Roy G. Perry College of Engineering

Purpose and Goals

The modern mission of the Roy G. Perry College of Engineering, in the new millennium, is to sustain an infrastructure that will attract and maintain a world-class faculty that produces graduates with the highest level of professional standards. These graduates will be prepared for a career of life-long learning that will result in leaders, productive workers, innovators and entrepreneurs who will positively impact the increasingly multi-disciplinary and diverse national economy. The College serves as a value added partner within the University to meet the challenge to excel in education and research in engineering, engineering technology, and computer science; and to service and relevance to regional, national, and global communities.

This mission is accomplished through the following six goals:

1. Strive for excellence in engineering education through the dissemination and interpretation of knowledge through the educational programs.
2. Recruit and retain students who have demonstrated a capacity to excel in an environment that integrates advanced information technology with creativity, critical thinking, and problem solving.
3. Recruit and retain a cadre of world-class faculty effective in every endeavor of student-faculty interaction and committed to maintaining an academic standard that will ensure the students are highly competitive for graduate or professional school or for employment in the private or public sectors.
4. Promote scholarly activities through the continual development of our research centers and other collaborations and further enhancing our incorporation of undergraduate and graduate research activities.
5. Continue strong external relations that cultivate and integrate our corporate and alumni constituents into partnerships with the College.
6. Maintain the appropriate infrastructure and support services necessary to provide an atmosphere conducive to learning.

Instructional Organization

The Roy G. Perry College of Engineering offers the following degree programs:

<table>
<thead>
<tr>
<th>Program</th>
<th>Degree Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering</td>
<td>BS</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>BS</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>BS</td>
</tr>
<tr>
<td>Computer Information Systems</td>
<td>MS</td>
</tr>
<tr>
<td>Computer Science</td>
<td>BS &amp; MS</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>BS, MS &amp; PhD</td>
</tr>
<tr>
<td>Engineering</td>
<td>MS</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>BS</td>
</tr>
</tbody>
</table>

College Admission and Academic Requirements

High School Preparation for Admission to the Roy G. Perry College of Engineering

For students intending to pursue a major in engineering, the recommended curriculum is defined by the "Recommended Texas High School Program Graduation Requirements" and approved by the State Board of Education in November 1993. The listing below reflects the current State Board recommendation and expands upon the University requirements stated earlier in this catalog:

Suggested High School Course Work

In support of the aforementioned requirements, an additional year of advanced mathematics (e.g., Calculus) is recommended. Chemistry and Physics are foundations for all engineering programs, and are strongly recommended. Further, students planning careers in the health or biomedical engineering professions should take one year of biology. Additionally, students are urged to take advantage of advanced placement opportunities and honors programs.

Moreover, a student who enrolls without having completed the above courses will not be optimally prepared and the duration of the student's undergraduate program will likely be extended. In particular, the engineering programs offered by the college are based upon a student being fully prepared to begin study with Calculus and Chemistry for Engineers at the college level. Prerequisites for Calculus and Chemistry for Engineers are considered deficiencies and are not counted toward an engineering degree.

Admission to the Roy G. Perry College of Engineering

Admission to the Roy G. Perry College of Engineering is based on the University's undergraduate admission requirements plus the following additional admission criteria for the Roy G. Perry College of Engineering. A student is admitted directly into a major only if all admission criteria are met.
First-time Freshmen – Engineering and Computer Science Majors

First-time freshmen will be evaluated on the basis of the following admission criteria that are applicable for the student:

1. Students must meet the Prairie View A&M University admissions requirements.
2. Students must present a new SAT Reasoning Test score of 950 (based on combined verbal and math scores only) or higher or a composite ACT score of 18 or higher.
3. Must have a cumulative high school GPA of 3.0 on a 4.0 scale

Students Entering with Transfer Credit

Transfer students include those from other units within Prairie View A&M University as well as those from other educational institutions. Transfer students external to Prairie View A&M University must furnish an official transcript to the Office of Admissions for evaluation of all college level work completed. Transfer students with less than 30 hours of transferable credit are admitted under the criteria for first-time freshmen.

