

6. MINORS AND HONORS PROGRAMS

Many of the School's departments offer an undergraduate minor to interested students. The requirements for each of the available minors are listed on the pages that follow. To obtain more information, contact a department's Undergraduate Program representative or the Office of Student Affairs in Room 201, Terman Engineering Center.

General requirements and policies for a minor in the School of Engineering are:

1. A minor consists of a set of courses totaling not less than 18 and not more than 36 units, with a minimum of six courses of at least 3 units each.
2. The set of courses should be sufficiently coherent as to present a body of knowledge within a discipline or sub-discipline.
3. Students may not overlap (double-count) courses for completing major and minor requirements, *unless*:
 - a) Overlapping courses constitute introductory skill requirements (for example, introductory math and statistics)
 - b) Overlapping courses enable the student to meet School of Engineering requirements, such as introductory science, the TIS requirement, and engineering fundamentals.
4. Departmentally-based minor programs are structured at the discretion of the sponsoring department, subject only to requirements (1), (2), and (3) above.

Interdisciplinary minor programs may be submitted to the Undergraduate Council for approval and sponsorship. No "General Engineering" minor is offered. University policy and procedures for declaring a minor, limitations on No Credit units, and so forth, may be found in the *Stanford Bulletin* or through the Axxess system. Minors must be officially declared by students no later than the deadline for their application to graduate, although individual departments may set an earlier deadline. Each department has its own form and approval process.

MINOR PROGRAMS

AERONAUTICS AND ASTRONAUTICS MINOR

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are listed in the following table.

COURSES FULFILLING THE MINOR IN AERONAUTICS AND ASTRONAUTICS[†]

Core:	Title	Units
ENGR 14*	Applied Mechanics: Statics	3
ENGR 15*	Dynamics	3
ENGR 30*	Engineering Thermodynamics	3
AA 100	Introduction to Aero/Astro	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	3-4
	<i>Core total</i>	12-25

Upper division electives:		
2 courses from one of the elective areas below		6
1 course from a second elective area below		3
	<i>Program total</i>	21-34

Elective areas:		
Dynamics and Controls:		
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
AA 242A	Classical Dynamics	3
AA 271A	Dynamics and Control of Spacecraft/Aircraft	3
AA 279	Space Mechanics	3
Aerospace Systems Synthesis/Design:		
AA 236A,B	Spacecraft Design, Spacecraft Design Laboratory	5, 3
AA 241A,B	Introduction to Aircraft Design, Synthesis, and Analysis (not given 2007-08)	3, 3
Fluids:		
AA 200A	Applied Aerodynamics	3
AA 210A	Fundamentals of Compressible Flow	3
AA 214A	Numerical Methods in Fluid Mechanics	3
AA 283	Aircraft and Rocket Propulsion	3
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
Structures:		
AA 240A	Analysis of Structures	3
AA 240B	Analysis of Structure II	3
AA 256	Mechanics of Composites	3
Notes	* ENGR 14, 15, or 30 are waived as minor requirements if already taken as part of the major.	
	* Courses cannot be double-counted within a major and a minor, or within multiple minors: if any of the core classes are an integral part of the student's major or of another minor program, the Aero/Astro advisor can help select substitute courses to fulfill the Aero/Astro requirements.	

CHEMICAL ENGINEERING MINOR

The courses required for the Chemical Engineering minor appear in the following table.

COURSES FULFILLING THE MINOR IN CHEMICAL ENGINEERING

Class	Title	Units
ENGR 20	Introduction to Chemical Engineering	3
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 140 <i>or</i> CHEMENG 160 <i>or</i> CHEMENG 181	Microelectronics Processing Technology Polymer Science and Engineering Biochemistry I	3 3 3
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 180	Chemical Engineering Plant Design	3
CHEMENG 185	Chemical Engineering Laboratory	4
CHEM 171	Physical Chemistry - Chemical Thermodynamics	3
	<i>Program total</i>	33

CIVIL ENGINEERING MINOR

The civil engineering minor is intended to give students an in-depth introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural/Geotechnical Engineering. (Students interested in Environmental and Water Studies should refer to the Environmental Engineering minor.) The minimum prerequisite for a civil engineering minor is MATH 42 (or MATH 21); however many courses of interest require PHYSICS 41 and/or MATH 51 as prerequisites. Students should recognize that a minor in civil engineering is **not** an ABET-accredited degree program.

