

3/9/2012

# Engineering Programs

- New Programs
- New Department Name
- New Building Name
- New College Name
- New TSU

Lei Yu, Ph.D., P.E., Dean

## Texas Southern University



COLLEGE of SCIENCE *and* TECHNOLOGY

3100 Cleburne Street, Houston, Texas 77004  
Tel: 713 313 7009, [www.cost.tsu.edu](http://www.cost.tsu.edu)

TSU  
Now.

# What we propose

1. B.S. in Electrical Engineering
2. B.S. in Civil Engineering
3. B.S. in Petroleum and Natural Gas Engineering
4. Master of Engineering
5. Department of Engineering and Technology
6. Engineering and Technology Building
7. College of Science, Engineering and Technology (COSET)

**Brand TSU in a better position in recruitment, job market, and external funding**

# Nature of the programs

- **Electrical Engineering**  
Electrical engineers design, develop, test, and supervise the manufacturing of electrical equipment
- **Civil Engineering**  
Civil engineers plan, construct, and maintain infrastructures
- **Petroleum and Natural Gas Engineering**  
Petroleum engineers design equipment and processes to achieve recovery of oil and gas

# Engineering vs. Technology

## Engineering Technology

- Graduates are implementers
- Emphasis on specific technical programs and standard design problems
- Professional registration in **most states**
- 'Hands-on' or in-the-field jobs

## Engineering

- Graduates are innovators
- Emphasis on solutions for open-ended, complex and unique design problems
- Professional registration in **all states**
- Research, development, or design jobs

# What changes are needed

- **Current programs offered at TSU:**
  - Civil Engineering Technology
  - Electronics Engineering Technology
  - Computer Engineering Technology
- **About 85% of courses same as those in Engineering Curricula**
- **Additional courses needed:**
  - Calculus III
  - Differential Equation
  - Calculus-based Physics

# Civil Engr. Tech. vs. Civil Engr.

TSU - Civil Engr. Tech.	PV A&M - Civil Engr.	TSU - Civil Engr. Tech.	PV A&M - Civil Engr.
DRAFT 131 Fundamental of Drafting		CIVT 435 Civil Eng Const. Methods	
SC 135 Speech	SPCH 1003 Fund. Of Speech Communication	CIVT 331 Transportation Engineering	CVEG 3053 Transportation Engineering
*ENG 131 Freshman English	ENGL 1123 Freshman Composition I	CIVT 434 Water & Wastewater Eng	CVEG 4043 Environmental Engr. Design
ENG 132 Freshman English II		CIVT 340 Structural Steel Design	CVEG 3083 Steel Design
FS 102 Freshman Seminar	CVEG 2001 Emerging Issues in CE	PHYS 237 College Physics 1	PHYS 2513 University Physics I
ENG 2xx Upper level English		PHYS 213 College Physics 1 Lab	PHYS 2511 University Physics Lab I
POLSC 231 American Pol. System I	POSC 1113 American Government I	PHYS 238 College Physics II	PHYS 2523 University Physics II
POLSC 232 American Pol System II	POSC 1123 American Government II	PHYS 214 College Physics II Lab.	PHYS 2521 University Physics Lab II
MUSIC 239 Fine Arts in Daily Living	Visual & Performing Arts Elective	CHEM 131 General Chemistry	CHEM 1034 Chemistry for Engineers
HIST 231 Soc Pol History of U.S	HIST 1313 U.S. to 1876	CHEM 111 General Chemistry I Lab	CHEM 1021 Inorganic Chem Lab II 1
HIST 232 Soc & Pol History of the U.S	HIST 1323 U.S. 1876 to Present	*MATH 133 College Algebra	GNEG 2021 Engr. Appl. Lab III for Math 1
CIVT 141 Civil Engineering Materials	CVEG 3031 Construction Materials Lab	MATH 134 Plane Trigonometry	GNEG 1121 Engr. Appl. Lab II for Math 1
CIVT 231 Surveying I		MATH 241 Calculus & Geometry I	MATH 1124 Calculus I
CIVT 232 Statics	CVEG 2053 Engineering Mechanics II	MATH 242 Calculus & Anal. Geometry	Math 2024 Calculus II
CIVT 233 Dynamics	CVEG 2043 Engineering Mechanics I	DRFTG 336 Computer Aided Design	ELEG 1043 Computer Appl. In Engineering
CIVT 224 Geotechnical Engineering	CVEG 3023 Geotechnical Engineering	ITEC 331 Technical Writing	ENGL 1143 Technical Writing
CIVT 234 Surveying II		ENGT 331 Engineering Economy	
CIVT 337 Reinforced Concrete Design	CVEG 4013 Reinforced Concrete	** Technical Elective	Technical Elective 3
CIVT 332 Applied Fluid Mechanics			CVEG 1011 Intro Engr CS Tech 1
CIVT 338 Strength of Materials	CVEG 2063 Mechanics of Materials		MATH 2043 Differential Equations I 3
CIVT 223 Hydrology & Water	CVEG 4063 Water Resources Engr.		MATH 3685 Math for Engineers 5
CIVT 333 Hydraulics Engineering	CVEG 3063 Hydraulics		CVEG 1021 Intro CVEG Lab 1
CIVT 335 Geometric Design of Hwys			Humanities Elective 3
CIVT 336 Structural Analysis	CVEG 3073 Structural Analysis		Behavioral or Social Science Elective 3
CIVT 301 Environmental Engineering	CVEG 3043 Environmental Engineering		CHEG 2003 Eco Anal Tech Appl. 3
CIVT 400 Problems in Civil Eng Tech.	CVEG 4483 Senior Design and Professionalism		