Transfer students with 30 hours or more of transferable credit must meet the following requirements:

1. Students must meet the Prairie View A&M University and the Roy G. Perry College of Engineering admissions requirements.
2. Must have a “C” or higher in all transfer courses.
3. Must have a minimum cumulative GPA of 2.5 on a 4.0 scale in all math, science, and engineering courses.

College Academic Requirements

Along with meeting the general requirements of the University, students enrolled in the Roy G. Perry College of Engineering must maintain the following performance levels in order to satisfy degree requirements:

1. Earn an overall grade point average of 2.0 or better in courses taken outside of the college and earn a grade of “C” or better in English, Mathematics, and Science courses.
2. Earn a grade of “C” or better in each course taken within the College.
3. Earn a grade of “C” or better in the prerequisite before advancing to the next level course in a sequence for English, Mathematics, and Science courses.
4. Earn a grade of “C” or better in prerequisite courses before advancing to the next level course in College courses.
5. Demonstrate professional standards and ethical conduct.
6. Three-Attempt Rule: A student may not attempt a course in Mathematics, Science, or Engineering in the Roy G. Perry College of Engineering at PVAMU more than three times and apply that course toward his/her degree. Enrollment in a course for a period of time sufficient for assignment of a grade, including a grade of “W”, is considered an attempt. After a student failed a course attempt twice by not receiving a grade of “C” or higher, he/she must obtain approval from the Department Head to enroll in the course for the 3rd time.

Students who transfer from other colleges and universities should meet the University’s scholastic regulations and additional core curriculum requirements for engineering.

Eligibility to Take Upper Division College Courses

The Roy G. Perry College of Engineering has an eligibility standard for the students to take upper division college courses. Students must have completed or be currently enrolled in all lower division (1000 and 2000 level) courses in English, Mathematics, Science, and Engineering to be eligible to enroll in upper division (3000 or 4000 level) courses in the Roy G. Perry College of Engineering. Students must also complete a prescribed set of courses listed in the catalog section outlining specific degree programs and have a minimum Grade Point Average (GPA) of 2.5 to be eligible to enroll in upper division (3000 or 4000 level) courses in the College. Students transferring to the Roy G. Perry College of Engineering with 60 or more semester hours from another institution will be allowed a period of one semester to comply.

University Core Curriculum For Engineering Programs

The core curriculum concept provides for portability of a basic element of a college degree between higher education institutions. However, certain programs have specific requirements in their programs that must be satisfied for the purpose of accreditation. For a specific program, the core curriculum may look different to most efficiently satisfy both the core and program-specific requirements. For ABET-accredited engineering programs, for example, the math requirement in the core curriculum is best satisfied if the engineering student takes Differential Equations. The program-specific core curriculum requirements presented for degree programs in the Roy G. Perry College of Engineering represent the suggested University Core Curriculum designed for an engineering student to minimize the coursework required.

Students who undertake a more general core curriculum may require additional coursework. For example, the Roy G. Perry College of Engineering requires a programming language course so that some 3-hour courses that satisfy the University Core Curriculum may not be acceptable for the Roy G. Perry College of Engineering degree programs.
Supporting Facilities

Center for Energy and Environmental Sustainability (CEES)

Center for Energy and Environmental Sustainability is established in 2010 with funding from National Science Foundation under the Center for Research Excellence in Science and Technology (CREST) program. The Center consists of a diverse team of faculty and research scientists from two colleges (Roy G. Perry College of Engineering and the Brailsford College of Arts & Sciences) and five departments (Chemical, Civil & Environmental, Mechanical and Electrical Engineering, and Chemistry & Physics). The goal of this center is to establish research and education focused on energy engineering. CEES will focus on innovative technical solutions in the energy arena and will engage PVAMU students on research questions that lead to science and technological breakthroughs needed to fill critical gaps in the future utilization of environmentally responsible and sustainable energy solutions. The three research themes of the center are Biofuels, wind energy and energy and environment. More information on the center is available at www.pvamu.edu/cees (http://www.pvamu.edu/cees/).