Since civil engineering is a very broad field, and undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, there is no single set of course requirements. Interested students are encouraged to propose their own set of courses within the guidelines listed on the following page; the undergraduate minor advisor must officially approve this list for the Civil and Environmental Engineering Department. Additional information on preparing a minor program, including sample programs focusing on each of the three areas of expertise listed above, is available at

http://cee.stanford.edu/prospective/ug/minor_overview.html.

General guidelines and procedures:

- A civil engineering minor must contain at least 24 units of coursework not taken for the major, and must conform to the School of Engineering minor requirements published in the *Stanford Bulletin* or this Handbook.
- Complete a **Major-Minor & Multiple-Major Course Approval Form**. The form is available online at <http://registrar.stanford.edu/shared/forms.htm#Undergrads>, or, in the CEE department's student services office.
- Consult and obtain study list approval from the appropriate advisor, using the Major-Minor & Multiple-Major Course Approval form: Professor Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction. John Barton (jhbarton@stanford.edu), Program Director, is the CEE undergraduate minor adviser in Architectural Design. You must also obtain a signature on this form from the Dean's Office (Bertha Love) before it goes to the Registrar's Office.
- Follow the instructions attached to the form. Prior to applying online for the minor in civil engineering, a completed and signed copy of the form must be filed with the department's office of student services in the Y2E2 Building, Rm 316.
- Apply for the CE minor on Axess. The CEE Student Services Administrator will then check the Major-Minor & Multiple-Major Course Approval Form to accept the declaration. **Minors must be officially declared and all courses completed (or in progress) no later than the deadline for a student's application to graduate.**

COMPUTER SCIENCE MINOR

The courses necessary to fulfill the requirements for the minor in Computer Science are shown in the table below (continuing on the next page). In addition, students must complete the standard mathematics sequence through MATH 51 as a prerequisite.

COURSES FULFILLING THE MINOR IN COMPUTER SCIENCE

<i>Introductory programming:</i>		Units
CS 106B or CS 106X	Programming Abstractions Programming Abstractions (Accelerated)	5 5
<i>Core:</i>		
CS 103 ²	Mathematical Foundations of Computing	5
CS107 ³	Computer Organization and Systems	5
CS109 ⁴	Introduction to Probability for Computer Scientists	5
	<i>Core total (including introductory programming)</i>	20

(continued on the next page)

Computer Science Minor, continued		
<i>Electives:</i>		
2 courses from two different areas taken from the list below		6-9
<i>Program Total</i>		26-29
<i>Elective areas:</i>		
<i>Software:</i>		
CS 108	Object-Oriented Systems Design	4
CS 110	Principles of Computer Systems	5
<i>Systems:</i>		
CS 140	Operating Systems	4
CS 143	Compilers	4
CS 144	Introduction to Computer Networking	4
CS 145	Introduction to Databases	4
CS 148	Introduction to Computer Graphics	3
<i>Theory:</i>		
CS 154	Automata and Complexity Theory	4
CS 157	Logic and Automated Reasoning	4
CS 161	Design and Analysis of Algorithms	4
<i>Artificial Intelligence:</i>		
CS 121 or CS 221	Introduction to Artificial Intelligence	3
	Artificial Intelligence: Principles and Techniques	4
<i>Human-Computer Interaction:</i>		
CS 147	Introduction to HCI Design	3-4
<i>Notes:</i>		
<ol style="list-style-type: none"> 1. AP units may be used to meet the introductory programming requirement. 2. Students who have taken either CS103X or CS103A,B are considered to have satisfied the CS103 requirement. 3. The name of CS107 has changed. The previous CS107 course titled Programming Paradigms also fulfills this requirement. 4. Students who complete STAT 116, MS&E 120, or CME 106 in Winter 2008-09 or earlier may count that course as satisfying the CS109 requirement. These same courses taken in Spring 2008-09 or later cannot be used to satisfy the CS 109 requirement. 		
*All courses must be taken for a letter grade.		
*The minimum acceptable GPA is 2.0.		
*Only CS106AB/X may be double-counted towards both major and minor requirements.		
*A maximum of one transfer credit course may be counted towards the minor requirements.		

ELECTRICAL ENGINEERING MINOR

There are three options for completing a minor in Electrical Engineering, as outlined below.

