gas cycles, vapor cycles.

ME 3340 Fluid Mechanics
The fundamentals of fluid mechanics. Topics include fluid statics, control-volume analysis, the Navier-Stokes equations, similitude, viscous, inviscid and turbulent flows, boundary layers.

ME 3345 Heat Transfer
Introduction to the study of heat transfer, transport coefficients, steady state conduction, transient conduction, radiative heat transfer, and forced and natural convection.

ME 4053 Mechanical Engineering Systems Laboratory

ME 4055 Experimental Engineering
Application of experimental techniques to engineering problems involving various mechanical engineering processes and systems. Open-ended investigations are accomplished by teams.

ME 4182 Capstone Design Project
Teams apply a systematic design process to real multidisciplinary problems. Problems selected from a broad spectrum of interest areas, including biomedical, ecological, environmental, mechanical, and thermal.

ME 4210 Manufacturing Processes and Engineering
Major manufacturing processes, their capabilities, analysis, and economics. Manufacturing process selection

ME 4315 Energy Systems Analysis and Design
Integrated concepts, laws, and methodologies from thermal sciences are used to analyze, model, and design energy systems and to predict system performance for fixed designs.

Required Courses in Nuclear and Radiological Engineering
The Nuclear and Radiological Engineering Program offers each course once per academic year as outlined in the suggested Program of Study. No undergraduate NRE courses are offered in the summer.

NRE 2110 Introduction to Nuclear and Radiological Engineering
Introduction to nuclear and radiological engineering; nuclear energy production and radiation technologies; their role and importance to society; their environmental impact.

NRE 3112 Nuclear Radiation Detection
An introduction to the principles and characteristics of basic detectors for nuclear radiation and the pulse processing electronics associated with them

NRE 3212 Fundamentals of Nuclear and Radiological Engineering
Intermediate treatment of nuclear and radiological engineering, with emphasis on reactor physics and engineering, radiation protection and radiation shielding.

NRE 3301 Radiation Physics
Characteristics of atomic and nuclear radiations, transition probabilities, radioactivity, classical and quantum-mechanical derivations of cross sections, interaction of photon, neutron, and charged particles with matter.
NRE 3316 Radiation Protection Engineering
Covers radiation dosimetry, biological effects of radiation, radiation-protection criteria and exposure limits, external radiation protection, internal radiation protection, and sources of human exposure.

NRE 4204 Nuclear Reactor Physics
This course covers physical principles of nuclear reactors. Topics include neutron diffusion theory, criticality and multigroup theory, slowing down theory, heterogeneity effects and reactor kinetics.

NRE 4206 Radiation Physics Laboratory
Measurements of reactor parameters such as approach to criticality, flux mapping, buckling, and diffusion length using subcritical assemblies. Neutron spectral measurements, shield transmission measurements and other radiation field measurements.

NRE 4214 Reactor Engineering
Nuclear heat generation; fuel elements' thermal analysis; single and two phase flow and heat transfer in reactor systems; core thermal design and treatment of uncertainties

NRE 4232 Nuclear Radiological Engineering Design
Introduction to the methodologies of nuclear and radiological design. An open-ended design project that integrates all relevant engineering aspects is to be completed in this course.

NRE 4328 Radiation Sources and Applications
Radiation Sources, Radioisotope Production, Application of Radiation and Radioisotope technology in industry and medicine.

Undergraduate Research/Special Problems Courses
Several options are available for a Special Problems Course as shown in the accompanying chart. ME/NRE 4903 is a non-research special problem. ME 4903 is usually a design course and may be combined with ME 4182 to work on a two-semester design problem. ME/NRE 4699 and ME/NRE 2699 are research special problems courses. ME/NRE 4699 is for juniors and seniors and will qualify as a technical elective. ME/NRE 4698 and ME/NRE 2698 are research internships. You will be paid for working on a project and the work will be entered on your transcript.

In all cases, you must find a faculty member to work with. Dr. Sanborn simply administers the courses. He will determine which faculty are interested in sponsoring a course and will notify interested students. However, the most effective method of finding a willing faculty member is to approach those who work in a field that interests you and let them know that you are interested. All courses are nominally three credit hours and enrollment requires a permit. Once you have found an interested faculty sponsor, obtain the appropriate form from the Office of Student Services, select a title for the project, write a paragraph describing both the work to be performed and the required deliverable at the end of the term, obtain the required signatures and return it to Dr. Sanborn. He will sign the form and issue a registration permit.

Each special problem must culminate in a written final report, which is to be submitted to the faculty advisor for grading and forwarded to the Office of Student Services at the end of the semester. No grade will be assigned until the final report has been reviewed and approved by Dr. Sanborn. All special problems taken for credit are given a letter grade.
## Undergraduate Research Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Standard Credit Hours</th>
<th>Hours Count for Degree per Institute?</th>
<th>Hours Count for Degree per ME?</th>
<th>Used As</th>
<th>For Pay?</th>
<th>Grading</th>
<th>New Description</th>
<th>Eligible</th>
</tr>
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<tbody>
<tr>
<td>ME 4903</td>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
<td>Technical Elective</td>
<td>No</td>
<td>A - F</td>
<td>Non-Research Special Problem (4)</td>
<td>Juniors, Seniors</td>
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<td>NRE 4903</td>
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<td>Non-Research Special Problem (4)</td>
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<tr>
<td>ME 4699</td>
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<td>Yes</td>
<td>Yes</td>
<td>Technical Elective</td>
<td>No</td>
<td>A - F</td>
<td>Research Special Problem (4)</td>
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<tr>
<td>NRE 4699</td>
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<td>Research Special Problem (4)</td>
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<tr>
<td>ME 2699</td>
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<td>Yes</td>
<td>No (3)</td>
<td>Free Elective</td>
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<td>A - F</td>
<td>Research Special Problem (4)</td>
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<tr>
<td>NRE 2699</td>
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<td></td>
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<td>ME 4698</td>
<td>3</td>
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<td>No</td>
<td>Transcript Entry Only</td>
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<td>NRE 4698</td>
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<tr>
<td>ME 2698</td>
<td>3</td>
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<td>No</td>
<td>Transcript Entry Only</td>
<td>Yes</td>
<td>P/F</td>
<td>Undergraduate Research – Pay (5)</td>
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<td>NRE 2698</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Undergraduate Research – Pay (5)</td>
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</tr>
</tbody>
</table>

Notes:
1. The new courses are not strictly limited to 3 credit hours.
2. Three credit hours would typically require 9 research hours work per week (14 during the summer term)
3. ME currently does not have a free elective.
4. Requires a written statement of work and deliverables. Must be signed by student and advisor to obtain a registration permit.
5. Requires completion of a form detailing hours to be worked and pay rate. Must be signed by student and advisor to obtain a registration permit.

For more information on undergraduate research, see

[www.undergradresearch.gatech.edu/undergradresearch.htm](http://www.undergradresearch.gatech.edu/undergradresearch.htm) or
[www.me.gatech.edu/me/academics](http://www.me.gatech.edu/me/academics).
Academic Standing
The minimum grade point average for good academic standing is 1.7 for freshmen, 1.8 for sophomores, 1.95 for juniors, and 2.0 for seniors. Any student who has an overall scholastic average below the minimum requirement or whose average for a given semester falls below the minimum requirement will be placed on academic warning and will be limited to a maximum load of sixteen credit hours. A student on warning whose average for any semester falls below the minimum requirement for good standing will be placed on academic probation and will be limited to a maximum schedule load of fourteen credit hours. A student on probation whose average in any semester falls below the minimum requirements will be dropped for unsatisfactory scholarship. A student whose average for any semester is below 1.0 may be placed on academic probation or dropped regardless of their previous record.

Change of Major
Except for freshmen, the minimum requirements for admission to the Mechanical Engineering or the Nuclear and Radiological Engineering program from another school or department at Georgia Tech are:

A GPA of 2.6 or better in GT courses, and
grades of C or better in required math and science courses.

To change from ME or NRE to another major, check with the other school or department to determine the requirements for admission to that program. Once approval has been obtained, complete a Change of Major form, secure signatures from both the new and the former schools, and present the form to the Registrar’s Office in the Tech Tower. Go to the Woodruff School’s Office of Student Services to obtain a signature.

Dropped for Unsatisfactory Scholarship
If you have been dropped for unsatisfactory scholarship you will not normally be readmitted. However, if you seek readmission, you must petition the Institute Undergraduate Curriculum Committee. If you are readmitted into the Woodruff School you must demonstrate the potential for greatly improved academic performance. Before applying for readmission we strongly encourage you to complete at least two semesters of work at another accredited institution. At least half of these may be Humanities courses. An additional semester of absence from campus may be required to allow time for evaluation of your qualifications for readmission. The summer term qualifies as a semester off. This evaluation will include an academic review with the Undergraduate Academic Advisor and submission of completed transcripts from the other school.

