

Graduate School 101
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Topics

- Why Graduate School?
- What Should You Get From Graduate School?
- How to Choose a Graduate Program?
- How to Choose a Research Area?
- Why Texas A&M?
- How to Apply?
- How to Fund Graduate School?

Options After Graduation with a B.S. in Engineering

- Industry, Government, and Military
- Independent entrepreneur
- Social or mission service
- Medical School
- Law school
- **Graduate School in Engineering**

Advantages of Graduate Education

- Confidence in solving difficult problems
- Appreciation for research
- Greater knowledge depth in a specific area
- Global issues
- Independent learner
- New learning skills
- Opportunity to interact with students from overseas
- Leadership skills
- Communication skills
- Life long learning
- Higher wages
- Challenging job assignments
- Greater responsibility
- Greater job flexibility
- Learn to think out of the box

The Importance of Continual Learning

- Your career could be 40-50 years long
- No degree or training will be valid for this length of time – technology is advancing at increasing rates
- You will need to continue to learn or will be out-dated quickly
- Education is a continuing process for all of our lives
- Graduate school's most important feature is that it helps you master how to continually learn

Defer Attending Graduate School - Challenges

- Academic
- Financial
- Time Management

Attending Graduate School while Working - Challenges

- Time Constraints
- Fewer employers are paying for education
- Reduced flexibility for research oriented degrees

Options for Engineers with a Doctoral Degree

- Industrial R&D
- Government
- Defense
- National Laboratories
- Academia

What Should You Get From Graduate School?

- New learning skills
- New confidence in solving difficult problems
- New appreciation in research
- New knowledge in a specific area
- New perspectives on globalization
- New and broader outlooks on many technical and non-technical topics
- Leadership skills

Just some of the disciplines.....

Average Starting Salaries 2007

Major	BS	MS	PhD
Aerospace	\$53,408	\$62,459	\$73,814
Biomedical	\$51,356	\$59,240	Not available
Chemical	\$59,361	\$68,561	\$73,667
Civil	\$48,509	\$48,280	\$62,275
Computer	\$56,201	\$60,000	\$92,500
Electrical	\$55,292	\$66,309	\$75,982
Industrial	\$55,067	\$64,759	\$77,364
Mechanical	\$54,128	\$62,798	\$72,763
Nuclear	\$56,587	\$59,167	Not available
Petroleum	\$60,718	\$57,000	Not available

Attracting U.S. Students to Graduate School-Challenges

- "The World is Flat"; Thomas L. Friedman; Douglas & McIntyre, Ltd., 2005

Challenges -Numbers Gap

COUNTRY	POPULATION (MILLIONS)	# BACCULAUATE ENGINEERS/YR	# BACCULAUATE ENGINEERS/YR/MILLION
USA	293	70,949	242
CHINA	1299	>200,000	>154
INDIA	1065	>200,000	>188
FRANCE	60	28,000	467
UNITED KINGDOM	60	16,200	270
GERMANY	82	40,000	488
WORLDWIDE	>6000	>1,000,000	>167

Source: ASEE¹; Weekly Magazines, and CIA Fact Book; National Academy of Engineering; National Institute of Informatics

Earned Degrees Confirmed in US, 2003-04

Earned Degrees Confirmed in US, 2003-04					
	Baccalaureate	Masters	Doctoral	Total	Fraction
Engineering	63,558	32,698	5923	102,179	5%
Business, Management, and Marketing	306,623	139,344	1481	447,448	23%
All Fields	1,339,542	558,940	48378	1,946,860	100%
Dentistry				4335	
Medicine				15,442	
Law				40,209	
Veterinary Medicine				2228	
Reference: The Chronicle of Higher Education, V.LIII, Number 1, August 25, 2006					

HOW TO CHOOSE A GRADUATE PROGRAM

Graduate Program Quality Indicators

- Faculty
- Research Areas
- Curriculum
- Quality of Incoming Graduate Students
- Quality of Graduates (value added)
- Resources/Infrastructure

Quality of Incoming Students

- GPA
- GRE Scores
- Academic Preparation
- Acceptance Rate
- Composition of Domestic Students
- Composition of underrepresented minority students