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# Elect. Engr. Tech. vs. Elect. Engr.

TSU - Elect. Engr. Tech.	PV A&M - Elec. Engr.		TSU - Elect. Engr. Tech.	PV A&M - Elec. Engr.	
ENG 131 Freshman English I	ENGL 1123	Freshman Comp I	ELET 432 Senior Electronics Project	ELEG 4473	Senior Desg & Prof. I
ENG 132 Freshman English II			ELET 441 Electronics SR. Comp		
ENG 2xx Upper level English			ITEC 111 Orientation		
MATH 133 College Algebra	GNEG 1121	Engr. Appl Lab II for Math	ITEC 331 Technical Writing	ENGL 1143	Tech. Writing
MATH 134 Plane Trigonometry	GNEG 2021	Engr. Appl Lab III for Math	ENGT 333 Ethics & Pro. Eng. Practice	GNEG 3051	Prof. Engr. I
MATH 241 Calculus & Geometry I	MATH 1124	Calculus I	PHYS 215 Phys Lab For Tech I	PHYS 2511	Univ. Phy. Lab I
MATH 242 Calculus & Anal. Geometry	MATH 2024	Calculus II	PHYS 235 Phys For Tech I	PHYS 2513	Univ. Phy. I
MATH 345 Applied Math & Stat. for Tech.			Phys 216 Phys Lab for Tech. II	PHYS 2521	Univ. Phy. Lab II
ELET 111 DC Circuit Lab			Phys 236 Phys for Tech. II	PHYS 2523	Univ. Phy. II
ELET 131 DC Circuits			DRFT 233 Intro to Computer Aided	ELEG 1043	Comp. Appl. Engr
ELET 113 Circuits Lab	ELEG 2011	Elect. Cir. Lab	CHEM 111 General Chemistry Lab	CHEM 1021	Chem. Lab II
ELET 133 AC Circuits			CHEM 131 General Chemistry	CHEM 1034	Chem. For Engrs.
ELET 130 Intro to Stru. Prog. with C++			HIS 231 Soc. Pol. His. Of U.S	HIST 1313	US to 1876
ELET 112 Electronics I Lab	ELEG 4011	Electronics Lab.	HIS 232 Soc. Pol. His. Of U.S	HIST 1323	US 1876 to Present
ELET 132 Electronics I	ELEG 3043	Electronics I	POLSC 231 America Pol System I	POSC1113	American Govt. I
ELET 212 Electronics II Lab	ELEG 4043	Electronics II	POLSC 232 America Pol System II	POSC1123	American Govt. II
ELET 232 Electronics II	ELEG 4043	Electronics II	SC 135 Business & Prof. Comm.	SPCH 1003	Fund. Of Speech
ELET 241 Digital Logic Circuits	ELEG 3063	Logic Circuits	MUSIC 239 Fine Arts in Daily Living		Visual & Perf. Arts
ELET 213 Digital Hardware Design Lab	ELEG 3021	Logic Circuits Lab	Technical Elective		Technical Elective
ELET 243 Digital Hardware Design					
ELET 312 Control Systems Lab	ELEG 4073	Control Systems		ELEG 1011	Intro. Engr CS Tech
ELET 332 Control Systems	ELEG 4073	Control Systems		ELEG 1021	Intro Elect. Lab
ELET 311 Communicating Systems Lab	ELEG 4003	Comm. Theory		MATH 2043	Diff. Equations
ELET 331 Communicating Systems	ELEG 4003	Comm. Theory			Humanities Elect.
ELET 313 Microprocessor Architecture Lab	ELEG 2023	Network Theory I		MCEG 2013	Thermodynamics I
ELET 343 Microprocessor Architecture	ELEG 2023	Network Theory I		CHEG 2003	Econ Analy Tech App
ELET 411 Micro Computer Networks Lab.	ELEG 3013	Network Theory II		MATH 3685	Math. For Engrs.
ELET 434 Micro Computer Networks	ELEG 3013	Network Theory II		ELEG 3033	Phys. Electronics
ELET 410 Computer Control Systems Lab	ELEG 3023	Signals & Systems			Behavioral & Soc. Sci
ELET 430 Computer Control Systems	ELEG 3023	Signals & Systems		ELEG 4013	Energy Conversion
ELET 353 Micro Computer Software Appl.				ELEG 4033	Electro. Field Theory
ELET 412 Senior Project Proposal					ECE Lab. Elective
ELET 422 Advanced Stru. Prog. With C++	ELEG 3073	Microproc. Sys. Desg			
ELET 413 Microprocessor Interfacing Lab	ELEG 3071	Microproc. Sys. Lab			
ELET 431 Microprocessor Interfacing	ELEG 4483	Senior Desg & Prof. II			

