Parks College of Engineering, Aviation and Technology prepares students for careers in engineering, aviation, technology, physics 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 Flight Science curricula is accredited by the Council on Aviation Accreditation (CAA). The Biomedical Engineering degree program will be seeking an ABET accreditation visit in 2006.

Special Admission Requirements

Admission Requirements

Admission requirements to Parks College of Engineering, Aviation and Technology degree programs are based on a combination of secondary school grades, college admission test scores, co-curricular activities and attempted college course work, as well as other indicators of the applicant's ability and character. This process respects the non-discrimination policy of the University and is designed to select a qualified, competent and diverse student body with high standards of scholarship and character, consistent with the mission of the University.

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:

<table>
<thead>
<tr>
<th>Bachelor of Science</th>
<th>Freshman GPA</th>
<th>Transfer GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>2.50</td>
<td>2.70</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>3.00</td>
<td>2.70</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>2.50</td>
<td>2.70</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>2.50</td>
<td>2.70</td>
</tr>
<tr>
<td>Physics</td>
<td>2.50</td>
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</tr>
<tr>
<td>Bachelor of Arts in Physics</td>
<td>2.50</td>
<td>2.70</td>
</tr>
<tr>
<td>Conferred by College of Arts and Sciences</td>
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</tbody>
</table>

For admission into the above programs it is recommended that a student have 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, Earth Science, Biology, Physics, or Chemistry; two or three Social Sciences - History, Psychology, or Sociology; and three electives.

For admission into the above programs it is recommended that a student have 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, Earth Science, Biology, Physics, or Chemistry; two or three Social Sciences - History, Psychology, or Sociology; and three electives.

Bachelor of Science Freshman Transfer GPA GPA
Aeronautics: Flight Science 3.00 2.50
Electronics Engineering Technology 2.50 2.00
Mechanical Engineering Technology 2.50 2.00
Aeronautics: Aircraft Maintenance Management 2.50 2.00

Admission to Flight Science Program

Enrollment capacity in the Flight Science program may be limited; therefore, early application is strongly encouraged. In addition to meeting the academic requirements for admission, the applicant to any flight science 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.faa.gov/pilots/amelocator/. 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.

Admission to Aircraft Maintenance Management Program

Students admitted to this degree program are expected to have completed or plan to complete the FAA's Mechanical with Airframe and Powerplant certification. The Airframe and Powerplant certification is no longer offered by Saint Louis University, and therefore, a student without the certificate should plan on earning the certificate before applying to graduate with the AMM degree. Students should consult with the Department of Engineering Technology chairperson for complete details.
Math Placement for Entering Students
Math placement exams are required of beginning and transfer students who have not completed a transferable mathematics course before coming to Parks College. The placement exam is used only as a tool along with ACT and SAT test scores and high school math work to determine the appropriate entering math course. The placement exam does not result in credit being awarded.

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 course.
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 not otherwise 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.

Parks College of Engineering, Aviation and Technology - 143

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 (whether currently enrolled or not). Students who receive flight instruction outside the approved curricula without prior approval are subject to dismissal from the program.

Flight fees will be charged in addition to the regular tuition. Please contact the Department for the current rates.

Students with prior flight experience/certification will be evaluated for proficiency at the corresponding flight certification level. Based on the results of such evaluation, the Director of Flight Training will recommend either some remedial training or continuation to the next level of training. Ground school courses completed at a Part 141 flight school may be transferable; those completed at a Part 61 flight school may not be transferable. Early consultation with the Department Chair and/or the Director of Flight Training is strongly recommended.

TSA Requirements
The Transportation Security Administration (TSA) requires any individual applying for flight training to provide proof of citizenship prior to beginning the training. New student pilots will be unable to begin flight training until the proof of citizenship requirement is met. Pilots typically provide 1) the individual's valid, unexpired U.S. passport or 2) the individual's original or government-issued certified U.S. birth certificate, together with a government-issued picture identification of the individual. Other TSA-specified documents may be accepted.