If readmission is recommended, you will be asked to sign a contract which will include a program of study and a requirement for a minimum, overall grade point average of 2.0 at the end of the period covered by the contract. Contracts typically run for three semesters. Each term, students must enroll in the courses specified in the contract. Courses may not be dropped. If a course cannot be scheduled, an amended contract must be signed and approved.

Failure to meet any part of the contract will result in your dismissal from the Institute with the understanding that no attempt will be made to seek further readmission to the Woodruff School of Mechanical Engineering. Section VIII, B.6 of the Student Rules and Regulations states: "A student who is dropped a second time for unsatisfactory scholarship will not be readmitted to the Institute."
Exam Policy
The Woodruff School adheres to the guidelines on quizzes and final exams set by the Academic Senate of the Institute as follows:

- Students should receive some performance evaluation before the published drop deadline.
- Quizzes are not to be given during the week preceding final examination. All quizzes are to be graded and returned on or before the last day of class preceding final exam week.
- Each regularly scheduled lecture course shall have a final exam, and it shall be administered at the time specified in the official final exam schedule as distributed by the Registrar.
- A request for a change in the final exam period for an individual student will not ordinarily be granted. The request must be justified in writing and submitted to the instructor at least a week before the scheduled exam period.
- A request for a change in the final exam period for a class must have the approval of the instructor and unanimous approval of the class as determined by secret ballot. The request must be submitted to the Associate Chair for Undergraduate Studies for his approval at least a week before the beginning of final exams.
- In the event a student has two examinations scheduled for the same period, it is the obligation of the instructor of the lower numbered course to resolve the conflict by giving a final exam to that student at a mutually satisfactory alternate time.
- In the event a student is scheduled to take three exams in the same day, it is the obligation of the instructor of the class scheduled for the middle exam period to give a final exam to that student at a mutually satisfactory alternate time.

Graduate Course Option
If you complete both the bachelor's and master's degrees in Mechanical Engineering or Nuclear and Radiological Engineering at Georgia Tech, with the approval of the Woodruff School, you may use up to six credit hours of graduate-level course work for both degrees. To qualify for this option, you must complete your undergraduate degree with a cumulative grade point average of 3.5 or higher and complete the master's degree within a two-year period from the award date of your bachelor's degree. Thus, if you wish to pursue an M.S. degree, you can use graduate courses to fulfill the six hours of technical electives required in either the undergraduate ME or the NRE programs.

Incomplete
If you receive an incomplete (I) in a course, you must satisfactorily complete the course work and arrange for the incomplete to be removed from your record by the end of the next semester for which you are registered. Otherwise, the grade will automatically be changed to an F. Clear the incomplete with your original professor. Do not register again for the course. Incompletes are only given for nonacademic reasons.

Maximum Academic Load
Students in good academic standing may take up to 21 credit hours in any fall or spring semester. Up to 16 hours may be taken in the summer semester. However, course loads of more than 18 hours are not advisable except for exceptionally talented students.
**Pass/Fail**
You may take certain courses on a pass/fail basis. The maximum accumulated number of pass/fail hours that can be applied toward a bachelor’s degree depends on the total number of credit hours taken at Georgia Tech, according to:

- 45 to 70 credit hours: 3 hours pass/fail
- 71 to 90 credit hours: 6 hours pass/fail
- 91 or more credit hours: 9 hours pass/fail

Pass/fail hours may be taken in excess of these limits, but the excess hours will not count toward the bachelor’s degree.

In the Mechanical or Nuclear and Radiological Engineering curricula, the only courses that may be taken on a pass/fail basis are humanities and social sciences. There are two exceptions: the Economics and Engineering Ethics courses required for the degree must be taken for a letter grade. All nonhumanities and nonsocial science courses required for the degree must be taken for a letter grade.

**Petitions to the Faculty**
You may ask for relief from any of the Institute's rules and regulations by petitioning the Institute’s Undergraduate Curriculum Committee. The Petition to the Faculty is available in the Office of Student Services. Complete the form, obtain the recommendation and signature of the Undergraduate Academic Advisor and submit the petition to the Registrar. Petitions are generally granted when you have been unjustly served by the regulations or when relief is requested from the consequences of a mistake over which you had no control. **Do not expect the faculty to protect you from the consequences of your own carelessness.**

**Readmissions**
We suggest that you consult with the academic advisor before you begin the readmission process. If, for any reason, you have remained out of school more than two semesters (including the summer), you must apply for readmission. A completed Application for Readmission must be submitted to the Office of the Registrar (located in the Tech Tower) prior to the deadlines listed in the General Catalog or on the Academic Calendar. It is your responsibility to allow sufficient time for the readmission process to be completed. Please note that the Woodruff School can only recommend a course of action; the final decision is made by the Institute's Undergraduate Curriculum Committee.

**Repeating Courses**
Courses that are passed with a grade of C or better normally may not be repeated. Consult with Dr. Sanborn or the academic advisor if you are considering retaking a non-math course in which you received a grade of D. If you wish to repeat such a course, obtain approval in writing from your major department. Approval, in writing, of the department in which the course is offered is also required. Except for math, a grade of D or better is considered passing.
Ten-Year Rule
Courses completed more than ten years prior to your graduation must be validated by a special examination.

Thirty-Six-Hour Rule
The final 36 hours earned for a degree must be taken in residence at Georgia Tech.

Transfer Credit
Course work taken at another institution may be considered for transfer credit if it was passed with a grade of C or better, and it is not a substitute for a course previously failed at Georgia Tech. Transfer credit is granted by one of two means.

For most lower division courses the Admissions Office or the Office of the Registrar, will review a transcript and automatically give credit, based on a table of equivalency, for courses taken at other institutions. See www.registrar.gatech.edu/students/transfercredit.php

Otherwise, you must present evidence to the appropriate department at Georgia Tech that the nonresident course is equivalent to a course here. Bring all relevant materials (syllabus, textbook, catalog description, copies of exams, homework, etc.) to the department at Georgia Tech offering the course, and ask that a Non-Resident Credit form be completed and submitted to the Registrar. You should check at a later date to make sure the form reached the Registrar.

For ME and NRE students seeking transfer credit for courses in these disciplines, Transfer Credit forms can be picked up from the Office of Student Services. Please complete the form and leave copies (not originals) of the requested information as it will not be returned. Take materials and the completed form to the Office of Student Services. You will be notified of the outcome of your request by an e-mail from Dr. David Sanborn, Associate Chair for Undergraduate Studies.

Transfer credit appears as the initial entry on a transcript. Where credit is granted for a course that has content identical to a Georgia Tech course, the Georgia Tech course number will be listed. If the credit is for a course that does not exactly match a Georgia Tech course in content or hours, the listing will be in a generic form, such as Math 3xxx.

Voluntary Withdrawal After Completion of a Semester
If you are on good standing or warning status you may apply for readmission in any subsequent semester and expect positive action by the Registrar's Office.

If you are on probation, arrange for an interview with the Undergraduate Academic Advisor to discuss your application for readmission. A positive recommendation normally will be given if there is a clear indication that the problems which led to your poor standing have been, or are being, rectified.

Voluntary Withdrawal With All W Grades
If you drop a class during a semester and receive all W grades, you will not be allowed to re-enter Georgia Tech the semester following withdrawal. In addition, the application for readmission must be
accompanied by a letter explaining how the problems that led to your withdrawal have been resolved. If you are on probation at the time of withdrawal, you must schedule an academic review with the Undergraduate Academic Advisor in the Office of Student Services.

**Withdrawal From a Course**

You may withdraw from a course on-line without penalty any time before fifty percent of the term has been completed, as specified by the official calendar. The exact date of the last day that withdrawals can be accepted is published online at

www.registrar.gatech.edu/home/calendar/2004/fiveterm.php

Woodruff School students will not be permitted to drop more than three ME or NRE required courses except for documented, nonacademic reasons.

The decision to drop a course is a serious one and should be made only after consultation with the Undergraduate Academic Advisor. Numerous W's on a transcript are an indication of either poor planning, ineffective time management and/or study skills, or lack of ability to complete assigned tasks. Prospective employers and graduate schools will not look favorably upon a record with a pattern of frequent withdrawals. As a practical matter, withdrawal from a course can jeopardize your ability to complete the degree program as scheduled.

