Parks College of Engineering and Aviation prepares students for careers in engineering, aviation, computer science and related fields. Satisfying this mission demands excellence in academic programs that integrate the education of the whole person, in the liberal and Jesuit traditions, with classroom and laboratory experiences in the major fields of study. A Parks College education provides opportunities for students to develop intellectually, stay abreast of changing technology, learn more about themselves and the world in which they live, and to prepare for a lifetime of learning.

The Aerospace Engineering, Mechanical Engineering and Electrical Engineering curricula are professionally accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering Technology (ABET). The Aircraft Maintenance Management, Aviation Science/Professional Pilot, Avionics Engineering and Aviation Management curricula are accredited by the Council on Aviation Accreditation (CAA).

**Special Admission Requirements**

In addition to the general admission and matriculation requirements of the University, Parks College has the following additional requirements.

The recommended academic requirements for particular programs are as follows:

**Bachelor of Science in Aerospace Engineering**
**Bachelor of Science in Aircraft Maintenance Engineering Technology**
**Bachelor of Science in Biomedical Engineering**
**Bachelor of Science in Computer Science**
**Bachelor of Science in Electrical Engineering**
**Bachelor of Science in Mechanical Engineering**
**Bachelor of Science in Physics**
**Bachelor of Arts in Physics (Degree conferred by the College of Arts and Sciences)**

1. Grade range B+ to A from high school or 2.70 college transfer average.
2. Fifteen units of high school work: three or four English; four or more Mathematics - Algebra I and II, Geometry; and Senior Mathematics with Trigonometry; three or four sciences - General Science, Biology, Physics, or Chemistry; two or three Social Sciences - History, Psychology, or Sociology; and three electives.

**Bachelor of Science in Aeronautics: Avionics Engineering**
**Bachelor of Science in Aeronautics: Aviation Science/Professional Pilot**

1. Grade range B to A from high school or 2.50 college transfer average.
2. Fifteen units of high school work: three or four English; four or more Mathematics - Algebra I and II, Geometry, and Senior Mathematics with Trigonometry; three or four sciences - General Science, Introduction to Physical Science, Chemistry or Physics; three Social Science - History, Psychology, or Sociology; and three electives.

**Bachelor of Science in Aeronautics: Aircraft Maintenance Management**
**Bachelor of Science in Aeronautics: Aviation Management**

1. Grade range B- to A from high school or 2.20 college transfer average.
2. Fifteen units of high school work: three or four English; three Mathematics - Algebra I and II, Geometry, or Trigonometry; two sciences - General Science, Chemistry, Introduction to Physical Science, Earth Science or Physics; three Social Science - History, Psychology, or Sociology; and four electives.

**Associate of Science in Avionics Engineering Technology**

1. Grade range B- to A from high school or 2.00 college transfer average.
2. Fifteen units of high school work: three or four English; two Mathematics - General Mathematics, Algebra or Geometry; two sciences - General Science, Physics or Chemistry, three Social Science - History, Psychology, or Sociology; and four electives.

**Airframe and Powerplant Certificate Program:** Offered through the Aviation Maintenance Institute

1. Grade range C to A from high school or 2.00 college transfer average.
2. Fifteen units of high school work: three or four English; two Mathematics - General Mathematics, Algebra or Geometry; two sciences - General Science, Earth Science, Introduction to Physical Science, Chemistry or Physics; three Social Sciences - History, Psychology, or Sociology; and four electives.
Admission to Professional Pilot Program

Enrollment capacity in the Aviation Science/Professional Pilot program may be limited; therefore, early application is strongly encouraged. In addition to meeting the academic requirements for admission, the applicant to any professional pilot program must be able to pass a Federal Aviation Administration (FAA) Class II medical examination. This physical examination is an absolute prerequisite for flight training and should be taken prior to the student's arrival on campus.

For specific information regarding the Class II medical examination, see the FAA website http://www.cami.jccbi.gov/. This source will provide you with information about the medical certificate as well as listing of FAA designated Aviation Medical Examiners.

International students will be evaluated for their listening comprehension and spoken ability in addition to meeting regular English requirements. Prior to commencing flight instruction, special training will be required for those students found deficient in this evaluation.

Advanced Placement and Credit by Examination

The following conditions apply for advanced placement and credit by examination at Parks College:

Students who participate in Advanced Placement programs in high school are eligible for exemption and/or advanced placement credit. Exemption and placement examinations in mathematics will be given to new students upon arrival on campus. Guidelines for the exemption examinations are as follows:

Math Placement Examination - required of beginning and transfer students who have not completed a transferable mathematics course before coming to Parks College.

Students should contact the College of Arts and Sciences for information about advanced placement in English, languages and the humanities. Test results must be received from The College Board (http://www.collegeboard.com/).

English Language Requirements for International Students:

All the admission policies and requirements for domestic students apply to international students. In addition, admission as a full-time student is based upon the student's proficiency in the English language, as measured by standardized tests. Upon arrival, all students are given English language proficiency tests. Those students who do not meet the minimum standards for their programs are placed in the English as a Second Language Program, until their language skills meet the standards set by the student's program. Applicants are encouraged to complete these requirements prior to arriving at Parks College. Transfer applicants with credit in English courses will be assessed on an individual basis by the Parks College Deans Office.

College Level Examination Program

Parks College accepts successfully completed CLEP results for credit. These, however, must be Subject Examinations. The College does not recognize the General CLEP for credit purposes.

Credit will be granted for CLEP under the following conditions:
1. A maximum of thirty hours can be earned through CLEP.
2. The score on each test must equal or exceed the 50th percentile on the national college sophomore norm.
3. Credit will be awarded in Subject Examinations when approved by the department offering comparable courses. This credit will be awarded on the basis of the number of credit hours in the pertinent courses.
4. Transfer students please note: Acceptance of CLEP Examinations for advanced standing by another college or university does not automatically ensure the transfer of this credit to Parks College. Recording of advanced standing for CLEP courses on the Academic Record is contingent upon the College's receiving the Educational Testing Service results of all CLEP examinations for which the student is seeking advanced standing.
5. Full-time students may take external examinations for credit, including required departmental CLEP supplementary examinations, within one calendar year of initial registration at Parks College.

Special Registration Procedures

Some special registration procedures apply to students enrolled in Parks College.

Pass/No Pass Option

The maximum number of hours that may be taken on a Pass/No Pass basis is eighteen (18), but not more than one course is permitted during any one semester.

These eighteen (18) hours may be taken under the following options:
1. Any hours above the number required for graduation.
2. Any hours within the number required for graduation which are no longer specified due to the results of testing out of courses and/or advanced placement.
3. Any hours within the area of concentration which are not required by the controlling department and for which the student has received the approval of the advisor.

Pass/No Pass hours are not counted towards fulfilling degree requirements. The student must register as a Pass/No Pass member of the class. This status becomes permanent at the time of registration. The student is responsible for seeing that the above conditions are met.

Audit

A student may audit a course offered at Parks College with the following reservations:
1. The student must have approval of the instructor and department chair to sit in that particular class. A course taken for credit may be changed to an audit status until the last day to receive a grade of "W".
2. The student is eligible to take tests if he or she desires. However, they will not be graded.
3. No grade or credit can be earned by auditing a course and, although an "AU" grade is entered instead of the grades described elsewhere, the course does not count toward fulfilling the degree requirements.
4. An exemption examination cannot be taken for an audited course.

Registration at Another Educational Institution

Classified students at Parks may not register for courses at other educational institutions without prior written approval of the Dean of Parks College.