Non-U.S. citizens must receive TSA approval prior to beginning any flight training. Please contact the Flight Training Director's office for additional information.

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 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 exami-
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 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 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. 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.
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 pre-registration 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, Aviation and Technology 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 or Program Director for guidance in choosing core curriculum courses.

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.)
Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). The undergraduate curriculum is professionally accredited by the Commission on Engineering Education and Accreditation of the Accreditation Board for Engineering and Technology. The Aerospace Engineering program has the following objectives:

1. To prepare our graduates for employment as entry-level engineers and /or to pursue graduate degrees.
2. To provide students with the current knowledge and skills necessary to become practicing aerospace engineers and an awareness of professional development.
3. To provide an education that will allow aerospace engineering students to understand their career in the broader societal and ethical context.

Aerospace Engineering (B.S.)

The Aerospace Engineering program has the following objectives:

1. To prepare our graduates for employment as entry-level engineers and /or to pursue graduate degrees.
2. To provide students with the current knowledge and skills necessary to become practicing aerospace engineers and an awareness of professional development.
3. To provide an education that will allow aerospace engineering students to understand their career in the broader societal and ethical context.

Aerospace & Mechanical Engineering

Krishnaswamy Ravindra, Ph.D., P.E., Chair

Faculty:
Richard M. Andres, Ph.D., P.E., Professor Emeritus
Patricia A. Benoy, Ph.D.
Lawrence G. Boyer, M.S.
Sridhar Condoor, Ph.D., Program Director, Mechanical Engineering
Paul A. Czyz, B.S., Professor Emeritus
Marly A. Ferman, Ph.D., P.E.
Russell P. Fitzgerald, Ph.D.
John A. George, Ph.D., Professor Emeritus
Sanjay Jayaram, Ph.D.
Swami N. Karunamoorthy, D.Sc.
Ray N. Nitsche, Ph.D., P.E., Associate Professor Emeritus
Krishnaswamy Ravindra, Ph.D., P.E.

Aerospace Engineering (B.S.)

The Aerospace Engineering program has the following objectives:
1. To prepare our graduates to work as entry-level engineers and /or pursue higher education.
2. To provide an education to prepare students with the contemporary knowledge and skills necessary to become practicing aerospace engineers and an awareness of professional development.
3. To provide an education that will allow aerospace engineering students to understand their career in the broader societal and ethical context.

To this end, the design process, as exemplified by the assignment of open-ended problems, is experienced in nearly all engineering courses. 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 understand their career in the broader societal and ethical context.

Excellent laboratory and/or open-ended problem-solving experiences in nearly all aerospace engineering courses.

A comprehensive open-ended design project is conducted by the AIAA.

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

Typical Course of Study

First Semester .................................. Second Semester

FRESHMAN
CHEM 161 .................................. 4 CSCI 140 .................................. 3
ENGL 192 .................................. 3 ESCI 102 .................................. 1
ESCI 101 .................................. 2 MATH 143 .................................. 4
MATH 142 .................................. 4 PHYS 161 .................................. 3
THEO 100 .................................. 3 PHYS 162 .................................. 1
.................................. 16 Humanities/Soc Sci .................. 3

SOPHOMORE
AENG 201 .................................. 1 AENG 200 .................................. 3
CM M 293 .................................. 1 EENG 201 .................................. 3
ESCI 210 .................................. 3 EENG 202 .................................. 1
ESCI 220 .................................. 3 ESCI 211 .................................. 3
MATH 244 .................................. 4 ESCI 322 .................................. 3
PHYS 163 .................................. 3 ESCI 323 .................................. 1
PHYS 164 .................................. 1 MATH 355 .................................. 3
.................................. 16 17