There is a restricted withdrawal policy for several Woodruff School courses. These are usually laboratory or other courses that require special departmental resources. Other courses with limited enrollments might be added to this list, and they will be so designated during registration. The courses are:

- **ME/CEE/AE 1770** Introduction to Engineering Graphics and Visualization
- **ME 2110** Creative Decisions and Design
- **ME 3056** Experimental Methodology Laboratory
- **ME 4053** Mechanical Engineering Systems Laboratory
- **ME 4182** Capstone Design Project
- **NRE 3112** Nuclear Radiation Detection
- **NRE 4206** Radiation Physics Lab
- **NRE 4232** Nuclear Radiological Engineering Design

A withdrawal from one of these courses will be granted only in the event of serious illness or comparable circumstance beyond the student's control. A **HOLD** will be placed on your registration which will require a meeting with the Undergraduate Academic Advisor to discuss your reasons for dropping the class.
GRADUATION

**Degree Petitions**
To graduate, you must petition for a degree and pay a $25 diploma fee to the Cashier’s Office in Lyman Hall. You can obtain the **Degree Petition** in the Office of Student Services. This petition must be completed the semester preceding the semester of your graduation and be at the Registrar’s Office by the published due date. The Office of Student Services will inform you of the due date by e-mail. **You are strongly encouraged to turn in degree petitions early, so that the petition can be reviewed by the Office of Student Services in time to resolve any deficiencies in your program during the drop/add period of your final semester.**

If you do not graduate in the semester for which you petitioned, you will need to reactivate your petition when you are ready to graduate. Reactivated petitions require an additional $25 diploma fee. The petition may be submitted to the Office of Student Services for review and forwarded to the Registrar’s Office no later than the end of the first week of classes of your final semester.

**Checklists**
Use the ME and NRE checklists to track your progress toward graduation.

**Graduation with Academic Distinction**
For graduation with highest honors, the minimum scholastic average is 3.55, for graduation with high honor, the minimum scholastic average is 3.35, and for graduation with honor, the minimum scholastic average is 3.15. Please refer to the *Georgia Tech General Catalog* for additional requirements.
## B.S.M.E. Degree Petition Checklist for 2004 – 2005

### Designated Courses (94 hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Code</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>Chem 1310</td>
<td>Phys 2211</td>
<td>ME 2016</td>
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<td>Science</td>
<td>Phys 2212</td>
<td>ME 2110</td>
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<td>CHEM 1311</td>
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<td>AND</td>
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<tr>
<td>CHEM 1312</td>
<td>ECE 3741</td>
<td>ME 3015</td>
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<tr>
<td>OR one of the following:</td>
<td>ECE 3301</td>
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<tr>
<td>BIOL 1510</td>
<td>CS 1371</td>
<td>ME 3180</td>
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<td>ME 3322</td>
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<td>EAS 1601</td>
<td>MSE 2001</td>
<td>ME 3340</td>
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<td>PHYS 2213</td>
<td>ME/CE/AE 1770</td>
<td>ME 3345</td>
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<tr>
<td>Math 1501</td>
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<td>ME 4053</td>
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<td>Math 1502</td>
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<td>ME 4055</td>
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<td>Math 2401</td>
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<td>ME 4210</td>
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<td>Math/ISYE 3770</td>
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<td>ME 4315</td>
</tr>
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</table>

### Elective Courses (32 hours)

#### Humanities * (12 hours)
- ENGL 1101
- ENGL 1102
- Humanities Elective
- Humanities Elective

#### Social Sciences *(12 hours)*
- Economics
  - Choose one
    - ECON 2100
    - ECON 2105
    - ECON 2106
- HIST/POL SCI Requirements
  - Choose one
    - HIST 2111
    - HIST 2112
    - POL 1101
    - PUBP 3000
    - INTA 1200
- Social Science Elective
- Social Science Elective

#### Technical Electives (6 hours)

#### Wellness (2 hours)
- Choose one
  - HPS 1040
  - HPS 1062
  - HPS 1063
  - HPS 1064

### Total Hours

<table>
<thead>
<tr>
<th>Hours earned at Georgia Tech</th>
<th>Nonresident credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

### Net credits (126)

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*See the Georgia Tech Catalog at [www.catalog.gatech.edu](http://www.catalog.gatech.edu) for allowable humanities and social science electives.

** Choose one Ethics course from: HTS 2084 (Social Science), INTA 2030 (Social Science), PST 3105 (Humanities), PST 3109 (Humanities), PST 3127 (Humanities), or PST 4176 (Humanities).
# B.S.N.R.E. Degree Petition Checklist for 2004 – 2005

## Designated Courses (91 hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<td>Chem 1310</td>
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<td>Math/ISyE 3770</td>
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<td>MSE 2001</td>
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<td>ME 3201</td>
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<td>NRE 3316</td>
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<td>NRE 4328</td>
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</table>

## Elective Courses (35 Hours)

### Humanities* (12 hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>ENGL 1101</td>
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<td>ENGL 1102</td>
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### Social Sciences* (12 hours)

HIST/POL SCI Requirements

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<td>HIST 2111</td>
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<td>PUBP 3000</td>
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<td>INTA 1200</td>
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### Technical Electives (9 hours)

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</table>

### Economics

Choose one

<table>
<thead>
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<tbody>
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<td>ECON 2100</td>
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<td>ECON 2105</td>
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<tr>
<td>ECON 2106</td>
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<tr>
<td>Social Science Elective</td>
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### Wellness (2 hours)

Choose one

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<tbody>
<tr>
<td>HPS 1040</td>
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<td>HPS 1063</td>
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<tr>
<td>HPS 1064</td>
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## Total Hours

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<tbody>
<tr>
<td>Hours earned at Georgia Tech</td>
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<tr>
<td>Nonresident credits</td>
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<td>Current and last semester’s credits</td>
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<td>Minus extra hours</td>
<td></td>
</tr>
<tr>
<td>Net credits (126)</td>
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</table>

*See the Georgia Tech Catalog at [www.catalog.gatech.edu](http://www.catalog.gatech.edu) for allowable humanities and social science electives.

** Choose one Ethics course from: HTS 2084 (Social Science), INTA 2030 (Social Science), PST 3105 (Humanities), PST 3109 (Humanities), PST 3127 (Humanities), or PST 4176 (Humanities).
CAREERS

A major in mechanical engineering will give you many options for finding a job. For the past few years the placement rate has been excellent for Woodruff School graduates. The Career Services Office (in the Moore Student Success Center) sponsors career fairs, and there are hundreds of company visits to campus each academic year, with most employers looking to hire mechanical engineers.

For information on student and employer services, view

www.career.gatech.edu

Those Woodruff School students who go to graduate school get accepted at many top-ten schools. Almost twenty percent of our graduating seniors go directly to graduate or professional school, and the remaining eighty percent go into industry, where the starting salaries for mechanical engineers are excellent.

You are invited to make use of the Career Center's Computerized Systematic Interactive Guidance and Information System (SIGI) for assistance in determining career interests and aptitude and the Computer Assisted Study Skills Instruction (CASSI) for improving study skills.

www.counseling.gatech.edu/services.htm

The center also offers personal counseling to assist you in dealing with personal, motivational, or study problems. Counselors are available for individual sessions by appointment at (404) 894-2575.
FINANCIAL AID

Scholarships
Many awards recognize academic achievement and outstanding service to the School, the College, and the Institute.

HOPE Scholarships
Many students at Georgia Tech hold HOPE Scholarships, a program funded from Georgia State Lottery proceeds. Approximately fifty percent of the in-state mechanical engineering students in the Woodruff School have this aid.

President’s Scholarships
A number of Woodruff School students have received President's Scholarships. These students have demonstrated excellence in leadership and academics, and receive financial awards for four years. Students are expected to maintain honors-level academic performance, and to be involved in campus or community activities. The Office of Student Financial Planning & Services is located on the 3rd floor of the Student Success Center, located next to the Tech Tower and adjoining the football stadium. Hours are Monday through Friday from 8 a.m. - 4:30 p.m.

Woodruff School Scholarships and Awards
The Woodruff School has a number of designated scholarships and awards for mechanical engineering students who excel in scholarship, leadership, and service to the School. Because of its strong ties with industry, government, and foundations, the Woodruff School attracts an unusual number of scholarship opportunities. The School makes every attempt to nominate its exceptional students by matching their qualifications as closely as possible to the spirit and requirements of each award. To provide the School with information about your background, goals, honors, and personal interests, particularly if interested in being considered for a scholarship or award, you should submit a résumé to the Office of Student Services. These résumés should be updated periodically and reviewed with the Undergraduate Academic Advisor. In addition to the résumé, the Undergraduate Academic Advisor may also request an interview with scholarship candidates.

Awards are announced at Student Honors Day held in the spring semester. The winners are chosen by the Associate Chair for Undergraduate Studies and the Undergraduate Academic Advisor with approval by the School Chair. These awards, which often include a monetary award, are:

- Pi Tau Sigma Outstanding Junior Award for demonstrating outstanding scholarship and service to the School and student activities.
- Pi Tau Sigma Outstanding Senior Award for outstanding scholarship achievement and service to the School, the Institute, and to student activities.
- Pi Tau Sigma Outstanding Sophomore Award given for demonstrating outstanding scholarship service to the School and to student activities.
- Richard K. Whitehead Jr. Memorial Award, which is given to an outstanding mechanical engineering senior who exemplifies high standards of scholarship and service.
• Samuel P. Eschenbach (class of 1933) Memorial Award in Mechanical Engineering is based on academic performance, leadership capabilities in the campus community, and promise as a mechanical engineer.
• Woodruff School Chair's Award is given for outstanding scholarship and contributions to the School, especially to its program by a graduating senior.
• Woodruff School Outstanding Scholar Award which recognizes a graduating senior who has achieved an exceptional scholastic record in the mechanical engineering program.