Flight Instruction at Other Institutions

Once a student has enrolled at Parks College, all subsequent flight instruction must be completed in residence at the College. Flight instruction outside of the College's FAA-approved pilot instruction curricula is not permitted without prior written approval from the Chair of the Department of Aviation Science (whether currently enrolled or not). Students who receive flight instruction outside the approved curricula without prior approval are subject to dismissal from the Department of Aviation Science.
Special Academic Requirements

Attendance
As a policy, undergraduate students are expected to attend regularly all classes, laboratory sessions and examinations. The implementation of this policy is left to the discretion of the individual instructor with the following exception: no absences are permitted in any course, which is required for the Federal Aviation Administration (FAA) regulated Airframe and Powerplant Technician Certificate or pilot certification courses. FAA regulations specify the number of hours required in the approved programs. Students should contact the academic departments for details of these regulations.

If any absences occur, it is the student's responsibility to make up the missed work. Since the student is expected to attend classes regularly, the instructor is not obligated in any way to provide make-up examinations or additional help on material covered when a student is absent.

When, in the judgment of the instructor, a student has accrued an excessive number of absences, the instructor may report this on the appropriate excessive absence form to the student and his/her advisor. This report is, in effect, a warning. At the discretion of the instructor a grade of "AF" (failure due to excessive absence) may be given.

When a student is absent because of an authorized student activity, the instructor, providing that the faculty member direct- ing such student activities secures prior approval from the Dean's office, may excuse the absence. Any scholastic difficulties resulting from the absence, as well as any assignments and examinations, remain the student's responsibility.

Academic Categories

Unclassified
Anyone enrolled in Parks College who is not pursuing a program of studies designed to obtain a degree from the college or university but who enrolls in one or more classes will be considered an unclassified student. Unclassified students who subsequently decide to pursue a degree must complete the entire process of applying for admission and must be admitted under the usual guidelines and procedures.

Students in Good Academic Standing
Students with a cumulative grade point average of 2.00 or higher are classified as students in good standing. Such students are classified as part-time if enrolled for less than twelve hours, full-time if enrolled for between twelve and eighteen credit hours, and full-time on overload if enrolled for more than eighteen credit hours. Every student is assigned an academic advisor, a faculty member who should be consulted about any academic issues and who must approve all proposed course enrollments and withdrawals.

Students on Supervisory Status
Minimum satisfactory scholastic achievement at Parks College is represented by a 2.00 cumulative grade point average (a C average). Anyone whose current or term grade point average is below 2.00 and whose cumulative grade point average is above a 2.00 will be considered on supervisory status during the term in which they next attend Parks College. Such students must see the Academic Board and their academic advisor during regular registration. The Academic Board will inform that:
1. They may not hold office in any student organization during the period of probation.
2. They will ordinarily be restricted to no more than 15 credit hours. The academic advisor may grant exceptions to these rules.
3. After receiving their mid-term grades, they must consult with their advisor as to their academic performance and they must meet with an Academic Board member with their mid-term grades and their records. If the student fails to do so, a registration hold will be placed on their academic record.

Students on Contract Status
Any student whose overall grade point average is below 2.00 contract status (probation) to the Academic Board. Such students must see the Academic Board and their academic advisor during regular registration. The Academic Board will inform them that:
1. They may not hold office in any student organization during the period of probation.
2. They will ordinarily be restricted to no more than 15 credit hours.
3. After receiving their mid-term grades, they must consult with their advisor as to their academic performance and they must meet with an Academic Board member with their mid-term grades and their records. If the student fails to do so, a registration hold will be placed on their academic record.
4. The Board will require each student to sign a contract stating that he or she will decrease the credit point deficiency by a fixed amount (to be determined by the Academic Board) and acknowledging that failure to satisfy this contract can result in dismissal from Parks College. The Academic Board may grant exceptions to these rules.

The preregistration of students on supervisory and contract status will be cancelled if the student fails to see a member of the Academic Board prior to the third day of class of next term of enrollment. These students should see their advisor and the Academic Board during regular registration. Students who have not registered and attended classes within the first three days of the semester may not be allowed to enroll. A registration hold will be placed on their academic record.

Dismissed Students
Any student on contract status who does not satisfy the contract he or she signed with the Academic Board may be dismissed from Parks College. In addition, any student who fails a course three times can be dismissed from the college.

Appeal Options for Dismissed Students
A dismissed student may attempt to again attend Parks College by appealing to the Dean. Information regarding this appeal may be obtained from the Dean's office.

Parks College Core Curriculum
In addition to general requirements specified by the University, all students in degree programs leading to Bachelor of Science degrees must satisfy the Parks College Core Curriculum requirements and additional requirements specified by the individual academic programs.

Parks College of Engineering and Aviation has established educational objectives for students graduating from Bachelor of Science degree programs. Some objectives are specific and unique to degree programs, while others are broader in scope and may include students and instruction from outside of the degree program and college. The Parks College Core Curriculum describes the educational experiences that the faculty and administration of the college have identified as being “essential” for all Parks College students, and it describes the methods by which selected academic objectives may be accomplished.

Notice to students:
Individual degree programs may require specific courses in order to satisfy these requirements. It is recommended that students consult their Academic Advisor, Department Chairperson...
Professional Orientation (minimum of 1 credit)
One course designed for incoming freshman students providing an orientation to careers in the intended field of study. Also included is presentation of resources available to students from the department, college, and university.

Jesuit Tradition (minimum of 12 credits)
Theology (3 Cr.)
Philosophy and/or Ethics (3 Cr.)
Humanistic Values* (6 Cr.)

Knowledge (minimum of 16 credits)
Science* with laboratory experience (4 Cr.)
Mathematics (3 Cr.)
Computer Science/Information Technology (3 Cr.)
Additional experience in Science* and/or Mathematics (6 Cr.)

Communication Skills (minimum of 4 credits)
Written or Oral Communication (4 Cr.)

Cultural Diversity (minimum of 3 credits)
Cultural Diversity experience* (3 Cr.)

Capstone Experience (minimum of 3 credits)
A senior-level course or sequence of courses providing opportunities for students to use their acquired and accumulated knowledge on a problem or in a setting that is representative of that found in the profession.

* Notes
Science courses shall be chosen from Astronomy, Biology, Chemistry, Engineering Science, Geology, Meteorology, and Physics.

Humanistic value courses shall be chosen from Philosophy, Theology, Social and Behavioral Sciences, or Humanities.

Social and Behavioral Science courses shall be chosen from Anthropology, Communications, Economics, Education, Political Science, Psychology, Public Policy Studies, Sociology, or Social Work.

Humanities courses shall be chosen from Fine Arts, Literature, History, or Foreign Language.

Cultural diversity courses shall be chosen from the list of courses provided by the College of Arts and Sciences, during each semester.

Aerospace & Mechanical Engineering
Krishnaswamy Ravindra, Ph.D., P.E., Chair

Faculty:
Richard M. Andres, Ph.D., P.E., Professor Emeritus
Mir Atiqullah, Ph.D.
Patricia A. Benoy, Ph.D., Program Director, Mech. Engineering
Lawrence G. Boyer, M.S.
Sridhar Condor, Ph.D.
Paul A. Czyz, B.S., Professor Emeritus
Marty A. Ferman, Ph.D., P.E., Director of Master's Program
John A. George, Ph.D. Professor Emeritus
Swami N. Karunamoorthy, D.Sc.
Amy Lang, Ph.D.
David Manor, Ph.D.
Bellur L. Nagabhushan, Ph.D.
Ray N. Nitzsche, Ph.D., P.E., Associate Professor Emeritus
Krishnaswamy Ravindra, Ph.D., P.E.
Thomas Scott, Ph.D.
Bjorn Wolf Yeigh, Ph.D.