JUNIOR
AENG 320 .................................. 3 AENG 310 .................................. 3
ESCI 310 .................................. 4 AENG 311 .................................. 3
ESCI 311 .................................. 1 AENG 322 .................................. 3
ESCI 330 .................................. 3 AENG 330 .................................. 3
MATH 370 .................................. 3 ESCI 430 .................................. 3
MATH 430 .................................. 3 MATH 435 .................................. 3
.................................. 16 18

SENIOR
AENG 410 .................................. 3 AENG 355 .................................. 3
AENG 411 .................................. 1 AENG 451 .................................. 3
AENG 420 .................................. 3 Cultural Diversity .......................... 3
AENG 430 .................................. 3 Tech. Elective ................................. 3
AENG 450 .................................. 3 Tech. Elective ................................. 3
PHYS 340 .................................. 3 .................................. 15
.................................. 16

Total credit hours: 129

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

Mechanical Engineering (B.S.)

The Mechanical Engineering program has as its objectives:
1. To prepare our graduates for employment as entry-level engineers and /or pursue graduate degrees.
2. To provide students with the current knowledge and skills necessary to become practicing mechanical engineers and to pursue further professional development.
3. To provide an education that will allow mechanical engineering students to understand their careers within the broader societal and ethical context.

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, 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).

Students are encouraged to participate in the activities of the student chapter of the American Society of Mechanical Engineers (ASME) and to enter the regional and national technical paper and design competition conducted by the ASME.

### Typical Course of Study

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td><strong>FRESHMAN</strong></td>
<td></td>
</tr>
<tr>
<td>C H E M 161</td>
<td>C S C I 140</td>
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<tr>
<td>E N G L 192</td>
<td>E S C I 102</td>
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<tr>
<td>E S C I 101</td>
<td>M A T H 143</td>
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<tr>
<td>M A T H 142</td>
<td>P H Y S 161</td>
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<tr>
<td>T H E O 100</td>
<td>P H Y S 162</td>
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<tr>
<td></td>
<td>Humanities/Soc Sci</td>
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<td>16</td>
</tr>
<tr>
<td><strong>SOPHOMORE</strong></td>
<td></td>
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<tr>
<td>C M M 293</td>
<td>E E N G 201</td>
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<tr>
<td>E S C I 210</td>
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</tr>
<tr>
<td>E S C I 220</td>
<td>E S C I 310</td>
</tr>
<tr>
<td>M E N G 201</td>
<td>E S C I 311</td>
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<tr>
<td>M A T H 244</td>
<td>M A T H 403</td>
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<tr>
<td>P H Y S 163</td>
<td>M E N G 200</td>
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<td>P H Y S 164</td>
<td>M E N G 335</td>
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<td><strong>JUNIOR</strong></td>
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<tr>
<td>E S C I 211</td>
<td>E S C I 330</td>
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<td>E S C I 322</td>
<td>M E N G 337</td>
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<td>E S C I 323</td>
<td>M E N G 339</td>
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<tr>
<td>M E N G 345</td>
<td>M E N G 351</td>
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<tr>
<td>M A T H 355</td>
<td>M E N G 365</td>
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<tr>
<td>P H I L 205</td>
<td>M A T H 370</td>
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<td>16</td>
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<tr>
<td><strong>SENIOR</strong></td>
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<tr>
<td>E S C I 430</td>
<td>Cultural Diversity</td>
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<tr>
<td>M E N G 355</td>
<td>M E N G 445</td>
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<tr>
<td>M E N G 425</td>
<td>M E N G 451</td>
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<tr>
<td>M E N G 444</td>
<td>Tech. Elective</td>
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<tr>
<td>M E N G 450</td>
<td>Tech. Elective</td>
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<tr>
<td>P H I L 340</td>
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<td>15</td>
</tr>
</tbody>
</table>

Total credit hours: 129

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

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### Aviation Science

**Manoj S. Patankar, Ph.D., Chair**

**Faculty:**
- Stephen M. Belt, M.A.
- Bruce D. Hoefer, M.S.
- John J. Goglia, M.BA
- Jiao Ma, Ph.D.
- Manoj S. Patankar, Ph.D.
- James M. Seiesta, S.J., M.S., M.A.