Awards in the College of Engineering and the Institute
Woodruff School students may also qualify for awards at the Institute or College of Engineering level. These are announced on Student Honors Day toward the end of the spring semester. These include:
• Georgia Engineering Foundation Senior Design Award, which is presented to the design team producing the most outstanding senior design project in the College of Engineering.
• Georgia Tech Alumni Association Student Leadership Award for International Study which recognizes outstanding student leaders and provides them with the opportunity to broaden their educational experience through travel abroad. They must also have demonstrated significant potential for future alumni leadership.
• James G. and Mary G. Wohlford Scholarship recognizes outstanding senior coops who have excelled academically and on their coop jobs and who have made contributions to the community.
• Robert Engineering Award presented on an annual rotation to an outstanding rising senior in CE, ECE, ISyE, and ME.

Nuclear and Radiological Engineering Scholarships
Unique scholarship opportunities exist for Georgia Tech BSNRE students. In addition to national NRE scholarships sponsored by the National Academy for Nuclear Training, the U. S. Department of Energy, and some professional societies, Georgia Tech offers scholarships sponsored by local industry, as well as the prestigious George W. Woodruff NRE Scholarship.

Academic Common Market (ACM)
The ACM provides an exciting opportunity for students from the southeast whose state universities do not offer a B.S.N.R.E. degree. Students from those states who are accepted to the BSNRE program at Georgia Tech pay (Georgia) in-state tuition and must maintain ACM status. For more information, view www.me.gatech.edu/me/publicat/flyers/BSNRE-ACM.html

Other Financial Aid Sources
If you need to take out a loan, U. S. (Stafford) and State Government loans are available to American citizens and permanent residents only; they require advance planning. Contact the

Office of Student Financial Planning
Georgia Institute of Technology
Atlanta, Georgia 30332-0460

or call (404) 894-4160 for more information.
SPECIAL PROGRAMS

The Cooperative Program
Since 1912, Georgia Tech has offered a five-year cooperative program to those students who wish to combine career-related experience with classroom studies. The program is the fourth oldest of its kind in the world and the largest optional co-op program in the country. The program alternates between industrial assignments and classroom studies on a semester basis for two of the four years. If you participate in the cooperative program, you will receive the degree Bachelor of Science in Mechanical Engineering or Nuclear and Radiological Engineering, Cooperative Plan. You will then have completed the same course work as that completed by regular four-year students.

While on work semesters, you can receive academic advice by telephoning the Office of Student Services at (404) 894-3203. It is important to check periodically with the Office of Student Services to make sure you know about any revisions in Woodruff School course schedules or curriculum. For more information or to apply for admission to the cooperative program contact the Cooperative Division Office in the Savant Building at (404) 894-3320 or view www.coop.gatech.edu

The International Cooperative Program
By completing work assignments in a foreign county and exhibiting proficiency in a foreign language, you may earn the "International Cooperative Plan" designation on your degree. Information for Students Working Abroad. This is a great opportunity to utilize your foreign language skills, gain a global perspective and experience a diverse culture. About a half dozen ME students are living in Germany and working at Siemens (in Munich).

If you are a co-op/intern student who would like to experience working overseas in a foreign country, please schedule an appointment with Ken Little to discuss opportunities and requirements for participating in the International Co-op Degree Program OR Undergraduate Professional Internship. For more information on this program, please view www.profpractice.gatech.edu

The Undergraduate Professional Internship Program
In fall 2002, the Undergraduate Professional Internships (UPI) Program was established at Georgia Tech. The first students participated in the program in spring semester 2003. This program is geared toward those students who could not or did not participate in the cooperative program, but want some career-related experience before graduation. The program is open to all majors at Georgia Tech, and is aimed mainly at rising juniors and seniors.

Program Requirements
Requirements for the program include: completion of 30 hours of academic coursework at Georgia Tech; transfer students must complete one semester of full-time study at Georgia Tech; a minimum
2.0 GPA and good academic standing; a completed application to the UPI program; and completion of a full course load during the term immediately proceeding the work assignment. For more information and application instructions, view

www.profpractice.gatech.edu/students/upi.html

or call (404) 894-3320 if you have any questions about the program.

Since the inception of the program mechanical engineering students have participated: 2 in summer 2003, 4 in spring 2004, and 22 in summer 2004. Students generally work for one semester, typically in the summer, with an option for more. Students are typically late sophomores, juniors, or seniors. Companies in which mechanical engineering students have worked are: Applied Materials, Cummins, Department of the Air Force, Eli Lily & Company, GE, Robert Bosch Corp., Texas Instruments, and Siemens.

Other Learning Opportunities in NRE
Undergraduate research with NRE faculty mentors typically begins in the junior year. NRE suggests that students begin with undergraduate research for course credit by finding a faculty research mentor and signing up for NRE 4901, Special Problems in NRE. The following semester the successful student should apply to the President’s Undergraduate Research Awards

www.undergradresearch.gatech.edu

(up to $1,500 for student salary, up to $1,000 for student travel to professional meetings) or NRE’s new Undergraduate Research Scholar’s Program (up to $1,000 for student salary). The NRE program requires a GPA of 3.3 or higher to apply. Applications for the NRE program are available from Dr. Nolan Hertel. Other opportunities for paid undergraduate research opportunities can be found at

www.undergradresearch.gatech.edu/institute-wide.htm

Successful seniors that plan to continue research can apply to the faculty research mentor for continued salary support.

Nuclear and Radiological Engineering (NRE) encourages undergraduates to pursue out-of-class experiences to further their professional development. The department has arranged for hands-on experience in nuclear and radiological engineering to be acquired through a coop assignment, internship, or undergraduate research experience. The Office of Professional Practice offers long-term, alternating full-time work experience for NRE majors through their coop program

www.coop.gatech.edu

and short, one semester professional work experience through their Professional Internship Program.

The Five-Year BS/MS Program
The Woodruff School offers a five-year BS/MS Program for outstanding Woodruff School students who want to obtain a graduate degree. You can obtain your degrees in various combinations, such as a B.S. and an M.S. in Mechanical Engineering, or a B.S. in Nuclear and Radiological
Engineering and an M.S. in Mechanical Engineering, or a B.S. in Mechanical Engineering and an M.S. in Nuclear and Radiological Engineering. To learn if you are eligible for this individualized program, view

www.me.gatech.edu/publicat/brochures/bsms.htm

Program Requirements
To be eligible for the program you should have completed 30 semester credit hours at Georgia Tech, which is typically at the end of your freshman year; shown appropriate progress in your degree program; and obtained a grade point average of 3.5 or higher. You must apply to the program before you complete 75 semester credit hours, including transfer and advanced placement credits.

You will need to submit a one-page application form and a short biographical statement. There is no need to take the Graduate Record Exam (GRE) for admission to the program.

The United Technologies Teaching Intern Program
This program is funded by the United Technologies Corporation and supports up to seven junior and senior mechanical engineering students for one or two semesters. Students are invited into the program based on academic achievement and recommendations by the faculty. The program is intended to give students the opportunity to work with a faculty member in teaching an undergraduate course in mechanical engineering; encourage our best students to consider graduate school; help develop communication and interpersonal skills; and provide a way for practicing engineers and managers at United Technologies to interact with Woodruff School students. The teaching interns participate as tutors in the Woodruff School’s Academic Study Program. For more information, contact Dr. David Sanborn at david.sanborn@me.gatech.edu.

Studying Abroad
Woodruff School students participate in a number of study-abroad programs. These programs usually offer courses taught by Georgia Tech faculty. In 1997, the Institute began managing reciprocal exchange programs that allow students to attend foreign universities for a portion of their academic program. During the past academic year, Woodruff School students participated in these programs: Aerospace Engineering in Russia (3 students), Brussels Summer Program (2 students), Costa Rica Summer Program (1 student), Exchange Programs (3 students), German Language for Business and Technology (2 students), Georgia Tech Lorraine Summer Program for Undergraduates (25 students), Oxford Summer Program (8 students), Pacific Study Abroad Program (8 students), Spanish Language for Business and Technology (2 students), Technical University Munich/Siemens (1 student), and Work Abroad/International Coop (1 student).