Chemical Engineering

The Chemical Engineering Department has research facilities available in several areas including bioengineering, materials, nuclear engineering, economic and environmental impact assessment. Bioengineering facilities include laboratories for biotechnology, bioprocess engineering and bioseparations studies. Materials facilities include equipment for measuring such properties as flash point, thermal expansivity and coefficient of friction. Nuclear studies facilities include a laboratory for the detection and measurement of ionizing radiation of different types. Modeling and simulation tools enable the study and comparison of alternative chemical processing routes on the basis of performance cost and risk. Other facilities are available for studying transport processes in oil recovery and bioremediation operations, as well as in general purpose laboratories.

Civil & Environmental Engineering

The Civil and Environmental Engineering Department research facilities consist of several laboratories, namely the construction materials, environmental, geotechnical, hydraulics, transportation, geographic information systems (GIS), and computer information systems. These laboratories are used to enhance our undergraduate and graduate education as well as conduct research. These laboratories are renovated and equipped with the latest tools and equipment through funding from US Department of Education, Title III grant.

The Construction Materials laboratory is equipped with an Instron UTM machine which has the capability to perform tension, compression, bending, fatigue and other dynamic and cyclic loading tests. The lab is also equipped with new structural test frames that allow small scale educational beam bending and stress analysis. The laboratory also has equipment with testing capabilities for torsion and hardness. Several other material testing facilities are available in the college through other departments and research centers and are accessible to our graduate students. The Environmental Engineering laboratory is equipped with Gas chromatograph with Mass-spect and FID, High Performance Liquid chromatograph, Ion Chromatograph, total Organic Carbon Analyzer in addition to water and wastewater analysis tools and sedimentation, filtration, jar test and aerobic digestion apparatus to study various treatment methods. The Geotechnical Engineering lab has equipment with the capability to perform triaxial, consolidation, direct shear and unconfined compressive strength tests. Located in the Hydraulics Engineering Laboratory is state of the art equipment in fluid mechanics and hydraulic machinery including hydrostatic bench, open channel hydraulics, hydraulics bench with various fittings to study various phenomenon, a pump test rig, and a water hammer apparatus. The Transportation Engineering, GIS and computer information systems laboratory house over twenty-five (25) state of the art computers loaded with civil and environmental engineering software, transportation engineering, and other GIS tools. The department also houses a 48-node cluster which is set up to run air quality modeling software such as CAMx as well as Computational Fluid Dynamics simulations.

Computer Science

The Computer Science Department has a variety of computing facilities, including several MS Windows-based PC labs, MacOSX-based iMaclab, cybersecurirty lab, distance learning and video conference laboratory, graduate student laboratory equipped with multiple operating systems, databases and other software. The department research facilities include a Graphics and 3-D Visualization laboratory, a networks laboratory, and a parallel cloud computing laboratory, a data-mining laboratory, and an RFID applications laboratory.

The Graphics and 3-D visualization laboratory consists of several 3-D visualization workstations with head-mounted displays and data gloves for developing tactile and motion sensing applications. The networks laboratory consists of several different types of network appliances including switches, VPN, routers, etc., using which students study the various network topographies and traffic patterns. The artificial intelligence laboratory has several neural network software modules and the data-mining laboratory has several database and data-mining software modules. The RFID laboratory has setups of several types of RFID readers and writers which enable students to configure the hardware and software for various real-time RFID application scenarios. Newly developed drone-based real-time data collection and processing project has been applied for forest fire alarming, animal disease data sharing and air quality monitoring.