Aerospace Engineering (B.S.)
The Aerospace Engineering program has as its objectives:
1. Prepare students to be Aerospace Engineers.
4. Achieve proficiency in both analytical and experimental evaluation of flight vehicles.
5. Achieve proficiency in written and oral communications skills.
6. Develop an ability to engage in life long learning.

To this end, the design process, as exemplified by the assignment of open-ended problems, is experienced in nearly all engineering science courses. The design experience is developed throughout the program by introduction of problem identifying and solving tasks that are assigned in those courses that precede the two semester capstone design course. The student is instilled with an awareness of the impact of design decisions, not only on vehicle performance, but on society as well. Every effort is made to establish in each graduate, the incentives to pursue the learning process throughout his or her career. Excellent laboratories emphasize measurements and experimental methods.

With a solid core of mechanics, thermal/fluids, electrical/electronics, and controls, the student is able to progress to the discipline specific areas of structures, flight dynamics and control, aerodynamics, and propulsion. There is an emphasis on both aeronautics and astronautics. The undergraduate curriculum is professionally accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The department offers both undergraduate (B.S.) and graduate (M.S., M.S. Research) degrees.

Students are encouraged to participate in the activities of the student chapter of the American Institute of Aeronautics and Astronautics (AIAA) and to enter the regional, and national paper competition conducted by the AIAA.

Further details about the Aerospace & Mechanical Engineering program can be found on the World Wide Web at: www.parks.slu.edu

Typical Course of Study

First Semester Second Semester

FRESHMAN
CH-A151 . . . . . . . . . . . . . . . .3 CS-P125 . . . . . . . . . . . . . . . .4
CH-A152 . . . . . . . . . . . . . . . .1 ES-P102 . . . . . . . . . . . . . . . .1
ENG-A192 . . . . . . . . . . . . . . . .3 MTA-A13 . . . . . . . . . . . . . . . .4
ES-P101 . . . . . . . . . . . . . . . .2 PH-P161 . . . . . . . . . . . . . . . .3
MT-A142 . . . . . . . . . . . . . . . .4 PH-P162 . . . . . . . . . . . . . . . .1
TH-A100 . . . . . . . . . . . . . . . .3 Humanities/Soc Sci . . . . . . . .3
               16                          16

SOPHOMORE
AE-P201 . . . . . . . . . . . . . . . .1 AE-P200 . . . . . . . . . . . . . . . .3
CM-A293 . . . . . . . . . . . . . . . .1 EE-P201 . . . . . . . . . . . . . . . .3
ES-P210 . . . . . . . . . . . . . . . .3 EE-P202 . . . . . . . . . . . . . . . .1
ES-P220 . . . . . . . . . . . . . . . .3 ES-P211 . . . . . . . . . . . . . . . .3
MT-A242 . . . . . . . . . . . . . . . .4 ES-P322 . . . . . . . . . . . . . . . .3
PH-P163 . . . . . . . . . . . . . . . .3 ES-P323 . . . . . . . . . . . . . . . .1
PH-P164 . . . . . . . . . . . . . . . .1 MTA-A55 . . . . . . . . . . . . . . . .3
               16                          17

JUNIOR
AE-P320 . . . . . . . . . . . . . . . .3 AE-P310 . . . . . . . . . . . . . . . .3
Mechanical Engineering (B.S.)

The Mechanical Engineering program has as its objectives:
1. Prepare students to be Mechanical Engineers.
2. Achieve proficiency in Design and Manufacturing of Mechanical Systems.
3. Achieve proficiency in both the Structural and Thermal aspects of Mechanical Systems.
4. Achieve proficiency in both analytical and experimental evaluation of Mechanical Systems.
5. Proficiency in written and oral communication skills.
6. Develop an ability to engage in life long learning.

The Mechanical Engineering curriculum emphasizes Design and Manufacturing, which are the two most important functions of an engineer. Design is well integrated into all levels of the curriculum. An attempt is made to solicit industry sponsored projects for the capstone senior design course. In addition to basic science, mathematics, and engineering science courses, the curriculum includes courses in both the energy stem and the structures & motion stem. The humanities courses, including Engineering Ethics, provide a well rounded engineering education. Since modern mechanical systems are controlled by electronic systems, a course on Principles of Mechatronics has been included to provide the necessary interdisciplinary experience. The technical electives in the curriculum allow the student to specialize in either the energy stem and the structures & motion stem or the electronics & computer science area. Designing and developing high speed transportation (cars, trains, ships, planes), automated manufacturing, rapid prototyping, advanced robots, energy efficient devices, alternate energy sources, smart materials, and artificial devices for humans are some of the future challenges for a mechanical engineer. This curriculum provides the necessary building blocks and prepares the graduate to be a part of this future. The undergraduate curriculum is professionally accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

A list of courses approved as Technical Electives may be obtained from the department chair.

Aerospace Technology

Beshara I. Sholy, Ph.D., Chair

Faculty:
Aaron Cowin, M.S.
John D. Gremin, M.S.
Terrence K. Kelly, B.S.
Armineh Khalili, M.S.
Stephen G. Magoc, M.B.A.
Frederic C. Schneeberger, B.A.
Beshara I. Sholy, Ph.D.

Mission of the department
The mission of the Department of Aerospace Technology is to prepare students for careers in aerospace technology disciplines. The mission is met by the degree programs offered by the department. Each degree program is developed to provide specific training in the intended discipline. The curriculum of each discipline is designed to provide essential skills for employment opportunities in related Aerospace Technology career fields, and the ability to engage in life long learning.

Degree and Certificate programs
The department offers the Bachelor of Science in Aircraft Maintenance Engineering Technology (AMET), the Bachelor of Science in Aeronautics with a concentration in Avionics Engineering (AVN) and in Aircraft Maintenance Management.
(AMM). The department also offers an Associate of Science in Avionics Engineering Technology.

The department offers a certificate program that leads to the Federal Aviation Administration’s Airframe and Powerplant Certificate. This certificate program is necessary for the completion of both the AMET and AMM degree programs. The certificate program is offered and administered by the Aviation Maintenance Institute of the department of Aerospace Technology.

The Aircraft Maintenance Management and the Avionics Engineering degree programs are accredited by the Council on Aviation Accreditation (CAA).

Aviation Maintenance Institute (AMI) (Airframe and Powerplant Certificate)

The Aviation Maintenance Technician Program is offered through the college’s Aviation Maintenance Institute. This program leads to FAA certification as a Mechanic with an Airframe and Powerplant rating (A&P). After completion of this program, the student can pursue a rewarding and challenging career in the aviation/aerospace maintenance industry. Alternatively, the student can continue the educational experience by enrolling in either the Aircraft Maintenance Engineering Technology (AMET) or Aircraft Maintenance Management (AMM) programs. Both of these programs are based on a foundation of the technical skills developed in the Aviation Maintenance Technician Program.

++NOTE: For the Fall 2003 semester, students enrolling in the AMET program will receive 25 credits towards completion of the degree program if the student holds a valid A&P certificate, and students enrolling in the AMM program will receive 48 credits towards completion of that degree.

Aviation Maintenance Technician Program

This program is offered at times that vary from the normal academic calendar. On-line (Internet based) course offerings are available for selected subjects. Additionally, students with extensive aviation background may start at various times throughout the year. Inquiries about program start dates and costs can be obtained from the Aviation Maintenance Institute. Below is a typical class sequence.