For more information about these opportunities, contact International Student Programs at (404) 894-7475. See also

www.oie.gatech.edu
or
www.me.gatech.edu/me/gtl/GTL.html
or
www.ece.gatech.edu/academic/oxford
The Dual-Degree Program

The dual-degree program allows you to combine a typical liberal arts program with the technological curriculum offered by Georgia Tech. Under this program, you attend a liberal arts college for three years and then come to Georgia Tech for two years. Upon completion of the program, you receive both a bachelor of arts or science degree from the liberal arts college and a bachelor's of science degree in an engineering or science field from Georgia Tech. Most of the colleges and universities of the University System of Georgia, the Atlanta University Center colleges, and other selected colleges and universities from around the nation participate in this program.

As a dual-degree student you do not formally transfer credits upon matriculation to Georgia Tech, but you are considered a transfer student and must satisfy all the requirements of the B.S.M.E. or B.S.N.R.E. program. During the registration period for the first semester of residence at Georgia Tech, you should meet with the Undergraduate Academic Advisor to arrange the initial semester's schedule. She will evaluate your transcript for compatibility with Georgia Tech's Mechanical Engineering or Nuclear and Radiological Engineering program and fill out a program of study.

A Second Undergraduate Degree

The second undergraduate degree option is available for those who have received an undergraduate degree in another discipline at Georgia Tech or from some other school. To earn a B.S.M.E. or B.S.N.R.E. degree, you must satisfy all the requirements of either the Mechanical Engineering or the Nuclear and Radiological Engineering program including a minimum of 36 semester hours in excess of the requirements for the first degree.

The Frank K. Webb Program in Professional Communication

The Frank K. Webb Professional Communication Program provides classroom instruction, evaluation guidelines, and models of good performances for students who are learning how to prepare written and oral technical reports. Dr. Jeffrey Donnell participates in the Woodruff School’s design and laboratory courses; he explains how technical reports work and he grades many written and oral performances. Among his classroom activities at the Woodruff School are:

- Lectures on report preparation for undergraduate design and laboratory courses;
- Prepares instructional guides and example reports; and
- Evaluates and provides feedback on written and oral reports.

As you prepare to graduate from Georgia Tech, Dr. Donnell will help you to develop career-related documents:

- Lectures on the graduate application process and model application essays;
- Provides model graduate fellowships application essays;
- Reviews student application essays;
- Reviews student résumés and cover letters; and
- Reviews other class performances and reports, as well as reports prepared for independent research projects.

The program was created in 1990 and is one of the few writing programs of its kind in an engineering department. The program, which is based on the
University of Chicago's Little Red Schoolhouse program to teach clear writing and effective composition, is coordinated by Dr. Jeffrey Donnell, who has a doctoral degree in English from Emory University. The program formalizes the oral and written reports that are part of the School's design and lab courses. Communications activities are framed as career-development activities, and they are coordinated across the Woodruff School curriculum, beginning with the first design course.

www.me.gatech.edu/me/academics/little_red_schoolhouse

The various design and laboratory classes devote one or two class sessions to lectures on communications issues. In addition, design classes devote a few minutes of class time each week to oral presentations and to feedback on these presentations. You will also learn how to prepare project documentation.

Sources for Preparing a Professional Presentation

To help you prepare the results of your lab and design work in written form, here are some useful tools that discuss style, grammar, and writing skills. These books may be found in the Georgia Tech Library or they might be purchased in any bookstore.

Style


Dictionaries


Grammar


Study Programs

Academic Study Program in the Woodruff School
The Academic Study Program in the Woodruff School is organized by Pi Tau Sigma, an honorary society in mechanical engineering. WSSAC students and the United Technology Teaching Interns also serve as tutors for many required courses in mechanical engineering. The list of specific courses is available in the Office of Student Services (MRDC, Room 3112) or call Pi Tau Sigma at (404) 894-4000 for times and availability of tutors. An area in the MRDC Building on the 2nd floor (near the elevator) is reserved for this program.

Office of Minority Educational Development (OMED)
OMED offers a free tutorial service to undergraduates. Tutoring, which occurs in the Library, is available in mathematics, science, and many engineering courses. For information, go to www.omed.gatech.edu/blueprint/index.htm or call (404) 894-3959.

One-to-One Tutoring, Success Programs
This is a tutoring service in the core mathematics, computer science, physics, and chemistry course offered by the Office of Success Programs. Go to Room 105 in the ESM Building during the day. For an appointment, go to www.successprograms.gatech.edu/tutoring/policy.html or call (404) 894-1945.

School of Mathematics
The School of Mathematics provides a walk-in tutoring service in the Math Lab (Room 257 of the Skiles Building) for any Georgia Tech student in a freshman-level mathematics course. The hours are posted each semester.

Certificate Program and Minor in Nuclear and Radiological Engineering
The Nuclear and Radiological Engineering/Medical Physics Program in the Woodruff School offers a certificate and a minor in Nuclear and Radiological Engineering to non-NRE engineering students. The requirements for both programs include the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRE 3301</td>
<td>Radiation Physics</td>
<td>3-0-3</td>
</tr>
<tr>
<td>NRE 3212</td>
<td>Fundamentals of Nuclear Engineering</td>
<td>3 (0-3)</td>
</tr>
<tr>
<td>NRE 3316</td>
<td>Radiation Protection Engineering</td>
<td>3 (0-3)</td>
</tr>
</tbody>
</table>

Additional courses are required from the list below for a total of at least 12 credit hours for the Certificate Program and 18 credit hours for the Minor Program.
NRE 2110  Introduction to Nuclear and Radiological Engineering 2 (2-0-2)
NRE 4204  Nuclear Reactor Physics 4 (4-0-4)
NRE 4206  Radiation Physics Laboratory 2 (1-3-2)
NRE 4214  Reactor Engineering 3 (3-0-3)
NRE 4232  Nuclear Radiological Engineering Design 4 (1-9-4)
NRE 4234  Nuclear Criticality Safety Engineering 3 (2-3-3)
NRE 4266  Light Water Reactor Technology 3 (3-0-3)
NRE 4328  Radiation Sources and Applications 3 (3-0-3)
NRE/MP 4775  Radiation Imaging 3 (3-0-3)
NRE 4404  Radiological Assessment and Waste Management 3 (3-0-3)
NRE 4610  Introduction to Plasma Physics and Fusion Engineering 3 (3-0-3)
NRE 4770  Nuclear Chemical Engineering 3 (3-0-3) (Crosslisted with ChE 4770)

**Fundamentals of Engineering Exam**
The Georgia State Board of Registration offers Georgia Tech students the opportunity to take the Fundamentals of Engineering (FE) exam before they graduate, a privilege not normally afforded to the general public. You are encouraged to take this exam in your senior year. Check Woodruff School bulletin boards and e-mail messages for information and instructions on this test. The exam is given twice a year, usually in April and October. Students who are within two semesters of graduation and want to take the exam must fill out the application before the deadlines established by the Georgia State Board. The application, available online some time before the exam at

[www.ncees.org](http://www.ncees.org)

must contain a recent picture of the applicant, be typed, notarized (Norma Frank is a Notary Public), and signed by five references, three of whom must be registered Professional Engineers. The three P. E. signatures will be obtained for you by the Woodruff School.

**The Application**
The application consists of two parts. The first part is sent to the Georgia Secretary of State’s Office and costs $20. The first part of the application should be turned in to Norma Frank in the Office of Student Services. The second portion of the exam can be completed online at

[www.ncees.org](http://www.ncees.org)

To get the application, follow these directions: Choose **Exam Registration** in the left-hand column under Exams. Choose **Georgia** in the jurisdiction column. Choose **Online Registration** in the rightmost column under Related Pages. Choose **Proceed to Registration**. Choose **Buy online** under Georgia Tech (The FE Exam Registration fee has been $95.00). Choose **Add to cart**.

Application deadlines are approximately the first week in January for the April test and the last week in June for the October exam.
FACILITIES

We believe the Woodruff School has the finest mechanical engineering facilities in the United States. Most of the Woodruff School is housed in a three-building complex, all built after 1990, with classroom, laboratory, and research space.

The Manufacturing Related Disciplines Complex (MRDC) houses the Administrative Office, the Finance Office, and the Office of Student Services, many undergraduate laboratories, and some classrooms.

Our newest building, the J. Erskine Love Jr. Manufacturing Building, houses state-of-the-art research laboratories, classrooms, offices, and study space in the atrium of the building.

The Manufacturing Research Center (MARC) houses a high-bay area with an anechoic (echo-free) chamber and other research equipment and office space.

Our bioengineering faculty are located in the Parker H. Petit Institute for Bioengineering and Bioscience, and the nuclear and radiological engineering faculty are located in the Neely Research Center.

All facilities are connected to the campus fiber optic network and the Internet. Our machine and instrumentation shops are supported by a staff of full-time technicians, and there is a full-time coordinator for the undergraduate laboratories.