Scholarship

Quantitative

- No. of Refereed Journal Articles
- No. of Conference Papers
- No. of Patents
- No. of Textbooks and Research Monographs

Qualitative

- Journal Impact Factors
- Immediacy Index
- Cited Half Life
- No. of Citations
- h-index
- Acceptance Rate per Conference

RANKINGS

- U.S. News and World Report
- U.S. NRC (1995, 2008,..)
- London Times

Resources and Infrastructure

- Percent of students on Financial Support
- Number of Endowed Fellowships
- Number of Federal Graduate Fellowships (NSF, GEM, D. Ed., DOE)
- Space per Graduate Student
- Graduate Student Salary

How to Choose a Research Area

- Pursue your Passion
- Have strong Fundamentals
- Be an Independent Learner

- WHY TEXAS A&M?

Texas A&M University

- Consistently ranks among top 10 nationally in number of science and engineering doctoral degrees conferred each year
- Ranks among leaders nationally in number of doctoral degrees awarded to minority students
- Our students are highly sought after by employers
- Rare triple designation as a Land -, Sea-, and Space-Grant institution reflects the broad scope of its research endeavors.

Faculty

- Size (461 Total, 390 Tenured/Tenure Track)
- Research Funding
- Scholarship
- Visibility

Faculty Visibility

- Number of NAE members **(9)**
- Number of Endowed Chairs and Professorships **(141)**
- Number of Distinguished Professors **(10)**
- Number of members in State and National level policy making bodies
- Number of Editorships of Archival Journals
- Number of memberships on Editorial Boards of Archival Journals
- Number of Fellows in Professional Societies

Faculty Citations

- (ISI Web of Knowledge)
- Scopus

Research Funding - Quality

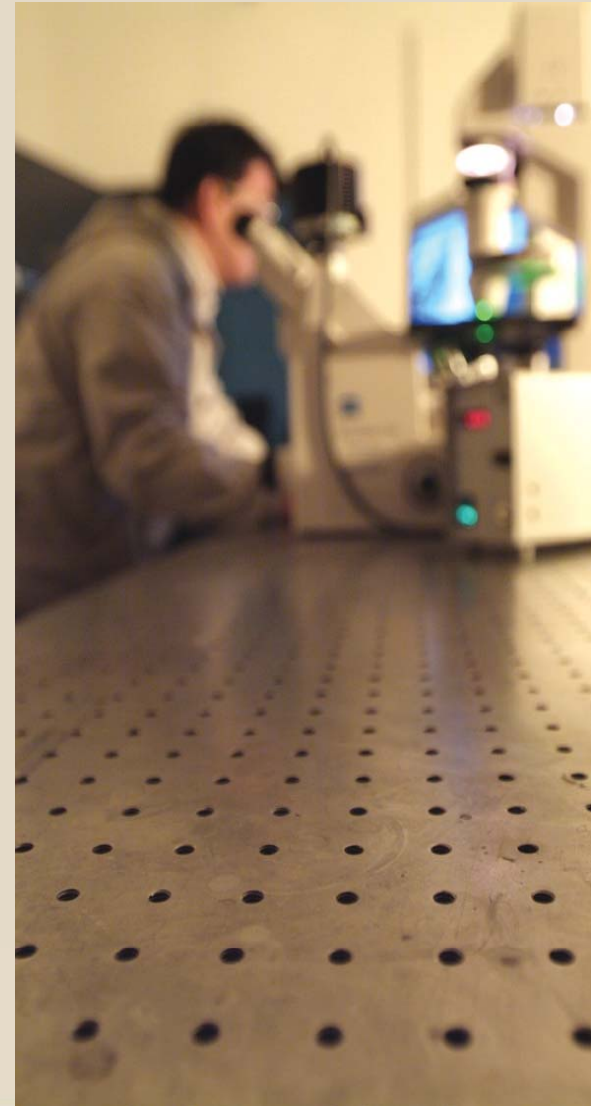
- Peer Reviewed Competitive Grants
e.g. NSF, NIH,.....