Session 1
Basic Mathematics
Basic Electricity
Physics for Mechanics
Aircraft Drawing
Fluid Lines & Fittings
Materials & Process
Cleaning & Corrosion Control
Federal Aviation Regulations
Weight & Balance
Ground Operations & Servicing
Aircraft Electrical Systems
Aircraft Fuel Systems
Aircraft Fire Protection Systems
Aircraft Instrument Systems

Session 2
Non Metallic Structures
Aircraft Covering
Aircraft Finishes
Sheet Metal Structures
Aircraft Welding
Transport Category Aircraft
Reciprocating Engines
Turbine Engines
Lubrication Systems

Session 3
Assembly & Rigging
Airframe Inspections
Ice & Rain Control Systems
Comm/Nav Systems
Cabin Atmosphere Control
Hydraulic/Pneumatic Systems
Aircraft Landing Gear
Powerplant Inspections
Ignition Systems
Fuel Metering Systems
Induction Systems
Powerplant Cooling Systems
Powerplant Exhaust Systems
Propellers

Aircraft Maintenance Engineering Technology (B.S.)

The AMET curriculum places heavy emphasis on the study of aircraft structures, systems, and power plants. Aerospace engineering technology subjects are followed by applied courses in structures, aerodynamics, design, strength of materials, and fabrication and structures repairs. With the degree, the graduate is prepared for rewarding career opportunities in many areas of aeronautics, including flight test technology, production technology and maintainability. Prior to acceptance into the AMET program, the student must earn the FAA Airframe and Powerplant Certificate.

Typical Course of Study

A typical course schedule is provided below. Credit hours received for holding a valid FAA Airframe and Powerplant Certificate is 25.

First Semester                   Second Semester

SOPHOMORE
AT-P131  .................. 1  ATP241  ................ 2
AT-P251  .................. 2  CS-P125 .................. 4
PH-P161  .................. 3  MT-A143 .................. 4
PH-P162  .................. 1  PH-P163 .................. 3
MT-A142  .................. 4**  PH-P164 ................. 1
TH-A100  .................. 3  ENG-A192 .................. 5*
CH-A151 .................. 3  17
CH-A152 .................. 1
                            18

JUNIOR
AT-P351  .................. 3  ATP341  ................ 3
AT-P352  .................. 1  ATP342  ................ 1
AE-P200  .................. 3  MTA167 .................. 3
ES-P220  .................. 3  ES-P310 .................. 3
ES-P200  .................. 4  ES-P311 .................. 1
MT-A244  .................. 4  AVN-P201 .................. 3
                              18
                             AVN-P202 ................. 1
                              CMM-A293 ................. 1
                            16

SENIOR
AT-P431  .................. 3  ATP435  ................ 3
AT-P432  .................. 1  ATP450  ................ 3
AE-P302  .................. 4  Elective .................. 3*
AE-P320  .................. 3  Elective .................. 3*
ES-P303  .................. 3  PL-A205 .................. 3
AT-P440  .................. 2  15
                              16

Cultural Diversity core requirement may be met by any course that simultaneously fulfills another core requirement

Total Credit Hours: 125
The department offers an undergraduate degree that consists of a core of general studies, mathematics, and science, as well as a study of the theories of engineering electronics. Students enrolled in this degree program should complete the outlined schedule; 127 credit hours are needed to earn the B.S. degree.

Typical Course of Study

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tr>
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<tr>
<td><strong>FRESHMAN</strong></td>
<td><strong>SOPHOMORE</strong></td>
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<tr>
<td>AF-P251 ................. 2</td>
<td>AVN-P205 ............. 3</td>
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<tr>
<td>AS-P100 ................. 2</td>
<td>AVN-P206 ............. 1</td>
</tr>
<tr>
<td>AVN-P100 ................. 1</td>
<td>**ENG-A192 ............. 3</td>
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<tr>
<td>AVN-P105 ................. 3</td>
<td>MT-A143 ............. 4</td>
</tr>
<tr>
<td>AVN-P106 ................. 1</td>
<td>CH-A151 ............. 3</td>
</tr>
<tr>
<td>*MT-A142 .................. 4</td>
<td>CH-A152 ............. 1</td>
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<td>13</td>
<td>15</td>
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<tr>
<td><strong>JUNIOR</strong></td>
<td><strong>SENIOR</strong></td>
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<tr>
<td>AVN-P305 ............. 3</td>
<td>AME-P218 ............. 3</td>
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<tr>
<td>AVN-P306 ............. 1</td>
<td>AVN-P307 ............. 1</td>
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<td>AVN-P351 ............. 3</td>
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<tr>
<td>AVN-P352 ............. 1</td>
<td>AVN-P353 ............. 3</td>
</tr>
<tr>
<td>Elective: Humanities ............. 3</td>
<td>AVN-P354 ............. 1</td>
</tr>
<tr>
<td>Elective: Soc/Beh Sci ............. 3</td>
<td>ES-P200 ............. 4</td>
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<tr>
<td>PL-A205 ............. 3</td>
<td>15</td>
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<td>17</td>
<td>17</td>
</tr>
<tr>
<td><strong>TOTAL CREDIT HOURS: 127</strong></td>
<td><strong>TOTAL CREDIT HOURS: 123</strong></td>
</tr>
</tbody>
</table>

* Students needing prerequisite work in writing skills as determined by ACT or SAT scores will be required to take ENG-A150: The Process of Communication (3) and perhaps ENGA090: Introductory Writing or ENGA094: Introduction to College Reading (offered as Pass/Fail).

** Students without transfer credit for MT-A115: Trigonometry or MT-A120: College Algebra and MT-A141: Pre-Calculus must pass a proficiency examination before enrolling in MT-A142 Calculus I.

* Students should consult with their advisor and obtain department chair approval on course selection to satisfy the elective requirement.

A list of approved technical elective courses may be obtained from the Chair of the Department of Aerospace Technology.

Avionics Engineering Technology (A.S.)

The associate degree program prepares students for careers as qualified avionics technicians. Graduates are qualified to provide technical assistance and perform repairs and maintenance of aircraft communication and navigation equipment. The FCC General Radio-Telephone Operator License may be earned by all graduates.
Students in the Aviation Science/Professional Pilot degree program may choose to complete a selected group of courses and receive a Certificate in Business Administration in addition to the bachelor's degree.

### Aviation Science

**Gary J. Northam, Ph.D., Chair**

**Faculty:**
- Wendy S. Beckman, Ed.D.
- Stephen M. Belt, M.A.
- Gary J. Northam, Ph.D.
- Manoj S. Patankar, Ph.D.
- Michael W. Richards, M.S.
- James M. Sebesta, S.J., M.S., M.A.
- Alan J. Stolzer, Ph.D.

**Flight Training Director:**
- Bruce D. Hoover, M.S.

**Chief Instructor:**
- Andora L. Vrooman, B.S.

**Assistant Chief Instructors:**
- John Loring Cowell, B.S.
- Michael Creek, B.S.

The Department of Aviation Science offers two degree programs that lead to Bachelor of Science degrees in Aeronautics. The Aviation Science/Professional Pilot program has flight courses integrated with business and management courses, and prepares the graduate for entry level positions in charter, corporate, or airline operations. Flight training is conducted under Federal Aviation Regulations Part 141 in an FAA approved syllabus. Applicants for this program must hold an FAA Class II medical certificate.