Computers

Shortly after you enter Georgia Tech, the Office of Information Technology (OIT) will create a user ID account and password, usually referred to as a GT account (until recently, this was called a “prism” account), for the campus mainframe computer, a Sun Sparc Center 2000, usually referred to as "acme." These accounts provide a UNIX programming environment, an e-mail account, home page location, and other services. The prism account is the official Georgia Tech e-mail account used for students. You can activate your user account and password in Room 140 of the Rich Building.

Computer Clusters

The Woodruff School maintains three computer clusters for student use. The General Use Computing Cluster (MRDC, Room 2104) has 18 PC compatible multimedia computers with zip drives, CD-Writers and 20-inch flat panel monitors, two HP LaserJet 8150 32 ppm, 11 x 17 laser printers, and an HP flatbed scanner with document feeder available for student use. Software installed on the machines include Word, Excel, PowerPoint, Access, Netscape, Matlab, Autocad, Engineering Equation Solver, and Cambridge Materials Selector. Log on information is posted. This cluster is accessible with your buzz card 24/7. Staffed hours are posted outside the door. All Woodruff School students should be programmed for access. If you are not, see the staff in MRDC, Room 2210, (404) 894-6824, or send an e-mail to michael.murphy@me.gatech.edu.
The **Computer Aided Engineering (CAE) Laboratory** (MRDC, Room 2105) houses 27 higher end PC compatible multimedia computers, CD-Writers, and 20 inch flat panel monitors, a Lexmark 11x17 24ppm laser printer, an HP 4550 color laser printer, an HP 4600 color laser printer, and an HP 755CM large format plotter. This cluster is reserved for classes and students using IDEAS, Fluent, or ANSYS modeling and analysis software. The cluster remains locked 24 hours a day with access via buzz cards only to authorized students. You must be in a class that needs these software packages or have special approval from a faculty member to use the lab. Requests to use the CAE can be made to

www2.me.gatech.edu/caecluster/cae_request.asp

The **Nuclear and Radiological Engineering Computer Cluster** (NNRC/G114) houses PC-compatible computers and printers. Some of the computers in this cluster are available for general use by NRE students. The rest of the computers are reserved for NRE classes requiring nuclear engineering specific codes. Instructions for use of the facility are posted on the door.

**Using the School’s Computers**

Computer facilities are available only to serve needs directly related to class assignments and academic research. **The facilities are not for personal use.** Use of computer resources to prepare personal letters, print résumés, play games, consulting activities, or for other commercial uses is a violation of Institute policy. Anyone caught not doing legitimate work may be asked by a user assistant to relinquish his or her seat in the cluster.

**Wireless/Walkup Network (LAWN)**

The purpose of the Georgia Tech Wireless/Walkup Network (LAWN) is to connect in common areas of the buildings where there is normally no access. OIT supports the LAWN from 8 a.m. to 5 p.m. Monday through Friday. There are instructions to connect to the LAWN in the lobbies of the Love and MRDC buildings and online. System requirements and instructions also can be found online at

www.me.gatech.edu/support/computer/LAWN/lawnpage.html

For additional assistance with connecting to the wireless or walkup network, please contact the help desk at 404-894-7193, or computer.support@me.gatech.edu, or go to MRDC, Room 2103.

**Woodruff School Cyber Station**

E-mail and web access are available at the Woodruff School Cyber Station, located on the 2nd floor of MRDC. The workstation may be used by Woodruff School students and guests of the School, and accesses Internet-based e-mail, general web browsing, and secure telnet messages. While you can use the Cyber Station as often as you like, it is intended for short-term use. Please be aware of others who are waiting to use the terminal and limit your activity accordingly. For complete instructions, view

www2.me.gatech.edu/kioskhome.htm

**Copy and Fax Machines**

A copy machine and a FAX machine, both reserved for student use, are located in the second floor lobby of the MRDC Building.
Shops and Laboratories
The Machine Shop, the Fabrication Shop, and the Electronics Shop are valuable Woodruff School resources. Most of the construction in these shops is done by the professional staff.

The Machine Shop
If you have the appropriate skills, you may be allowed to use the Machine Shop (MRDC, Room 2327). Prior, you will be asked to attend a machine shop safety training class or to demonstrate appropriate skills to shop personnel. Fill out a Machine Shop Student Work Request. This form contains a Waiver of Liability, and must be signed by your advisor and submitted to the machine shop manager prior to using the machines. This form is located outside of Room 2205 in the MRDC Building or online at www.me.gatech.edu/support/work_request_index.html

For more information about the student machine shop, contact Mr. John Graham at (404) 894-3216 or at john.graham@me.gatech.edu.

The Fabrication Shop
Typically, the Fabrication Shop, which is located in Room 2317 of the MRDC Building, is not open for student use. However, if you have a specific request or need, then permission to use the shop will be granted while a member of the professional staff is present. Some prior knowledge of the equipment in the shop is necessary before such use. For more information, contact Mr. Butch Cabe at (404) 894-3219 or donald.cabe@me.gatech.edu.

The Electronics Lab
The Electronics Lab is located in Room 2211 of the MRDC Building. You are not allowed in this lab unless a staff member is present. Work performed in the Electronics Lab must be related to funded research, thesis work, or course work. Contact Mr. Vladimir Bortkevich at (404) 894-7671 or at vladimir.bortkevich@me.gatech.edu to discuss your requirements. For more information, see www.me.gatech.edu/support/electronics
STUDENT ORGANIZATIONS

There are a number of groups for you to join. WSSAC is the umbrella organization in the Woodruff School and is open to all students. In addition, you will find student chapters of professional societies, honor societies, and student competition groups.

Woodruff School Student Advisory Committee (WSSAC): www.me.gatech.edu/sac
Joining the Woodruff School Student Advisory Committee is the best way to become part of the decision-making process in the Woodruff School. WSSAC advises the faculty and administration on issues that directly affect the students. Meetings are open to interested students. Each year they sponsor two major events: the Undergraduate Research Fair in the fall and the Woodruff School Spring Banquet in the spring. They publish a newsletter (Mechanical Engineering News) each semester, help interview candidates for faculty positions, and work to improve faculty and student relations. Dr. David Sanborn is the advisor.

Professional Societies
Several professional mechanical engineering societies have student chapters at Georgia Tech. These organizations offer you a unique opportunity to learn about the many facets of mechanical engineering, let you meet practicing professionals, and they also provide valuable service to the School. You are strongly encouraged to participate in one or more of these groups.

www.me.gatech.edu/me/students/organizations

American Nuclear Society (ANS): http://cyberbuzz.gatech.edu/ans
The Georgia Tech Student Section of the American Nuclear Society (ANS) is the link for prospective nuclear engineers with their chosen profession. Membership provides students with a subscription to the Society magazine, Nuclear News, technical paper reprints at a reduced rate, and eligibility for special student loans and scholarships. The section holds monthly meetings which regularly feature presentations by practicing engineers. Dr. Farzad Rahnema is the faculty advisor.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): www.ashrae.org
The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) is an international professional and technical society devoted to promoting the arts and sciences of heating, refrigerating, air-conditioning, ventilation, and allied technologies. The ASHRAE Student Chapter meets twice a semester to hear presentations and to discuss topics of current interest. Membership includes a subscription to the monthly magazine, The ASHRAE Journal, and entitles students to receive a free copy of latest version of The ASHRAE Fundamentals Handbook. Dr. Sheldon Jeter is the faculty advisor.

American Society of Mechanical Engineers (ASME): www.me.gatech.edu/asme
The Georgia Tech Student Section of the American Society of Mechanical Engineers (ASME) is the link for prospective mechanical engineers with their chosen profession. Membership provides students with a subscription to the Society magazine, Mechanical Engineering, technical paper reprints at a reduced rate, and
eligibility for special student loans and scholarships. The section holds monthly meetings which regularly feature presentations by practicing engineers. The section also sponsors several annual events such as the Spring Picnic. Dr. Jeffrey Streater is the faculty advisor.

**SAE International:** [www.me.gatech.edu/sae](http://www.me.gatech.edu/sae)

SAE International is a specialized engineering society which strives to further research, development, design, manufacture, and utilization of vehicles which operate on land and sea, and in air and space. The Georgia Tech student section is one of the largest in the country and consequently is able to attract excellent speakers and presentations for its meetings, which are held four to six times a semester.

gt motorsports and GT Off-Road are subgroups of the section. Membership in the student section includes a subscription to the monthly technical journal, *Automotive Engineering*, and the opportunity to purchase the SAE Handbook at a greatly reduced price. Dr. Ken Cunefare is the faculty advisor.