Engineering Research Expenditures

*in millions

MIT	\$234.5
U. of Illinois Urbana-Champaign	\$200.1
Georgia Tech	\$203.7
Purdue University - West Lafayette	\$121.8
Texas A&M University	\$196.1
University of Michigan	\$145.7
University of Southern California	\$169.8
University of Maryland	\$151.6
University of California, Berkeley	\$119.8
Stanford University	\$152.4
University of Texas	\$124.1

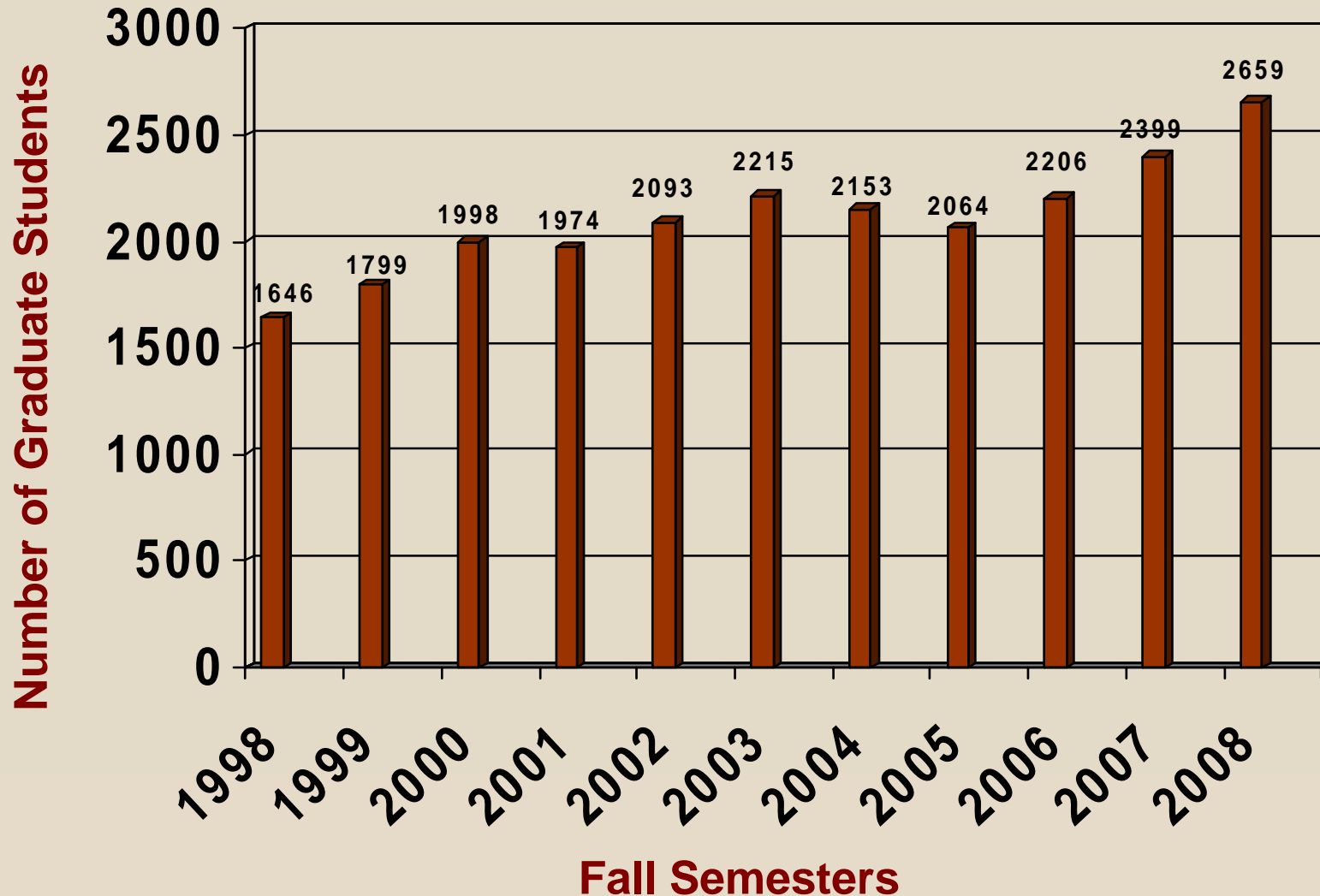
U.S. News & World Report, Best Graduate Schools 2008