The Aviation Management degree integrates business and management courses with an aviation curriculum to prepare the graduate for any of several aviation business professions. The focus of the Aviation Management degree in air carrier management is facilitated with a sequence of courses taken in the final three semesters along with a capstone experience (AM P450).

### Typical Course of Study

#### FRESHMAN

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>AME-P105</td>
<td>AVN-P205</td>
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<tr>
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<td>AVN-P206</td>
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#### SOPHOMORE

<table>
<thead>
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<td>AME-P201</td>
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#### JUNIOR

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<td>AME-P218</td>
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<td>CMM-A293</td>
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<td>CS-P125</td>
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<td>Elective: Soc/Beh Sci</td>
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<tr>
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</tr>
</tbody>
</table>

Total Credit Hours: 73

A list of approved elective courses may be obtained from the Chair of the Department of Aerospace Technology.

### Aviation Management (AM) (B.S.)

**Typical Course of Study**

#### FRESHMAN

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
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#### SOPHOMORE

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<td>PP-P200</td>
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### SENIOR

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<td>AS-P410</td>
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<td>AS-P450</td>
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<td>PL-A205</td>
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<td>Open Elective</td>
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<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

Total Credit Hours: 128
The minimum curriculum includes:

- electives, to tailor the curriculum for each individual student.

Parks College requirements, and includes the flexibility, through

The Biomedical Engineering curriculum satisfies the SLU and
Course of Study:

specific areas of interest.

provide a broad fundamental preparation for any of the three
professional schools. The courses and laboratory experiences
in Biomedical Engineering, supplemented with courses from

other engineering departments. The BME courses span a range
of subspecialties, including biomechanics, biomaterials, bioelec-
tronics, biofluids and transport. Within these courses, topics
may address problems in areas like cardiology, orthopedics, neu-
robiology, biology, or psychology. Students develop research and
design skills in courses and laboratories throughout the curricu-
lum, but the senior project provides a culminating experience by
focusing on a specific yearlong problem that may be done
individually or in teams.

The undergraduate degree program offers considerable
flexibility, allowing time for electives within and outside the
Department. The curriculum is designed for students whose
post-baccalaureate career plans are graduate school, industry, or
professional schools. The courses and laboratory experiences
provide a broad fundamental preparation for any of the three
career paths. At the same time, students can choose advanced
courses, senior project, and lab experience to define their spec-
cific areas of interest.

Course of Study:
The Biomedical Engineering curriculum satisfies the SLU and
Parks College requirements, and includes the flexibility, through
electives, to tailor the curriculum for each individual student.

The minimum curriculum includes:

Basic Science & Math

- Chemistry ........................................... 8
- Physics ............................................. 8
- Calculus ............................................ 12

Differential Equations ................................. 3

Biology .................................................. 3

Probability & Statistics .............................. 12

Basic Engineering

Computer Science ...................................... 4

Biomechanics I ........................................ 3

Circuits ............................................... 4

Communications

Adv. Writing for Professionals .................... 3

Small Group Presentations ........................ 1

Philosophy & Theology

Theological Foundations ........................... 3

Ethics .................................................. 3

Humans .................................................. 3

Cultural Diversity ..................................... 3

Social & Behavioral Sciences ....................... 3

Non-Technical Elective ............................... 3

Biomedical Engineering Core

BME Orientation ..................................... 1

BME Introduction .................................... 2

BME Methods ........................................ 2

Biomaterials I ....................................... 3

Biomedical Measurements ........................ 3

BioMedical Signals I ................................. 3

Transport Fundamentals ............................ 3

Senior Project ....................................... 6

Advanced Biomedical Engineering 18

in areas of

- biomaterials - tissue engineering
- biomechanics - biotransport
- biocomputing - signals - imaging

Open Electives ........................................ 6

options approved by BME Department

Minimum BS Credits (BME) 126

All BME courses with the exception of BMEP100 have prerequi-
sites that require a “C” or better. Please consult the department
for updated lists.

Computer Science

Asai Asaithambi, Ph.D., Chair/Associate Professor

Faculty:

Asai Asaithambi, Ph.D., Associate Professor

Stephen A. Blythe, Ph.D., Assistant Professor

Dennis J. Bouvier, Ph.D., Assistant Professor

Ann McNamara, Ph.D., Assistant Professor

Jacob Sukhodolsky, Ph.D., Associate Professor

Ventzeslav Valev, Ph.D., Associate Professor

Mission of the Department:

Within the context of Saint Louis University and Parks College of
Engineering and Aviation, the Department of Computer
Science Computer Science is dedicated to leadership and excel-
ence in its purposes of teaching, scholarship, student counsel-
ing, and service in the discipline of Computer Science. The

David W. Barnett, D.Sc., Chair

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Marcel Roy, Ph.D.

Becky K. Willits, Ph.D.

Ventzeslav Valev, Ph.D., Associate Professor

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Science Computer Science is dedicated to leadership and excel-
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ing, and service in the discipline of Computer Science. The
Department fulfills this mission by offering the Bachelor of Science degree in Computer Science; offering a minor in Computer Science for non-majors; supporting scholarship in Computer Science; and, supporting the computing interests within the College, the University, and the Community.

**Educational Objectives of Departmental Academic Programs and Expected Student Outcomes:**

1. Be able to develop and implement computer solutions to "real-life" problems through careful analysis and design.
2. Be prepared adequately for entry to a graduate program in Computer Science.
3. Acquire and demonstrate adequate knowledge of social, ethical, and legal aspects of computing.
4. Acquire and demonstrate knowledge in the general areas of computer science, including programming languages, computer organization, software engineering, and networking.
5. Acquire and demonstrate adequate knowledge in an allied subject area within the sciences, engineering, mathematics, management, marketing, and/or finance.

**Professional Objectives of Departmental Faculty Members:**

Each faculty member in the Department of Computer Science should:

1. Be able to teach effectively a variety of computer science courses;
2. Be involved continuously in professional activities for purposes of improving in effective teaching, and keeping up-to-date in areas related to normal teaching assignments;
3. Be active in research and scholarly pursuits for the purpose of keeping up-to-date in the field in general;
4. Be available to students outside the classroom for purposes of academic advising and mentoring;
5. Share the results of scholarship with colleagues within the department, the college, the University, and the computing community in general.

**Composition of the Major Programs:**

Both majors will require 123 credit hours, consisting of the following:

- Computer Science Courses: 44 credit hours
- College/University Core: 31 credit hours
- Courses in Science/Mathematical Topics: 32 credit hours
- Allied Electives: 12 credit hours
- Engineering courses: 4 credit hours

**Required Computer Science Courses:**

The Required Computer Sciences courses for both majors are:

- Freshman Computer Science CS-P101: 1 credit hr
- Computing and Society CS-P105: 3 credit hrs
- Introduction to Computer Science CS-P125: 4 credit hrs
- Data Structures CS-P126: 3 credit hrs
- Advanced Data Structures and Algorithms CS-P225: 3 credit hrs
- Advanced Object-Oriented Design CS-P226: 3 credit hrs
- Computer Architecture CS-P231: 3 credit hrs
- Concepts of Programming Languages CS-P310: 3 credit hrs
- Operating Systems CS-P331: 3 credit hrs
- Network Programming CS-P334: 3 credit hrs
- Database Systems CS-P341: 3 credit hrs
- Software Engineering CS-P353: 3 credit hrs

One course from:

- Combinatorics CS-P315: 3 credit hours
- Numerical Analysis I CS-P320: 3 credit hours
- Computer Science Elective: 3 credit hours
- Senior Design Project CS-P490: 3 credit hours

*CS-P315 and CS-P320 will be referred to as CS Theory courses.