COURSES FULFILLING THE MINOR IN ELECTRICAL ENGINEERING

<i>Option I</i>		Units
ENGR 40	Introductory Electronics	5
EE 101A	Signal Processing and Linear Systems I	4
EE 101B	Signal Processing and Linear Systems II	4
Four letter-graded EE courses of level 100 or higher		13-21
<i>Program total</i>		26-34
<i>Option II</i>		
ENGR 40	Introductory Electronics	5
EE 102A	Circuits I	4
EE 102B	Circuits II	4
Four letter-graded EE or EE cognate courses of level 100 or higher		13-21
<i>Program total</i>		28-36

Electrical Engineering Minor, continued		
<i>Option III</i>		
ENGR 40	Introductory Electronics	5
EE 108A	Digital Systems I	4
EE 108B	Digital Systems II	4
Four letter-graded EE or EE cognate courses of level 100 or higher		13–21
<i>Program total</i>		28–36

ENVIRONMENTAL ENGINEERING MINOR

The environmental engineering minor is intended to give students an in-depth introduction to one or more areas of environmental engineering. Departmental expertise and undergraduate course offerings are available in the areas of Environmental Engineering and Science, Environmental Fluid Mechanics and Hydrology, and Atmosphere/Energy Engineering. The minimum prerequisite for an environmental engineering minor is MATH 42 (or MATH 21); however, many courses of interest require PHYSICS 41 and/or MATH 51 as prerequisites. Students should recognize that a minor in environmental engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an environmental engineering minor, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below; this list must be officially approved by the undergraduate minor advisor for the Civil and Environmental Engineering (CEE) Department. Additional information, including sample programs focusing on the three different areas of expertise listed above, is available at <http://cee.stanford.edu/prospective/ug/minorEnvE.html>.

General guidelines and procedures for the minor in Environmental Engineering:

- An environmental engineering minor must contain at least 24 units of coursework not taken for the major, and must conform to the School of Engineering (SoE) minor requirements published in the *Stanford Bulletin* or in this Handbook.
- A **Major-Minor & Multiple-Major Course Approval Form must be completed**; available at <http://registrar.stanford.edu/shared/forms/htm#Undergrads> or in the department's student services office.
- Prof. Lynn Hildemann, email: hildemann@stanford.edu, is the advisor for minors in Environmental Engineering. Students must consult with her in developing their minor program and must obtain her approval of their study list using the Major-Minor & Multiple-Major Course Approval form. **You must also obtain a signature on this form from the Dean's Office** (Bertha Love or Darlene Lazar) before it goes to the Registrar's Office.

- Follow the instructions attached to the form. Prior to applying for the minor in Environmental Engineering online, a completed and signed copy of the form must be filed with the CEE department's office of student services in Rm 316, Y2E2 Building.
- Apply for the EnvE minor on Axess. The CEE Student Services Administrator will then check the **Major-Minor & Multiple-Major Course Approval Form** to accept the declaration. **Minors must be officially declared and all courses completed (or in progress) no later than the deadline for a student's application to graduate.**

MANAGEMENT SCIENCE AND ENGINEERING MINOR

The following courses fulfill the requirements for the minor in Management Science and Engineering. In addition, students must complete MATH 51 or CME 100 as a prerequisite.

COURSES FULFILLING THE MINOR IN MANAGEMENT SCIENCE AND ENGINEERING

Core:		Units
ENGR 60	Engineering Economy	3
ENGR 111	Introduction to Optimization	4
MS&E 120	Probabilistic Analysis	5
MS&E 121	Introduction to Stochastic Modeling	4
MS&E 130 <i>or</i>	Information Systems and Networks <i>or</i>	3
MS&E 131 <i>or</i>	Information Science <i>or</i>	3
MS&E 134	Organizations and Information Systems	4
MS&E 142 <i>or</i>	Investment Science <i>or</i>	3
MS&E 160	Analysis of Production and Operating Systems	4
MS&E 180	Organizations: Theory and Management	4
	<i>Core total</i>	26-28
<i>Electives:</i>		
Any one 100 or 200 level MS&E course.		3-4
	<i>Program total</i>	29-32

MATERIALS SCIENCE AND ENGINEERING MINOR

A minor in the Department of Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain understanding of the fundamental processes that govern materials behavior. The courses listed in the following table fulfill the requirements.