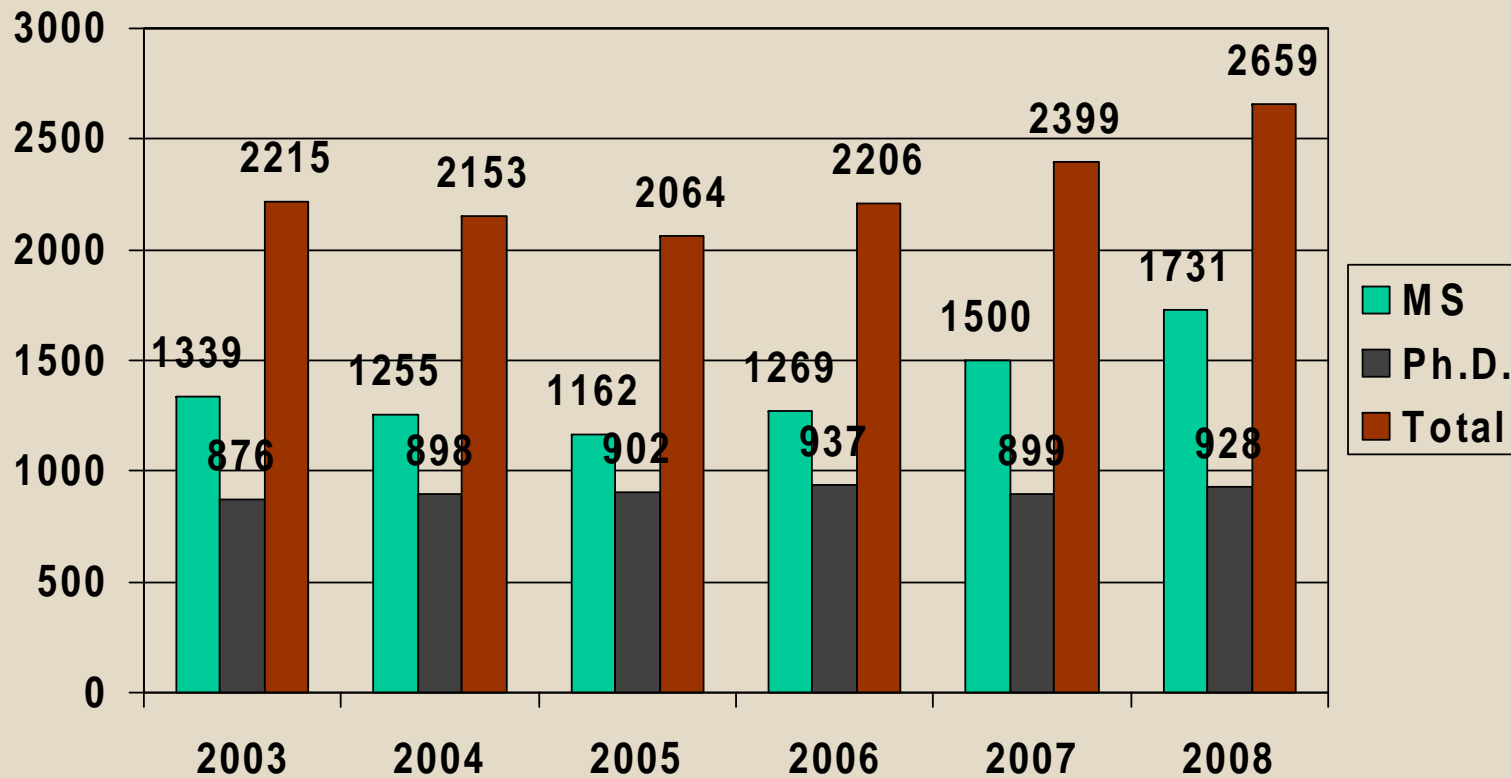
Curriculum

- Number of Graduate Courses taught per year **(398)**
- Number of Special Topics Taught per year **(69)**
- Number of Graduate Courses omitted from the catalog /year **(50)**
- Number of cross listed graduate courses taught per year **(76)**