**The College/University Core:**

The following courses are required as part of the College/University Core courses for both majors:

- Advanced Writing for Professionals ENGL-A192: 3 credit hours
- Small Group Presentations CMMA-A293: 1 credit hour
- Theological Studies TH-A100: 3 credit hours
- Ethics PL-A205: 3 credit hours
- Humanities Elective: 3 credit hours
- Social/Behavioral Sciences Elective: 3 credit hours
- Cultural Diversity Elective: 3 credit hours
- Non-technical Electives: 12 credit hours

**Required Courses covering Science/Mathematical Topics:**

The Science requirements for both majors will be as follows:

- One-year sequence of introductory courses in Biology, Chemistry, or Physics, each with a laboratory: 8 credit hours
- An additional science course with a laboratory: 4 credit hours
- Calculus I-II MT-A142-3: 8 credit hours
- Elements of Discrete Structures CS-P115: 3 credit hours
- Discrete Probability/Data Analysis CS-P116: 3 credit hours
- Computational Linear Algebra CS-P220: 3 credit hours
- A Science/Math Elective: 3 credit hours

**Allied Electives:**

1. Mathematics: MT-A244, MT-A266, MT-A315, MT-A351
2. Physics/Mathematics: PH-P261, PH-P301, MT-A244, PH-P311
3. Biology/Chemistry: CH-A244, BL-A303, BL-A310, BL-A305-6
4. Business: ACCB220, ECNB190, MGTB212, MGTB300
5. Other: Any other sequence of courses totaling 12 credit hours, approved by the department

**Non-technical Electives:**

- Non-technical electives can only be courses from the humanities, social and behavioral sciences, cultural diversity electives. They may not be courses from computer science, engineering, mathematics, or any of the sciences.

**Engineering Course Requirement:**

1. Digital Systems EE-P205: 3 credit hours
2. Digital Systems Laboratory EE-P206: 1 credit hour

**Computer Science Electives:**

Any CS-P course, numbered 201 or higher in computer science will qualify as a computer science elective for non-majors. Any CS-P course, numbered 301 or higher in computer science will qualify as the senior CS elective course included in the Computer Science curriculum plan for CS majors.
Departmental Practice and Policies:

A list of Computer Science electives available each semester may be obtained from the Department of Computer Science. Normally, a student and his/her advisor will prepare and present the student’s proposed schedule of courses to the Chair of the Department of Computer Science for approval during the student’s fourth semester of study. Students must pay attention to the following departmental policies:

1. D grades are not acceptable in Computer Science core courses and Computer Science minor courses.
2. Not more than one D grade is acceptable in the Mathematics and Science courses required for graduation.
3. Not more than one D grade is acceptable in Computer Science Electives and Allied Electives.

Description of the CS Minor

The Computer Science minor will consist of the following course work:

1. Discrete Structures CS-P115 .......................... 3 cr.
2. Introduction to Computer Science CS-P125 .......... 4 cr.
3. Data Structures and Object-Oriented Programming CS-P126 .... 3 cr.

Any two courses from:
5. Computer Architecture CS-P231 3 cr.
6. Advanced Object-Oriented Design CS-P226 3 cr.

Any one course from:
7. Concepts of Programming Languages CS-P310 3 cr.
8. Combinatorics CS-P315 3 cr.
10. Operating Systems I CS-P331 3 cr.
11. Database Systems I CS-P341 3 cr.
13. Software Engineering I CS-P355 3 cr.
14. Compiler Design CS-P410 3 cr.
16. Artificial Intelligence CS-P442 3 cr.

Typical Course of Study (for both majors)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<td>FRESHMAN YEAR</td>
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<tr>
<td>Freshman Computer Sci.</td>
<td>Computing and Society</td>
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<tr>
<td>Discrete Structures</td>
<td>Discrete Prob. &amp; Data Anal.</td>
</tr>
<tr>
<td>Intro. to CS</td>
<td>Data Structures &amp; O-OP</td>
</tr>
<tr>
<td>Calculus I</td>
<td>Calculus II</td>
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<tr>
<td>Humanities Elective</td>
<td>Adv. Writing for Professionals</td>
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<tr>
<td>Comp. Linear Algebra</td>
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<td>Adv. Data Struct</td>
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<td>&amp; Algorithms</td>
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<tr>
<td>Science I and Laboratory</td>
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<tr>
<td>Digital Sys. Design &amp; Lab.</td>
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<tr>
<td>Theological Foundations</td>
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<tbody>
<tr>
<td>Operating Systems I</td>
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</table>

Database Systems ........................................ 3 cr.
Science III and Laboratory .... 4 cr.
Allied Elective .................. 3 cr.
Total 16  Total 15

SENIOR YEAR

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<td>Senior CS Elective</td>
<td>Software Design Project</td>
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<td>Non-technical Elective</td>
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<td>Total 15</td>
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</table>

TOTAL NUMBER OF CREDIT HOURS: 123

Electrical Engineering

Will Ebel, Ph.D., Chair

Faculty:
William Ebel, Ph.D.
Roobik Gharabagi, Ph.D.
Huliyar S. Mallikarjuna, Ph.D.
Kyle Mitchell, Ph.D.
Habib Rahman, Ph.D.

The Department of Electrical Engineering offers a unique undergraduate program leading to the degree of Bachelor of Science in Electrical Engineering. The department provides a program that incorporates analysis, design and development of electrical and electronic systems, and prepares graduates for entry into the profession as productive and effective engineers.

The program is directed toward sequential development of course work to provide breadth and depth in electrical and electronics engineering. It provides instructions to cover broad areas that include electronics, communication systems, computer systems, control systems, power systems, electromagnetics and signal processing. The program is intended to develop the ability of graduates to apply knowledge of mathematics, sciences and engineering. It ensures that graduates have an opportunity to work on multi-disciplinary teams, and also develop effective communication skills. In addition to a strong focus on computer skills and computer software, the program provides a design experience, which is developed and integrated throughout the program by introducing fundamental elements of design process in course work. The program also includes a two-semester design sequence to provide a meaningful, major engineering design experience that also focuses on professional practice. Several laboratories in the program provide "hands-on" experience. There is also a strong emphasis on the studies of humanities and social sciences that serve not only to fulfill an objective appropriate to the engineering profession but also to meet Saint Louis University’s educational objectives. The overall program provides an integrated educational experience and training to maintain professional competency through life-long learning.

The Electrical Engineering Program at Parks is accredited by the Engineering Accreditation Commission of ABET.

Electrical Engineering (B.S.)

Course of Study

The Electrical Engineering Degree is satisfied by completing one of two concentrations: (1) The Electrical Engineering concentration (EE), and (2) The Computer Engineering concentration (CPE). These two concentrations are identical in all but five courses which are described below.
Humanities/Social Sciences
6 approved courses in the area of humanities and social sciences (18 hours). The courses selected must serve not only to fulfill ABET's "breadth and depth" requirements, but also to meet the institution's core curriculum.

English Placement Examination
ACT/SAT scores, or TOEFL scores for international students, are used to identify students proficiency in written communication in the English language, and to assign students to the appropriate composition/writing courses.

English
2 approved courses in written/oral communication (4 hours) as listed in the typical course of study.

Mathematics Placement Examination
Students without transfer credit for MTA117 Algebra and Trigonometry or MTA120 College Algebra and MTA141 Pre-Calculus must pass a proficiency examination before enrolling in MTA142 Engineering Calculus I.