COURSES FULFILLING THE MINOR IN MATERIALS SCIENCE AND ENGINEERING

Core: Choose one of the following:		Units
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	4
	<i>Core total</i>	4

(continued on the next page)

Materials Science and Engineering Minor, continued		
<i>Electives:</i>		
Any 6 courses taken from the list below		24
	<i>Program total</i>	28
<i>Approved elective courses:</i>		
MATSCI 151	Microstructure and Mechanical Properties	4
MATSCI 152	Electronic Materials Engineering	4
MATSCI 153	Nanostructure and Characterization	4
MATSCI 154	Solid State Thermodynamics	4
MATSCI 155	Nanomaterials Synthesis	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	4
MATSCI 157	Quantum Mechanics of Nanoscale Materials	4
MATSCI 160	Nanomaterials Laboratory	4
MATSCI 161	Nanocharacterization Laboratory	4
MATSCI 162	X-Ray Diffraction Laboratory	4
MATSCI 163	Mechanical Behavior Laboratory	4
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory	4
MATSCI 190	Organic and Biological Materials	4
MATSCI 192	Solid State Thermodynamics	4
MATSCI 193	Materials Chemistry	4
MATSCI 194	Thermodynamics and Phase Equilibria	4
MATSCI 195	Waves and Diffraction in Solids	4
MATSCI 196	Imperfections in Crystalline Solids	4
MATSCI 197	Rate Processes in Materials	4
MATSCI 198	Mechanical Properties of Materials	4
MATSCI 199	Electronic and Optical Properties of Solids	4

MECHANICAL ENGINEERING MINOR

There are three options for students interested in a minor in Mechanical Engineering: A general minor that exposes students to the breadth of the field, and two specialized minors—Thermosciences and Mechanical Design—that allow students to pursue a particular area in more depth. The requirements for each of these minors are listed below.

General Minor in Mechanical Engineering

This minor aims to expose students to the breadth of Mechanical Engineering in terms of topics and of analytic and design activities. Students interested in this minor must take the following courses as prerequisites: MATH 41, MATH 42, PHYSICS 41.

Core		Units
ENGR 14*	Applied Mechanics:Statics	3
ENGR 15*	Dynamics	3
ENGR 30*	Engineering of Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 101	Visual Thinking	3
<i>Plus any two of the following electives:</i>		
ME 80	Strength of Materials	4
ME 131A	Heat Transfer	4
ME 161	Dynamic Systems	4
ME 203	Manufacturing and Design	4
Program Total		24

Thermosciences Minor in Mechanical Engineering

Students interested in this minor must take the following courses as prerequisites: MATH 41, MATH 42, MATH 51 (or CME 100), PHYSICS 41.

Core:		Units
ENGR 14*	Applied Mechanics: Statics	3
ENGR 30*	Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	4
ME 131B	Fluid Mechanics	3
ME 140	Advanced Thermal Systems	5
Program Total		22

Mechanical Design Minor in Mechanical Engineering

This minor aims to expose students to design activities, supported by analysis. Students interested in this minor must take the following courses as prerequisites: MATH 41, MATH 42, PHYSICS 41.

Core		Units
ENGR 14*	Applied Mechanics: Statics	3
ENGR 15*	Dynamics	3
ME 80	Strength of Materials	4
ME 101	Visual Thinking	3
ME 112	Mechanical Systems Design	4
ME 203	Manufacturing and Design	4
<i>Plus one of the following:</i>		
ME 113	Mechanical Engineering Design	4
ME 210	Introduction to Mechatronics	4
ME 220	Introduction to Sensors	3
Program Total		24-25

*For all of the above minor programs: If ENGR14, 15, or 30 will be taken for the major requirements, other courses may be substituted for these minor requirements via petition. The total number of required units remains the same as listed in the above guidelines.

HONORS PROGRAMS

The departmental honors programs are designed to allow undergraduates with strong academic records and enthusiasm for independent research to engage in a significant project leading to a degree with departmental honors. This option is particularly valuable for students who intend to pursue a Ph.D. after college because it provides research experience that helps prepare a student for doctoral-level work. Typically, these programs are competitive in terms of their admission and also require that the student find a faculty member to supervise the work. Honors programs currently exist only in Chemical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Environmental Engineering, Mechanical Engineering, and Science, Technology and Society, although the School is encouraging other departments to establish honors programs as well. These programs are described in the remainder of this section.

CHEMICAL ENGINEERING

This program offers an opportunity for undergraduate majors to undertake research at an advanced level with a faculty mentor, graduate students, and other undergraduates. This three-quarter sequential program involves (1) research study in an area proposed to and agreed to by a Department of Chemical Engineering faculty adviser and/or sponsor, (2) concurrent enrollment in the undergraduate honors seminar, (3) completion of a faculty-approved thesis, and (4) participation in the Chemical Engineering Honors Symposium held annually during Spring Quarter. The last requirement may also be fulfilled through an alternative, public, oral presentation with the approval of the department chair.