**Society of Manufacturing Engineers (SME):** [cyberbuzz.gatech.edu/sme](http://cyberbuzz.gatech.edu/sme)

The Society of Manufacturing Engineers is an international professional society dedicated to serving its members and the manufacturing community through the advancement of professionalism, knowledge, and learning. Members have access to the resources needed to compete in today’s rapidly changing manufacturing environment. The student chapter meets regularly and sponsors plant trips and events such as building a bridge out of toothpicks. Dr. William Singhose is the faculty advisor.


**Honor Societies**

**Pi Tau Sigma: [www.me.gatech.edu/pts](http://www.me.gatech.edu/pts)**

Pi Tau Sigma is the national honorary fraternity of mechanical engineers. Invitations to join are extended to junior and senior mechanical engineering students who have distinguished themselves by high academic achievement. The Georgia Tech Chapter holds several meetings a semester to organize its several service projects, such as providing tutoring services in basic Mechanical Engineering courses. Pi Tau Sigma also presents two awards each year to the outstanding Mechanical Engineering students in the sophomore and senior classes. In the fall, the Society sponsors the Mechanical Challenge, a jeopardy-style competition with questions similar to the ones in the GRE and EIT exams. The group also runs the Academic Study Program in the Woodruff School (see the section on Study Programs). Dr. Janet Allen is the faculty advisor.

**Gamma Beta Phi: [cyberbuzz.gatech.edu/gbp](http://cyberbuzz.gatech.edu/gbp)**

The Gamma Beta Phi Society is an honor and service organization for students in colleges and universities in the United States. Membership at Georgia Tech is by invitation to students with a GPA of 3.3 or above. The organization is based on seven committees. Last year the Campus Service Committee was responsible for tutoring projects and the Community Services Committee sent representatives to high schools to talk about college life. Ms. Norma Frank advises the group.
Tau Beta Pi: www.cyberbuzz.gatech.edu/tbpi
Engineering students who show superior scholarship and leadership as well as integrity and breadth of interest, both inside and outside of engineering, are recognized by Tau Beta Pi, the highest engineering honor society. Undergraduate students who rank in the top eighth of their junior class are considered for membership.

Student Competition Groups

gt motorsports www.me.gatech.edu/gtmotorsports
gt motorsports was founded in 1986 by a group of students who felt they could gain valuable experience by applying their classroom knowledge to real-world problems. Each academic year the team conceives, designs, builds, and tests a single seat formula race car to compete in the annual SAE Formula Competition in Pontiac, Michigan. The students, most of whom are ME’s, are responsible for every aspect of the car, including fundraising to finance the program. Beginning in summer 2000, the team also competed in the international formula competition held in Birmingham, England, winning the competition in 2001 and 2003. In December 2003, the team went to Australia and won the overall competition. Dr. Ken Cunefare is the faculty advisor.

GT Off-Road (Mini-Baja Team) cyberbuzz.gatech.edu/minibaja
GT Off-Road is a group of mechanical engineering, industrial design, industrial engineering, and management students. The team designs and builds a single seat vehicle from scratch. Members are trained in machining skills and make the parts they design. The only standard for the competition is a 10 hp Briggs and Stratton engine. In June 2000 the team competed in their first competition. Mini-Baja racing is also under the auspices of SAE, but they race on a dirt track. Dr. Ken Cunefare is the faculty advisor.

RoboJackets: robojackets.org
RoboJackets competes in national and international robotics competitions, promotes robotics at Georgia Tech, and helps students learn skills necessary to build robots. Teams work on projects such as Battlebots, Vacubots, and the Intelligent Ground Vehicle Competition. The group also works with high schools and community groups as part of the FIRST competition. RoboJackets sponsors the Lego Robot Competition, where Georgia high school teams learn about robotics by building remote-controlled robots. Dr. Imme Ebert-Uphoff is the faculty advisor for RoboJackets and Dr. Wayne Book is the FIRST faculty advisor.
The Woodruff School has 81 tenure-track faculty (all with Ph.D.'s), twenty-one research faculty, five academic professionals, and forty-seven staff members. Fourteen faculty members hold endowed chairs or distinguished professorships.

Many of our faculty have received prestigious awards, written widely-used textbooks, and are well known in their respective areas of expertise. Twenty-three faculty members have received prestigious National Science Foundation Career Awards; at least thirty-nine hold the grade of Fellow in professional societies, such as the ASME or the ANS; and faculty members hold more than 192 patents.

Your interaction with faculty, both in and out of the classroom is an important part of your education. You are strongly encouraged to take advantage of the opportunities to meet with the faculty, just as faculty members are encouraged to include students to the maximum extent possible in research and other learning experiences. You may e-mail any faculty member by using

firstine.lastname@me.gatech.edu
or
firstname.lastname@nre.gatech.edu

for NRE faculty only.

View the individual faculty web pages at

www.me.gatech.edu/me/people/academic.faculty/index.html

**Acoustics and Dynamics**

**Yves H. Berthelot**, Professor
Acoustics, laser instrumentation in acoustics, ultrasonics
LOVE 124
404-894-7482

**Kenneth A. Cunefare**, Associate Professor
Active/passive control, modeling and control of brake squeal, fluid-structure interaction, and optimal acoustic design
LOVE 113
404-894-4726

**Aldo A. Ferri**, Associate Professor
Acoustics, structural dynamics, nonlinear dynamics and control
LOVE 107
404-894-9032

**Jerry H. Ginsberg**, George W. Woodruff Chair in Mechanical Systems and Professor of Mechanical Engineering
Vibrations, acoustics, dynamics, fluid-structure interaction
LOVE 101
404-894-3265

**Peter H. Rogers**, Rae and Frank Neely Professor in Mechanical Engineering
Underwater acoustics and bioacoustics
LOVE 118
404-894-3235
Automation and Mechatronics

Wayne J. Book, HUSCO/Ramirez Distinguished Chair in Fluid Power and Motion Control and Professor of Mechanical Engineering 404-894-3247
Robotics, automation, modeling fluid power, and motion control

Ye-Hwa Chen, Professor MARC 440
Controls, manufacturing systems, neural networks, fuzzy engineering 404-894-3210

Imme Ebert-Uphoff, Associate Professor MARC 476
Robotics, theoretical kinematics, dynamics, parallel manipulators, and digital clay 404-385-0667

Kok-Meng Lee, Professor MARC 474
System dynamics, control, automation, optomechatronics 404-894-7402

Harvey Lipkin, Associate Professor LOVE 214
Design and analysis of mechanical systems, robotics, and spatial mechanisms 404-894-7410

John G. Papastavridis, Associate Professor LOVE 132
Analytical, structural/nonlinear mechanics, vibrations, and stability 404-894-2789

Nader Sadegh, Associate Professor MARC 475
Controls, vibrations, and design 404-894-8172

William Singhose, Assistant Professor MARC 432
Vibration, flexible dynamics, and command generation 404-385-0668

Bioengineering

Andrés Garcia, Associate Professor IBB 2314
Cellular and tissue engineering, cell adhesion, and biomaterials 404-894-9384

Robert Guldberg, Assistant Associate Professor IBB 2311
Biomechanics, microCT imaging and tissue engineering 404-894-6589

Jens O. M. Karlsson, Associate Professor LOVE 005
Thermodynamics and transport in biological systems, nonequilibrium solidification, tissue engineering, and bioMEMS 404-385-4157

David N. Ku, Lawrence P. Huang Endowed Chair in Engineering and Entrepreneurship and Regents’ Professor Entrepreneurship IBB 2307
Thrombosis, biomaterials, and tissue engineering 404-894-6827

Marc Levenston, Associate Professor IBB 2312
Orthopedic biomechanics, soft tissue mechanics, tissue engineering 404-894-4219

Robert M. Nerem, Parker H. Petit Distinguished Chair for Chair Engineering in Medicine and Institute Professor 404-894-2768
Biomedical engineering, cellular and tissue engineering

Raymond P. Vito, Associate Dean for Academic Affairs and Professor Biomechanics, tissue mechanics, and design IBB 2305 404-894-2792

Timothy Wick, Professor of Chemical Engineering (Joint Appointment) IBB 1310
Tissue and bioprocess engineering, bioreactor design, cell adhesion, and blood rheology

**Ajit Yoganathan**, Regents' Professor (Joint Appointment)
Cardiovascular fluid dynamics, rheology, Doppler ultrasound, and MRI

**Cheng Zhu**, Professor
Biomechanics of single cells and single molecules, cell adhesion kinetics, and bio-MEMS

**Computer-Aided Engineering and Design**

**Bert Bras**, Professor
Environmentally conscious design, design for recycling, and robust design

**Farrokh Mistree**, Professor
Strategic design, design of product families and distributed design and manufacture

**Christiaan Paredis**, Assistant Professor
Simulation-based design, information technology for design, mechatronics, and evolutionary algorithms