Mathematics
6 approved mathematics courses (21 hours) as listed in the typical course of study.

Physics
2 approved calculus-based physics courses with laboratories (8 hours) as listed in the typical course of study.

Chemistry
1 approved chemistry course with laboratory (4 hours) as listed in the typical course of study.

Science and Math Elective
1 approved course (3 hours) in life sciences. Earth sciences, computer science, or advanced chemistry, physics, or mathematics. This must not be used to satisfy other curriculum requirements. CpE concentration students must take Data Structures to satisfy this requirement as shown in the typical course of study.

Major and Related Courses

Computer
2 approved course in computer programming (7 hours) as listed in the typical course of study.

Engineering Science
1 approved engineering science course selected from the list of Engineering Science Electives.

EE & CS Electives
EE concentration: 3 approved courses (9 hours) from the list of EE Electives.

CpE concentration: 2 approved courses (6) from the list of EE Electives and 2 approved courses (6) from the approved list of CS Electives

Technical Elective
1 approved course (3 hours) selected from courses in science, mathematics, or engineering, at the 300-level or higher. This 3-credit course must not be used to satisfy other curriculum requirements.

Electrical Engineering
10 approved electrical engineering courses (35 hours) including laboratories, in addition to the EE electives, as listed in the typical course of study.

Concentration Requirements
EE: 4 courses in electrical engineering as shown in the typical course of study providing breadth in the topical areas of energy conversion, controls, lines and waves, and communications.

CpE: 2 courses (6 hours) in electrical engineering as shown in the typical course of study providing breadth in computer systems design and the design of integrated circuits. One additional Computer Science course (3 hours) in Computer Architecture.

Typical Course of Study
Sequence of Courses: Each student’s sequence of courses will vary according to credits taken in high school, ability level, individual preference and career goals. The following chart shows two possible sequences for an entering student with no college credits. The EE identifier represents a Traditional Electrical Engineering concentration course and the CpE identifier represents a Computer Engineering concentration course. Only one concentration is completed to satisfy the Electrical Engineering degree.

First Semester Second Semester

FRESHMAN
CHA-A151 . . . . . . . . . . . . . .3 CS-P115 . . . . . . . . . . . .3
CHA-A152 . . . . . . . . . . . . . .1 MT -A143 . . . . . . . . . . . .4
ENG-A1921 . . . . . . . . . . . . . .3 PH-P161 . . . . . . . . . . . .3
EE -P101 . . . . . . . . . . . . . .1 PH -P162 . . . . . . . . . . . .1
MT-A1422 . . . . . . . . . . . . . .4 TH-A100 . . . . . . . . . . . .3
MT-A143 . . . . . . . . . . . . . .4 Humanities3 . . . . . . . .3
16 17

SOPHOMORE
CMM-A293 . . . . . . . . . . . . . .1 EE-P205 . . . . . . . . . . . .3
CS-P125 . . . . . . . . . . . . . .4 EE-P206 . . . . . . . . . . . .1
EE-P210 . . . . . . . . . . . . . .3 EE-P211 . . . . . . . . . . . .3
MT-A244 . . . . . . . . . . . . . .4 EE-P212 . . . . . . . . . . . .1
PH-P163 . . . . . . . . . . . . . .3 MT-A355 . . . . . . . . . . . .3
PH-P164 . . . . . . . . . . . . . .1 MT-A311 . . . . . . . . . . . .3
16 CS-P126 . . . . . . . . . . . .3

JUNIOR
EE -P301 . . . . . . . . . . . . . .3 EE -P302 . . . . . . . . . . . .3
EE -P303 . . . . . . . . . . . . . .3 EE -P309 . . . . . . . . . . . .3
EE -P305 . . . . . . . . . . . . . .3 EE -P310 . . . . . . . . . . . .1
EE -P306 . . . . . . . . . . . . . .1 EE -P404 or
MT-A403 . . . . . . . . . . . . . .3 CpE: CS-P231 . . . . . . . . . . .3
EE -P307 or . . . . . . . . . . . .3 PL-A205 . . . . . . . . . . . .3
CpE: EE-P311 . . . . . . . . . . . .3 Cultural Div. . . . . . . . . . .3
16 16

SENIOR
EE-P407 or . . . . . . . . . . . . . .3 EE-P408 or
CpE: EE-P419 . . . . . . . . . . . .3 CpE: CS Elective II5 . . . . .3
EE-P490 . . . . . . . . . . . . . .3 EE-P491 . . . . . . . . . . . .3
EE Elective4 or . . . . . . . . . . . .3 Tech Elective5 . . . . . . . . . . .3
CpE: CS Elective I4 . . . . . . . .3
Eng. Sc Elective . . . . . . . . . . . .3 EE Elective4 . . . . . . . . . . . .3
Gen Elective3 . . . . . . . . . . . .3 EE Elective4 . . . . . . . . . . . .3
15 15

Total Credit Hours: 127

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1 Students needing prerequisite work in writing skills as determined by ACT or SAT scores will be required to take an introductory English course prior to taking the Advanced Writing course.

2 Enrollment in Calculus I requires passing a mathematics proficiency exam.

3 Social & Behavioral Science Elective, Humanities Elective, and the General
Elective must be taken from an approved list. These courses provide educational breadth.

4 The EE Electives must be taken from an approved list of Electrical Engineering courses.

5 The CS Elective I and CS Elective II must be taken from an approved list.

6 The Technical Elective must be taken from an approved list.

EE Electives: (partial list)
Spacecraft Communications
Filter Design
Advanced Microprocessors
Antenna Engineering
Radar
Microwaves
Digital Signal Processing
Modern Controls
Physical Electronics
Advanced Filter Design
Image Processing
Computer System Organization
Advanced Digital Systems
System Performance Evaluation
Parallel Processing
VLSI
Special Topics

CS Electives I & II:
Operating Systems I
Operating Systems II
Concepts of Program Languages
Compiler Design
Network Programming
Network Management

Physics
Larry M. Stacey, Ph.D., Chair

Faculty:
Leslie P. Benofy, Ph.D.
Gregory L. Comer, Ph.D.
Vijai V. Dixit, Ph.D.
John C. James, Ph.D.
Martin Nikolo, Ph.D.
Jean Potvin, Ph.D.
Ian H. Redmount, Ph.D.
Thalanayar S. Santhanam, Ph.D.
Larry M. Stacey, Ph.D.
William D. Thacker, Ph.D.

The Department of Physics offers two undergraduate degrees: the Bachelor of Science (B.S.) degree for students enrolled in Parks College and the Bachelor of Arts (B.A.) degree for students in the College of Arts and Sciences. The Department also offers a Minor in Physics, useful primarily to students majoring in mathematics, computer science, engineering fields, and other sciences. Major-minor links between physics and other disciplines provide opportunities for students to acquire valuable analytical and problem-solving skills and to distinguish themselves from others pursuing similar career paths.

The Bachelor of Science Degree

The Bachelor of Science degree stresses undergraduate research and applications of computers in physics, taking advantage of the unique facilities of Parks College within the University. A focused set of electives, the Allied Electives, allow a student to adapt the program to his or her own post-baccalaureate plans.

For example, a student may use these electives to earn a minor in mathematics or some other field, or in nine or ten semesters, to earn a double major in physics and computer science, or physics and engineering. A student might use these electives to prepare for medical school, or for graduate school in physics or some other field.