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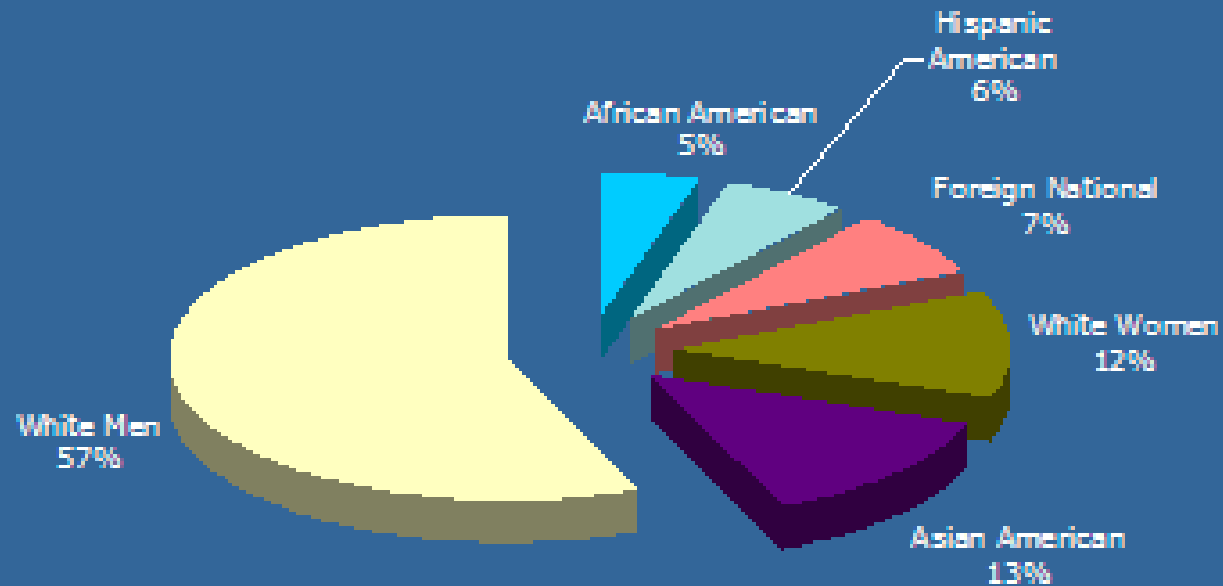
# Why Engineering at TSU