Chemical engineering majors who wish to be considered for the honors program should see departmental student services by the beginning of Winter Quarter of their junior year for more information about the application process, a research proposal template and other assistance. An application includes a proposal describing the research project, endorsement by a chemical engineering faculty sponsor, and a transcript of courses taken at Stanford. A faculty review committee will select the successful candidates. To qualify for recommendation for a Bachelor of Science in Chemical Engineering with Honors, degree students must complete the following requirements:

1. Should maintain an overall GPA of 3.5 or higher as calculated on the unofficial transcript.

2. Complete at least three quarters of research with a minimum of 9 units of CHEMENG 190H for a letter grade. All quarters must focus on the same topic. Maintain the same faculty advisor and faculty reader throughout, if feasible.
3. Participate in CHEMENG 191H concurrently with each enrollment in 190H
4. Participate in the Chemical Engineering Honors Symposium held during Spring Quarter with a poster and oral presentation of thesis work or, at the faculty's discretion, in a comparable public event.
5. Submit a completed draft of thesis simultaneously to both the advisor and the reader, and if appropriate to the Chemical Engineering faculty sponsor, no later than May 1 (or the first day of the second month of the quarter in which the BSH is to be conferred).
6. Complete all work and thesis revisions and obtain indicated faculty approvals on the Certificate of Final Reading of Thesis form by the end of the third week of May (or the second month of the graduation quarter).
7. Submit to Chemical Engineering Student Services five final copies of the honors thesis as approved by the appropriate faculty and with a signed certificate form in each copy. The 2008-09 deadline is May 18, 2009, (or the Monday at the beginning of the fourth week of the second month of the graduation quarter).

All requirements for the honors program are in addition to the normal undergraduate program requirements.

CIVIL ENGINEERING

Highly qualified engineering students can receive a B.S. with Honors in Civil Engineering by undertaking a more intensive course of study that includes an in-depth research project. To apply, you must find a faculty member in the CEE department who is willing to act as supervisor for your undergraduate honors thesis; the two of you must agree upon a topic for the thesis project.

In the fourth quarter before graduation, you must submit for approval a written proposal describing the research to be undertaken. At the time of submittal you must have a GPA of at least 3.3 for coursework at Stanford and this GPA must be maintained until graduation. You must complete a written thesis of high quality, obtaining input from the School of Engineering Writing Program via ENGR 202S or its equivalent. Up to 10 units of CE 199H may be taken to support the research efforts. The ENGR 202S and CE 199H units are beyond the normal undergraduate program requirements. The thesis advisor must approve and sign off on your written thesis. In addition to a written thesis, you are strongly encouraged to present your research results in a

seminar. A copy of thesis must be provided to the School of Engineering Dean's Office in 201 Terman prior to graduation.

COMPUTER SCIENCE

Selected computer science undergraduates whose academic records and personal initiative indicate that they have the necessary skills to undertake high-quality research in computer science may apply to the honors program. Applicants must be majoring in Computer Science, must have a GPA of at least 3.6 in courses that count toward the major, and must achieve senior standing (135 or more units) by the end of the academic year in which they apply. Coterminal MS students are eligible to apply as long as they have not already received their undergraduate degrees. Beyond these requirements, students who apply for the honors program must also find a faculty member who agrees to serve as the thesis advisor for the project. Thesis advisors must be members of Stanford's Academic Council.

Students who meet the eligibility requirements and wish to be considered for the honors program must submit a written application to the Computer Science undergraduate program office by May 1 of the year preceding the honors work. The application must include a letter describing the research project, a letter of endorsement from the faculty sponsor, and a transcript of courses taken at Stanford. Each year, a faculty review committee will select the successful candidates for honors from the pool of qualified applicants.

In order to receive departmental honors, students admitted to the honors program must do the following, in addition to satisfying the standard requirements for the undergraduate degree:

1. Complete at least 9 units of CS191 or 191W under the direction of their project sponsor.
2. Attend a weekly honors seminar in winter quarter.
3. Complete an honors thesis deemed acceptable by a committee consisting of the thesis advisor and at least one additional faculty member.
4. Present the thesis at a public colloquium sponsored by the department.
5. Maintain the 3.6 GPA required for admission to the honors program.