**David W. Rosen**, Professor
Virtual and rapid prototyping, intelligent CAD/CAM/CAE

**Suresh K. Sitaraman**, Professor
CAD/CAE, electronic packaging, thermomechanics and reliability, and FEM

**Fluid Mechanics**

**Cyrus Aidun**, Professor
Hydrodynamic stability, liquid coating, and suspended particle hydrodynamics

**Prateen Desai**, Professor
Fluid mechanics, solidification, convection in materials processing

**Ari Glezer**, George W. Woodruff Chair in Thermal Systems
Fluid mechanics, turbulent shear flows, flow control, diagnostics

**G. Paul Neitzel**, Professor
Hydrodynamic stability, surface-tension-driven and rotating flows, noncoalescence, and nonwetting and bioreactor fluid dynamics

**David Parekh**, Deputy Director of GTRI and Associate Vice Provost for Research (Joint Appointment)
Active flow control, propulsion, and fuel cell systems

**Marc K. Smith**, Professor
Hydrodynamic stability, liquid films, droplet atomization  

**Fotos Sotiropoulos**, Associate Professor of Civil and Environmental Engineering (Joint Appointment)  
Computational fluid dynamics, turbulent shear flows, fluid mixing, biofluid mechanics, and environmental hydraulics  

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Minami Yoda, Associate Professor
Experimental fluid mechanics, suspension flows, nano- and microfluids, and optimal diagnostics
LOVE 228 404-894-6838

Fusion
Weston M. Stacey, Jr., Regents' Professor and Fuller E. Callaway Neely Professor in Nuclear Engineering
Fusion engineering, plasma physics, reactor physics
4-3714

Heat Transfer, Combustion and Energy Systems
Frederick W. Ahrens, Professor
Heat and mass transfer, drying, transport phenomena in porous media, thermal and energy systems modeling, simulation, and optimization.
IPST 321 404-894-6496

J. Narl Davidson, Associate Dean of Engineering and Professor
Academic administration, engineering education, plasma physics, and power plant operation
COE 301 404-894-3350

Andrei Fedorov, Assistant Professor
Catalysis and fuel cells, chemical and electrochemical sensors, atomic force microscopy, and thermal radiation
LOVE 307 404-385-1356

Srinivas Garimella, Associate Professor
Sustainable technologies, phase change in microchannel and compact heat exchangers, heat and mass transfer in binary mixtures
LOVE 340 404-894-7479

Mostafa Ghiaasiaan, Professor
Multiphase flow, aerosol and particle transport, microscale heat transfer, and nuclear reactor thermohydraulics
LOVE 308 404-894-3746

Sheldon M. Jeter, Associate Professor
Thermodynamics, energy systems, and heat transfer
LOVE 330 404-894-3211

Yogendra K. Joshi, John M. McKenney and Warren D. Shiver Distinguished Chair in Building Mechanical Systems and Associate Chair for Graduate Studies
Thermo-fluid issues in emerging technologies and microthermal systems
LOVE 338 404-385-2810

J. Robert Mahan, Academic Affairs Director at Georgia Tech Lorraine and Professor
Heat transfer, thermal radiation, applied optics, and infrared Survivability of air targets
GT Lorraine

David Orloff, Professor
Impulse drying, pressing, and web preheating
IPST 315 404-894-6649

Alan V. Larson, Professor and Associate Chair of Administration Thermodynamics 3218 MRDC 4-3201

Samuel V. Shelton, Associate Professor
Energy systems, HVAC systems, absorption, refrigeration
LOVE 216 404-894-3289

William J. Wepfer, Vice Provost for Distance Learning and Professional Education and Professor
SWANN 404-894-8920
Heat transfer and thermodynamics

**Zhuomin Zhang**, Associate Professor
Microscale heat transfer, thermophysical properties, and radiation thermometry

**Ben Zinn**, David S. Lewis Jr. Chair in Aerospace Engineering and Regents' Professor (Joint Appointment)
Combustion instability, active control, microscale combustion, propulsion, and acoustics

**Manufacturing**

**Daniel F. Baldwin**, Associate Professor
Manufacturing systems design, electronics manufacturing and packaging, and polymer processing

**Jonathan S. Colton**, Professor
Manufacturing, polymer/composites processing, rapid prototyping, and nano/microfabrication

**Steven Danyluk**, Professor, Morris M. Bryan Jr. Chair in Advanced Manufacturing Systems and Professor
Semiconductor processing, lubricant-surface interaction, polishing and sensors

**Thomas R. Kurfess**, Professor
System dynamics, control, metrology, CAD/CAM/CAE, and precision system design

**Steven Y. Liang**, Professor
Automated manufacturing, controls systems, digital signal processing

**Shreyes N. Melkote**, Associate Professor
Machining processes, surfaces, intelligent fixturing, and CAM/CAPP

**Timothy Patterson**, Assistant Professor
Web preheating

**I. Charles I. Ume**, Professor
Electronic packaging, mechatronics, laser moiré and laser ultrasonics

**Mechanics of Materials**

**Laurence J. Jacobs**, Professor of Civil Engineering and Environmental Engineering (Joint Appointment)
Nondestructive evaluation, wave propagation in solids, and experimental mechanics

**Iwona Jasiuk**, Associate Professor
Micromechanics, elasticity, fracture, composite materials, nano and biomaterials

**Steve Johnson**, Professor of Materials Science and Engineering
W. Jack Lackey, Professor
Nuclear fuel and waste processing, ceramic and metallic coatings, composites, and rapid prototyping

Christopher S. Lynch, Associate Chair for Administration and Professor
Experimental mechanics, smart materials

David L. McDowell, Carter N. Paden, Jr. Distinguished Chair in Metals Processing and Regents’ Professor
Material deformation and damage, constitutive laws, and metals processing

Richard W. Neu, Associate Professor
Fatigue, deformation, and degradation of materials

Jianmin Qu, Professor
Fracture, composite materials, wave propagation, and microelectronic packaging

Min Zhou, Associate Professor
Micro- and nanoscale behavior, continuum and molecular dynamics modeling, experimental/computational mechanics, dynamic behavior and fracture

Microelectromechanical Engineering Systems

F. Levent Degertekin, Assistant Professor
Micromachined sensors and actuators, ultrasonics, atomic force microscopy, and nondestructive evaluation

James Gole, Professor of Physics (Joint Appointment)
Nanostructured materials, porous media, sensors, and micro- and nanocatalysis

Samuel Graham, Assistant Professor
Microscale heat transfer, thermophysical properties, nanostructured materials, nanodevices, and device reliability

Peter J. Hesketh, Professor
Microfabrication, micromachining, sensors, actuators, biosensors, and microfluids

William R. King, Assistant Professor
Micro/nanoscale heat transfer and thermal processing, atomic force microscopy, MEMS and micro/nanofabrication

Wenjing Ye, Assistant Professor
CAD design of MEMS, microfabrication and numerical analysis

Nuclear and Radiological Engineering/Medical Physics
Said I. Abdel-Khalik, Southern Nuclear Distinguished Professor
Reactor engineering and thermal-hydraulics, two-phase flow and heat transfer; and inertial fusion technology

Cassiano R. E. de Oliveira, Professor
Numerical radiation transport, computational fluid flow and molecular flow, and numerical modeling

Nolan E. Hertel, Professor
Radiation shielding, neutron dosimetry, radiological assessment, radioactive waste management, accelerator sources and applications, and high-energy particle transport

Farzad Rahnema, Associate Chair of the Woodruff School, Chair of the Nuclear and Radiological Engineering/Medical Physics Program, and Professor
Reactor physics, perturbation and variational methods, computational transport theory, criticality safety

Weston M. Stacey, Jr., Fuller E. Callaway Professor in Nuclear Engineering and Regents' Professor
Fusion engineering, plasma physics, and reactor physics

C.-K. Chris Wang, Associate Professor
Radiation detection and dosimetry, medical and industrial applications of ionizing radiations, and spent nuclear fuel measurements

Tribology

Itzhak Green, Professor
Hydrodynamic lubrication, vibrations, rotordynamics, fluid sealing, design, and diagnostics

Richard F. Salant, Georgia Power Distinguished Professor in Mechanical Engineering
Fluid mechanics, fluid sealing, lubrication and tribology

Jeffrey L. Streator, Associate Professor
Computer-disk tribology, thin-film lubrication, capillarity, and contact mechanics

Ward O. Winer, Eugene C. Gwaltney, Jr. Chair of the Woodruff School and Regents' Professor
High-pressure rheology, lubrication, tribology, thermomechanics, mechanical systems diagnostics

Academic Professionals,
Jeffrey Donnell, Academic Professional and Coordinator of the Frank K. Webb Program in Professional Communications
Kristi Lewis, Academic Professional and Undergraduate Academic Advisor
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MRDC 3103
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MRDC 2212
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Wayne Whiteman, Director of the Office of Student Services and Senior Academic Professional
Vibrations, structural dynamics, nonlinear dynamics, and engineering education
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