- Engineering is the field with great workforce need and critical to the national security and economy
- Texas workforce will need more engineers than Texas institutions are expected to graduate within the next decade
- Engineering programs at TSU will contribute to filling the gap by increasing the African-American workforce in the engineering field



# Engr. Degrees awarded by race

## Engineering Bachelor's Degrees in 2003



Source: the Engineering Workforce Commission ([ees.org/ewc/](http://ees.org/ewc/))

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# Supply and Demand

600 (private).

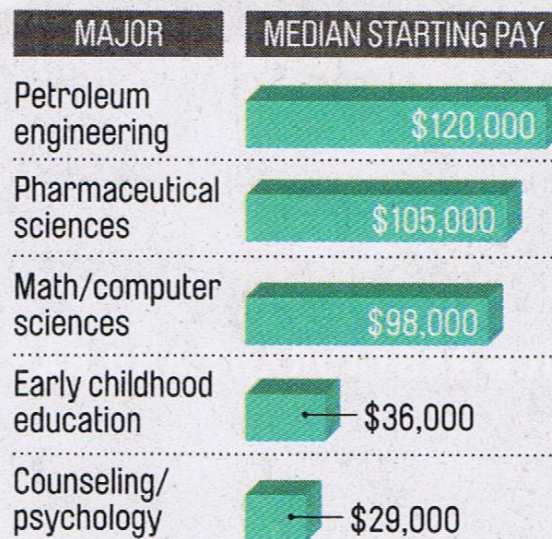
What we should be concerned about, in the words of Anthony Carnevale, director of the Georgetown University Center on Education and the Workforce, is "a misalignment between our education system and the labor market." The latter, he notes, "is demanding much more specific preparation" than students get.

## WORD: ENGINEERING

Whether you, your child, or both are financing college, to earn a decent return on that investment the student needs to base academic choices at least in part on employment trends. Universities, which have an interest in

## Econ 101: Supply and Demand

The gap in starting salaries for those with technical degrees and those without is now a chasm.



SOURCE: Georgetown University Center on Education and the Workforce

shorten the time and cost of a B.A. Others suggest that taking advanced classes as a means to

Yes, there's a risk in a course of study based on data and projections. It's a minor in Japanese studies, a great idea in the '80s that comes in handy at sushi restaurants. Fortunately for those who majored in finance.

Still, given what you want the best choice is an investment paying off. Make sure your kid isn't the highest-paid English poet; they're techni-

Ali Velshi is the chief business correspondent for CNN's "Your Money."



# Programs in peer institutions

## University of Houston

- College of Engineering
- College of Natural Science and Mathematics
- College of Technology

## Prairie View A&M University

- College of Engineering (Including Engineering Technology)
- College of Arts and Sciences (Including natural sciences)

## Jackson State University

- College of Science, Engineering & Technology

## Texas Southern University

- College of Science and Technology

# COSTS

- **Civil Engineering:**  
no additional cost to start
- **Electrical Engineering:**  
no additional cost to start
- **Petroleum Engineering:**  
Faculty: \$140,000; Equipment: \$200,000
- **Master of Engineering:**  
Faculty: \$85,000

# Challenges / Opportunities

## Challenges:

- Resistance from surrounding institutions with engineering programs
- Negative attitude of the Coordinating Board

## Opportunities:

- Well established engineering programs
- Qualified engineering faculty
- New Science and Technology building

# Summary

- There is indeed an overwhelming need for engineering programs at TSU
- Engineering education is considered a priority for the State's economic well-being
- TSU will become a more attractive and competitive institution with engineering programs
- The challenge will be to overcome obstacles to get the programs approved



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# Thank You

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