Electrical and Computer Engineering

The Electrical and Computer Engineering Department has a wide range of facilities available to support graduate studies and research. The Department has the following laboratories available for research: Analog and Mixed Signal Lab, Wireless Communications Lab, Computer Networking Lab, Digital Systems Lab, VLSI Design Lab, Device Characterization Lab, the Sprint Broadband Telecommunications Lab, and the Texas Instruments DSP Solutions Lab.

The laboratories are equipped with state-of-art equipment and instruments. The pieces of equipment include: spectrum analyzers, logic analyzers, network analyzer, pattern generators, signal generators, NI Elvis, power supplies, oscilloscopes, function/arbitrary waveform generators, Xilinx FPGA.
status admission if they satisfy all the admission requirements.

The following are university admission requirements to the master's programs in the College of Engineering. Students will be awarded graduate degree

Admission to Programs

Leaders and creative engineers and computer scientists devoted to the discovery, development, and refinement of knowledge and methodologies

The graduate Engineering programs are designed to enhance the student’s research capabilities and to make the student more competitive in the professional practice. They are the continuation of the intellectual, scholarly and professional development of the individual producing technological leaders and creative engineers and computer scientists devoted to the discovery, development, and refinement of knowledge and methodologies associated with the various engineering and computer disciplines. Each degree candidate is expected to have demonstrated the highest degree of professional ethics and standards. The College of Engineering provides excellent facilities in support of its graduate programs.

Admission to Programs

Master’s Programs

The following are university admission requirements to the master’s programs in the College of Engineering. Students will be awarded graduate degree status admission if they satisfy all the admission requirements.

1. Meet the requirements for admission to the graduate school.
2. Have an undergraduate degree from an ABET (or equivalent) accredited program.
3. Have a cumulative Grade Point Average (GPA) of 2.75 on a 4.00 scale.
4. Have previous educational background in the intended area of study.

Applicants who do not satisfy the above admission requirements may be awarded provisional graduate degree status with the minimum GPA of 2.50 on a 4.0 scale. An applicant with a bachelor's degree who has acquired relevant experience that could contribute to ensuring their success in graduate study, may be considered for conditional admission upon a holistic review and recommendation by the respective department head and dean.

Conditional students must petition the Dean of Engineering for full status to the graduate program during the term in which the first 12 graduate semester credit hours will be completed. To be considered for full degree status provisional students must have earned a minimum GPA of 3.0 in all courses recommended by the faculty advisor and the head of the graduate program.

Students may be awarded non-degree admission status if they satisfy the requirements as outlined in the catalog section “Types of Admission” under Admissions Information and Requirements.

Doctoral Program

The following are admission requirements to the Doctor of Philosophy program in the Department of Electrical Engineering. The candidate should:

1. Hold a baccalaureate degree in engineering, mathematics or the physical sciences conferred by a regionally accredited institution.
2. Have a 2.75 Grade Point Average (GPA) on a four-point scale on all completed undergraduate course work.
3. Hold a Masters of Science degree in Electrical Engineering or one of the related disciplines, conferred by an accredited institution.
4. Have a 3.2 GPA on all completed graduate work.
5. Produce original transcripts for all academic work completed at the undergraduate and graduate levels.
6. Have GRE verbal and quantitative scores in the higher percentiles.
7. Submit three letters of recommendation. These should preferably come from faculty sufficiently acquainted with the student to comment on the student’s potential to successfully complete the doctoral program.
8. Submit a personal statement describing the applicant’s academic or professional accomplishments, research interest and professional goals.
9. International students, when deemed appropriate are required to take the Test of English as a Foreign Language (TOEFL); a score of 550, or higher, is required.

Master of Science in Engineering Degree Program

The Master of Science Degree in Engineering is a general engineering program with four areas of concentration:

- Chemical Engineering
- Civil Engineering
- Environmental Engineering
- Mechanical Engineering

Each area of concentration has an option of a thesis or non-thesis degree plan. Each option includes 12 semester credit hours of graduate courses in general engineering with the remaining hours to be determined by the student and his academic advisor during the first semester of acceptance to the graduate program as a degree status student.