COE Graduate Enrollment



Graduate Enrollment – MS and PhD



Graduate Enrollment

	Domestic	% Δ	Underrepresented minorities	% Δ
Fall 2003	604		461	
Fall 2004	681	13%	457	-.9%
Fall 2005	736	8%	461	.9%
Fall 2006	781	6%	537	16%
Fall 2007	794	2%	578	8%
Fall 2008	844	6%	664	15%

Underrepresented minorities = African American, Hispanic, American Indian, and Female

GRE Scores and Selectivity

	Fall 02	Fall 03	Fall 04	Fall 05	Fall 06	Fall 07	Fall 08
GRE V	497	521	498	500	496	502	498
GRE Q	615	748	741	738	751	756	750
Acceptance Rate	29.6%	37.8%	42.7%	45.9%	36.2%	33.7%	35.1%

Quality of Graduates

- Currently 570 TAMU – COE PhDs hold academic positions within U.S. and abroad

Best Graduate Engineering Schools

Public Institutions

Ranked in 2008

- 1 UC Berkeley
- 2 Georgia Tech
- 3 Illinois (Urbana)
- 4 Michigan
- 5 UC San Diego
- 6 University of Texas
- 7 **Texas A&M**
- 8 UCLA
- 9 Purdue
- 10 University of Wisconsin -Madison

Source: U.S. News and World Report rankings of U.S. universities



Engineering Graduate Disciplines

- Aerospace Engr.
- Biological & Agric. Engr.
- Biomedical Engr.
- Chemical Engr.
- Civil Engr.
- Computer Engr.
- Computer Science
- Electrical & Computer Engr.
- Health Physics
- Industrial & Systems Engr.
- Industrial Distr.
- Materials Sci. & Engr.
- Mechanical Engr.
- Nuclear Engr.
- Ocean Engr.
- Petroleum Engr.

Departmental National Rankings

2009 Rankings (ranked in 2008)

- 2nd (2nd) Petroleum Engineering
- 4th (3rd) Nuclear Engineering
- 9th (7th) Industrial Engineering
- 8th (5th) Aerospace Engineering
- 13th (8th) Civil Engineering
- 18th (11th) Electrical Engineering
- 20th (12th) Mechanical Engineering
- 29th (15th) Computer Engineering
- 30th (20th) Chemical Engineering
- 27th (13th) Biomedical Engineering

Note: first number is ranking by all institutions; numbers in () are only public institutions

Source: U.S. News and World Report rankings of U.S. universities



Graduate Degrees Offered

- Master of Engineering (30 Credits)
- Master of Science
 - Thesis Option (32 Credits)
 - Non-Thesis Option (36 Credits)
- Doctoral (64 Credits beyond Masters)

How to Apply

- www.applytexas.org to complete on-line application
- Application fee
- Official Transcripts
- GRE Scores
- Letters of Recommendation (3)
- Statement of Purpose
- Resume or Curriculum Vitae

Note: TAMUQ students will submit a paper application and application fee to TAMUQ

How to Fund Graduate School

- Fellowships
 - National (just to name a few...)
 - NSF – Graduate Research Fellowship Program
 - GEM
 - U.S. Department of Defense
 - U.S. Department of Energy
 - U.S. Department of Education
 - Sloan Foundation
 - University Level
 - Regents' Fellowship
 - Graduate Merit Fellowship
 - Pathways to the Doctorate
 - Diversity Fellowship
 - College Level
 - Engineering Excellence Fellowship
- Assistantships
 - Teaching and Non-Teaching
 - Research

TAMU – College of Engineering Graduate Recruitment Events/Opportunities

- Graduate Invitational
 - Spring 2009
 - <http://essap.tamu.edu/gi>
- Undergraduate Summer Research Grant Program (USRG)
 - May 27 – August 1, 2008
 - <http://essap.tamu.edu/usrg>
- NSF Graduate Research Fellowship Workshop
 - Date TBA (early September 2008)
- GEM Fellowship Information Night
 - Date TBA
- Graduate School 101 Workshop
 - Fall and Spring Semesters

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Any Questions?