ELECTRICAL ENGINEERING

The Electrical Engineering Department offers a program leading to a Bachelor of Science in Electrical Engineering with Honors. This program offers a unique opportunity for qualified undergraduate majors to conduct independent study and research at an advanced level with a faculty mentor, graduate students, and fellow undergraduates. To qualify, students must complete following requirements:

1. Submit an application, including the thesis proposal, by autumn quarter of senior year signed by the thesis advisor and second reader (one must be a member of the Electrical Engineering faculty).
2. Maintain a grade point average of at least 3.5 in Electrical Engineering courses.
3. Take at least 10 units of EE 191. These units must be letter graded.
4. Submit two final copies of the honors thesis approved by your advisor and second reader.
5. Attend the Electrical Engineering Honors Symposium at the end of Spring quarter and give a poster or oral presentation.

ENVIRONMENTAL ENGINEERING

Highly qualified students in an engineering major can receive a BS with Honors in Environmental Engineering by undertaking a more intensive course of study that includes an in-depth research project. To apply, you must find a faculty member in the CEE department who is willing to act as supervisor for your undergraduate honors thesis and the two of you must agree upon a topic for the thesis project.

In the fourth quarter before graduation, you must submit for approval a written proposal describing the research to be undertaken. At the time of submittal you must have a GPA of at least 3.3 for coursework taken at Stanford, and this GPA must be maintained until graduation. You must complete a written thesis of high quality, obtaining input from the School of Engineering Writing Program via ENGR 202S or its equivalent. Up to 10 units of CEE 199H may be taken to support the research efforts. The ENGR 202S and CEE 199H units are beyond the normal undergraduate program requirements. The thesis advisor must approve and sign off on your written thesis. In addition to a written thesis, you are strongly encouraged to present your research results in a seminar. A copy of thesis must be provided to the School of Engineering Dean's office in 201 Terman prior to graduation.

MECHANICAL ENGINEERING

The Department of Mechanical Engineering offers a program leading to a Bachelor of Science in Mechanical Engineering with Honors. This program provides a unique opportunity for qualified mechanical engineering majors to conduct independent study and research at an advanced level with a faculty mentor.

Honors Criteria:

- GPA of 3.5 or higher in the major
- Arrangement with an ME faculty member who agrees to serve as the thesis advisor. The advisor must be a member of the academic council.
- Application Deadline:
No later than the second week of the autumn quarter of the senior year.

Application:

- One page written statement describing the research topic and signed advisor form (see ME Student Services for form)
- Unofficial Stanford transcript (from Axess)
- Signature of thesis advisor
- Submit all of the above to the Student Services Office, Building 530, room125

Applications are subject to the review and final approval by the Undergraduate Curriculum Committee. Applicants and thesis advisors will receive written notification when a decision has been made.

In order to receive departmental honors:

- Declare the honors program in Axess
- Maintain the 3.5 GPA required for admissions to the honors program
- Under direction of the thesis advisor, complete at least 9 units of ME191H (Honors Thesis) during the senior year
- Submit a completed thesis draft to the advisor by April 1
- Present the thesis synopsis at the Mechanical Engineering Poster Session held in April
- Further revisions and a final endorsement by the advisor are to be completed by the first week in June, when two bound copies are to be submitted to the Mechanical Engineering Services Office

SCIENCE, TECHNOLOGY, AND SOCIETY

Undergraduate engineering majors in all fields are encouraged to consider complementing their studies by enrolling in the STS Honors Program (the Science, Technology, and Society Program is a unit of the School of Humanities and Sciences). Earning "Honors in Science, Technology, and Society" requires successful completion of STS 101/E 130 (or STS 101Q), three other STS courses (one offering ethical perspective, one historical perspective, and one social scientific perspective on STS phenomena), a grade of B or better on an original senior honors thesis whose topic involves science or technology in society, and a GPA of 3.4 in the abovementioned four courses.

In recent years, the STS Program has made substantial grants to undergraduate engineering majors enabling them travel to countries such as India, Kenya, Thailand, and South Africa to conduct their honors thesis research. For details on the STS Honors Program, see the STS section of the 2008-09 *Stanford Bulletin*, contact the STS Office (723-2565), or e-mail STS Director Professor Robert McGinn (mcginn@stanford.edu), or STS Honors Program Director, Dr. Rebecca Slayton (rslayton@stanford.edu). A number of past STS honors theses written by engineering students are on file in the STS Office and are available for inspection on request. STS honors theses written by engineering majors include a study of the role of the Internet in the process of social change in Iran, the design of software for tele-diagnosis of health problems in rural India, the technological and economic development of Dubai, and the role of India's Institutes of Technology in Regional Economic Development.

For additional detail on the STS Honors Program, go to <http://sts.stanford.edu/honors.html> and click on the Information and Application Form.