During the first semester of graduate degree status, the student should select an advisory committee consisting of at least three members, two of whom must come from the engineering faculty, and the chairman of the committee who shall be a full member of the graduate faculty in engineering.

Degree Program Requirements

General Engineering Requirements

Select four of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GNEG 5063</td>
<td>Engineering Analysis I</td>
</tr>
<tr>
<td>GNEG 5073</td>
<td>Engineering Analysis II</td>
</tr>
<tr>
<td>GNEG 5033</td>
<td>Engineering Probability and Statistics</td>
</tr>
<tr>
<td>GNEG 5133</td>
<td>Engineering Numerical Methods</td>
</tr>
<tr>
<td>GNEG 5193</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>

Option (Select one below)

Thesis Option

- GNEG 5086 Thesis

Technical Electives (12 hours of graduate level courses identified based on concentration and in consultation with advisor)

Non-Thesis Option

- GNEG 5203 Graduate Internship
or GNEG 5303

Technical Electives (15 hours of graduate level courses identified based on concentration and in consultation with advisor)  

| Total Hours | 30 |

1. The student must consult his/her academic advisor and take at least two courses in GNEG 5063, GNEG 5073, GNEG 5033, and GNEG 5133.
2. Prior approval by the Degree Program Head is required for taking the Graduate Internship.
3. GNEG 5193 may be repeated when topic changes.

**Combined BS/MS Programs in College of Engineering**

The Roy G. Perry College of Engineering follows the University's guideline of combined BS/MS programs to encourage qualified undergraduates to start graduate study before completing their BS degrees. By entering in a combined BS/MS status, a student is eligible to count up to 6 semester credit hours toward both the BS degree and the MS degree.

*Admission to combined BS/MS programs*

An undergraduate student who intends to enter a graduate program in the College of Engineering through the combined BS/MS program must apply through the College of Engineering Dean's Office. An application form can be obtained in the Dean's Office or on the homepage of the College of Engineering website.

Approval of the combined BS/MS programs will primarily be decided by the Program Head/Department Head of the intended graduate program. The following is a guide of allowable combinations between the BS and MS programs:

**Allowable Combinations of BS/MS programs in College of Engineering**

*BS Program/MS Program*

- Computer Science/Computer Science
- Computer Science/Computer Information Systems
- Computer Engineering/Electrical Engineering
- Electrical Engineering/Electrical Engineering
- Chemical Engineering/Engineering
- Civil Engineering/Engineering
- Mechanical Engineering/Engineering

**Requirements for Energy Engineering as a Minor Field**

The Energy Engineering Minor curriculum is designed to prepare students to enter directly into a wide variety of careers in the energy sector serving the greater Houston area, state, national and international communities. Students of all majors are encouraged to enroll in the courses offered through the program. The curriculum is designed to work within the structure of the students’ majors.

The Center for Energy and Environmental Sustainability (CEES) is instrumental in developing the Energy Engineering Minor. The goal of this center is to establish research and education focused on energy engineering. The three research themes of the center are biofuels, wind energy and energy and environment. More information on the center is available at [www.pvamu.edu/cees/](http://www.pvamu.edu/cees/).

The Energy Engineering Minor has four focus areas:

- Chemical Engineering - Fossil Fuel and Nuclear Energy Focus
- Civil and Environmental Engineering - Energy and Environment Focus
- Electrical Engineering - Generation and Distribution Focus
- Mechanical Engineering – Renewable Energy Focus

Students shall complete the Energy Engineering Minor through satisfactory completion of 18 SCH from the following courses:

**Energy Engineering Minor Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEG 3113</td>
<td>Introduction to Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>CVEG 4113</td>
<td>Energy and Environment</td>
<td>3</td>
</tr>
<tr>
<td>MCEG 3123</td>
<td>Renewable Energy and Energy Sustainability</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives (select 9 hours from the following options):**
CHEG 4103  Special Topics in Chemical Engineering
CVEG 4103  Special Topics
ELEG 4013  Electromechanical Energy Conversion
ELEG 4023  Power Systems Engineering
ELEG 4223  Electronic and Photonic Materials and Devices
MCEG 4123  Energy System Design
MCEG 4163  Special Topics

Other energy related courses approved by the College

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEG 4103</td>
<td>Special Topics</td>
</tr>
<tr>
<td>ELEG 4013</td>
<td>Electromechanical Energy Conversion</td>
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<td>MCEG 4123</td>
<td>Energy System Design</td>
</tr>
<tr>
<td>MCEG 4163</td>
<td>Special Topics</td>
</tr>
</tbody>
</table>

Total Hours 18

1. This course may be repeated when the topic varies. The approved topics for this minor include Intro to Nuclear, Biofuels and Biomass, and Fossil Fuels.
2. This course may be repeated when the topic varies. The approved topics for this minor include Nuclear Waste Management and Energy and Waste Management.
3. This course may be repeated when the topic varies. The approved topics for this minor include Heating, Ventilating and Air Conditioning and Power Plants.

Special Programs

Engineering Internship/Cooperative Education. The primary goal of an internship or cooperative education experience is to strengthen and enhance the theoretical knowledge gained through classroom or distance education-based experiences. The objectives of internships and cooperative education are to:

1. Provide students with opportunities to obtain professional industrial/government internships.
2. Prepare graduates for immediate professional assignments without further on-the-job training.
3. Provide a closer partnership between employers and the Roy G. Perry College of Engineering.
4. Help students determine which type of organizational structure and corporate culture best suits them.

Students in the program are required to enroll in internship or cooperative education courses while they are employed in industry/government. They continue to be governed by College and University regulations concerning professional conduct during the employment period. Students are normally paid wages/salaries by the employing agency.

The Roy G. Perry College of Engineering Enhancement Institute (CE2I) is an innovative and intensive summer bridge-to-college program designed to prepare students for the rigors of an Engineering, Computer Science, or Technology Curriculum and to aid with the transition between high school and college. The Institute is a five-week residential program, where participants will complete coursework in Math, Science, Technology, and Professional Development Activities. The Institute is math intensive. A math assessment test will be administered initially to determine the appropriate math placement. The program goal is to achieve a mastery of one math level higher than the student placed when he/she entered the program. The program will also introduce students to basic concepts in chemistry, physics, and computing. Students will experience professional development activities including field trips to area engineering and technology industries; personal and professional development seminars and workshops (i.e. time management, study skills, learning style inventories, effective use of study groups and seven (7) habits of successful people).

College Professional and Honor Societies

Among the honor societies designed to support, augment, and supplement the educational and professional development of students are the departmental honor societies and Tau Beta Pi, National Engineering Honor Society, through the Texas Kappa Chapter. In addition, the Roy G. Perry College of Engineering sponsors the following chapters of national societies:

The Society of Women Engineers. Prairie View A&M Student Chapter is a professional society open for membership to female students majoring in an engineering curriculum at the University. The Chapter is affiliated with the national professional engineering body, the Society of Women Engineers. The society fosters the intellectual, professional, personal and social development of student members.

The Society of Hispanic Professional Engineers (SHPE) is a professional society open to all engineering students in the Roy G. Perry College of Engineering. The student chapter at Prairie View is affiliated with the National Society of Hispanic Engineers professional society. The society endeavors to change lives by empowering the Hispanic community to realize their fullest potential and impact through STEM awareness, access, support and development.

The Prairie View A&M chapter of the National Society of Black Engineers is a professional society open to all engineering students in the Roy G. Perry College of Engineering. The chapter fosters intellectual and professional development among its members and promotes growth and entry of more minority persons into the engineering profession.