Requirements of the B.S. Degree

Prerequisites:
PH-P111 Introduction to Physics
CHA-A161 Introduction to Chemistry I/Lab
CS-P125 Computer Science/Lab
PH-P161 Engineering Physics I
PH-P162 Engineering Physics I Lab
PH-P163 Engineering Physics II
PH-P164 Engineering Physics II Lab

Knowledge of Differential and Integral Calculus:
MT-A142 Calculus I
MT-A143 Calculus II
MT-A244 Calculus III

Required Courses:
PH-P261 Modern Physics
PH-P262 Modern Physics Lab
PH-P311 Classical Mechanics
PH-P331 Optics
PH-P351 Analog and Digital Electronics
PH-P412 Electricity and Magnetism I
PH-P461 Quantum Mechanics
MT-A355 Differential Equations
MT-A370 Advanced Mathematics for Engineers
MT-A403 Probability and Statistics for Engineers
CS-P320 Numerical Methods

Two additional courses selected from:
PH-P312 Classical Mechanics II
PH-P422 Electricity and Magnetism II
PH-P462 Applications of Quantum Mechanics

Allied Electives:
Eight courses (24 hours) selected in consultation with advisor.

Research Experience:
PH-P386 Physics Research I
PH-P487 Physics Research II
PH-P488 Physics Research III

College Core:
ENG-A192 Advanced Writing for Professionals
CMM-A293 Small Group Presentation
TH-A100 Theological Foundations
PL-A205 Ethics
Social/Behavioral Science Elective
Humanities Elective
General Elective (Social/Behavioral or Humanities)
Cultural Diversity Elective

Typical Course of Study for the B. S. in Physics:

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH-A161</td>
<td>CS-P125</td>
</tr>
<tr>
<td>ENG-A192</td>
<td>MT-A143</td>
</tr>
<tr>
<td>PH-P111</td>
<td>PH-P161</td>
</tr>
<tr>
<td>Humanities Elective</td>
<td>PH-P162</td>
</tr>
</tbody>
</table>
MT-A152 .................. 4  TH-A100 .................. 5
15 16

SOPHOMORE YEAR

CMM-A293 .................. 1  Allied Elective .................. 5
Allied Elective .................. 3  PH-P311 .................. 5
MT-A244 .................. 4  PH-P261 .................. 5
PH-P163 .................. 4  PH-P262 .................. 1
PH-P164 .................. 1  CS-P320 .................. 5
Social Science Elective .................. 5  MT-A355 .................. 5
16 16

JUNIOR YEAR

PH-P331 .................. 3  MTA-403 .................. 5
PH-P332 .................. 1  Physics Upper
PH-P461 .................. 3  PH-P341 .................. 5
Open Elective .................. 3  PH-P421 .................. 5
Allied Elective .................. 3  PH-P380 .................. 0
MT-A570 .................. 3  Allied Elective .................. 5
16 15

SENIOR YEAR

PH-P351 .................. 4  PL-A205 Ethics .................. 3
Physics Upper  General Elective .................. 3
Division Course .................. 3  Allied Elective
Allied Elective .................. 3  Allied Elective
PH-P487 Physics  PH-P488 Physics
Research III .................. 0  Research III .................. 3
Cultural Diversity Elective .................. 3
16 15

The Bachelor of Arts Degree

The Department of Physics offers a Bachelor of Arts degree for students in the College of Arts and Sciences. This degree prepares liberal arts students for a broad range of careers in which technical and scientific knowledge could be useful. This program is excellent preparation for graduate work in physics or for professional school. The required courses listed below are accompanied by the College of Arts and Sciences core. This degree is conferred by the College of Arts and Sciences.

Requirements of the B. A. Degree

Prerequisites:
PH-P161 Engineering Physics I
PH-P162 Engineering Physics I Lab
PH-P163 Engineering Physics II
PH-P164 Engineering Physics II Lab

Knowledge of differential and integral calculus including:
MT-A142 Calculus I
MT-A143 Calculus II
MT-A244 Calculus III

Required Courses (in addition to core requirements):
PH-P261 Modern Physics
PH-P262 Modern Physics Laboratory
PH-P311 Classical Mechanics
PH-P421 Electricity and Magnetism I
PH-P461 Quantum Mechanics
CH-A161 Introduction to Chemistry I
MT-A351 Differential Equations I
MT-A355 Introduction to Linear Algebra
MT-A451 Introduction to Complex Variables

Additional Requirements:
Two additional upper division physics courses (minimum 6 hours) selected from the Recommended list below. Senior Inquiry may be satisfied by one of the following:
PH-P484 Thesis
PH-P488 Research Project
PH-P489 Comprehensive Examination

Recommended:
Additional upper division courses for students who intend to pursue graduate studies in Physics:
PH-P301 Computational Physics
PH-P312 Advanced Classical Mechanics
PH-P331 Optics
PH-P332 Optics Laboratory
PH-P341 Thermodynamics and Statistical Mechanics
PH-P351 Analog and Digital Electronics
PH-P393 Computers in Science
PH-P422 Electricity and Magnetism II
PH-P462 Applications of Quantum Mechanics

Typical Course of Study for the B. A. in Physics:

FRESHMAN
PH-P161 .................. 3  PH-P163 .................. 3
PH-P162 .................. 1  PH-P164 .................. 1
MT-A142 .................. 4  MT-A143 .................. 4
Core: Foreign Language  Core: Foreign Language
Core: HS-A111 .................. 3  Core: HS-A112 .................. 3
Core: ENG-A190 .................. 3  Core: ENG-A200 Level Lit. .................. 3
17 17

SOPHOMORE
PH-P261 .................. 3  PH-P331 .................. 3
PH-P262 .................. 1  PH-P332 .................. 1
MT-A244 .................. 4  MT-A226 .................. 4
CH-A161 .................. 4  Computer Language 3
Core: PL-A105 .................. 3  Core: TH-A100 .................. 3
15 15
Core: Fine Art .................. 3
16

JUNIOR
PH-P311 .................. 3  PH-P312 .................. 3
PH-P301 .................. 3  PH-P421 .................. 3
MT-A355 .................. 3  PH-P341 .................. 3
MT-A315 .................. 3  PH-P488 .................. 1
Core: PL-A205 .................. 3  PH-P351 .................. 4
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Core: TH-A200 level .................. 3
17

SENIOR
PH-P422 .................. 3  PH-P462 .................. 3
PH-P461 .................. 3  Core: ENG-A300 level Lit. 3
MT-A451 .................. 3  Core: PL-A300/400 level .................. 3
PH-P488 .................. 2  Core: TH-A300 level .................. 3
Core: Social Science .................. 3  Core: Social Science .................. 3
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Physics Minor
(Parks College)

A student enrolled in Parks College of Engineering and Aviation can earn a minor in physics by completing at least 22 hours of physics consisting of:

I. PH-P161 through 164 and PH-P261 (without lab), and
II. Three upper division physics courses numbered between PH-P300 and PH-P470.
Students transferring credit in physics from other universities must as a minimum take three 300/400-level courses at Saint Louis University, selected in consultation with the Physics Department, regardless of courses completed at other institutions.

**Physics Minor**  
*(College of Arts and Sciences)*

A student can earn a minor in physics by completing at least 18 hours of physics consisting of:

I. PH-P161 through PH-P164 and PH-P261-262, and  
II. Two upper division physics courses numbered between PH-P300 and PH-P470.

Students transferring physics credit from other colleges or universities must as a minimum take Modern Physics with laboratory (PH-P261, 262) at Saint Louis University along with at least one 300/400 level course, selected in consultation with the Physics Department.