#### Mission of the Department

The mission of the Department is to actively engage in the fulfillment of the University's mission so that our students are formed as global citizens who are intellectually, technically, and ethically prepared to be responsible leaders in their profession and their community.

#### Degree Programs

The Department of Aviation Science offers a Bachelor of Science in Aeronautics degree program with a concentration in Flight Science (FSCI).

#### Flight Science (B.S. in Aeronautics)

Parks College is first federally certificated flight school in the country and it is the only Jesuit University with a flight program. Students of our Flight Science program have the opportunity to experience state-of-the-art learner-centric instruction; be trained in a performance-based flight instruction environment; and earn one-year's actual flight instruction experience prior to graduation or minor in a variety of other disciplines. Upon graduation, our alumni become part of a community of leaders who will continue their professional development through a unique structured mentoring program that continues long after graduation.

The Flight Science program has flight courses integrated with science and advanced aviation subjects and it prepares the graduates for entry-level positions in charter, corporate, or airline flight operations. Flight instruction is regulated by a Federal Aviation Regulations Part 141 approved syllabus.

The goal of the Flight Science program is not only to prepare our students to fly an aircraft, but also to prepare them as socially responsible leaders who have strong foundation in technical skill and are equipped with sufficient breadth of experiences in liberal arts and sciences that they are prepared for life.

The Department offers flight instruction at its Center for Aviation Sciences at the St. Louis Downtown Airport in Cahokia, Illinois. A fleet of Tampico T B-9 single-engine aircraft, Piper Seminole PA-44 twin-engine aircraft, and several flight training devices (simulators) are available for instruction.

#### Typical course of study

<table>
<thead>
<tr>
<th>First Semester</th>
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<tr>
<td><strong>FRESHMAN</strong></td>
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<tr>
<td>A S C I 101</td>
<td>M A T H 142</td>
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<tr>
<td>F S C I 130</td>
<td>P H I L 105</td>
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<tr>
<td>E N G L 150</td>
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<td>M A T H 141</td>
<td>C M M 120</td>
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<td>P P 110</td>
<td>P P 153</td>
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<td>P P 120</td>
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<td>17</td>
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</tbody>
</table>
Biomedical Engineering

David W. Barnett, D.Sc., Chair

Faculty:
David W. Barnett, D.Sc.
Gary Bledsoe, Ph.D.
Cheryl Miller, Ph.D.
Cecil W. Thomas, Ph.D.
Rebecca K. Willits, Ph.D.

Biomedical Engineering (B.S.)
The Department of Biomedical Engineering (BME) offers an undergraduate degree program that combines math, chemistry, and physics, as well as biology-physiology to form a unique engineering discipline. The first two years build a strong foundation of basic sciences and liberal arts, with introductory engineering. In the next two years, courses and labs build on the basic sciences and math to provide a focus of integrative courses in Biomedical Engineering. The BME courses span a range of subspecialties, including biomechanics, biomaterials, biosignals, biomresearments, and biotransport. Within these courses, topics may address problems in areas like cardiology, orthopedics, neurobiology, biology, or psychology. Students develop research and design skills in courses and laboratories throughout the curriculum, 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 specific 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 ............................ 11
- Probability & Statistics ............ 3
- Thermodynamics & Statistical Mechanics 3

### BASIC ENGINEERING
- Mechanics .......................... 3
- Circuits ............................. 4
- Engineering Shop .................. 1

### COMMUNICATIONS
- Advanced Strategies of Rhetoric .... 3
- Small Group Presentations ....... 1

### PHILOSOPHY & THEOLOGY
- Theological Foundations ............ 3
- Ethics ............................... 3
- Humanities ........................ 3
- Cultural Diversity .................. 3
- Social & Behavioral Sciences .... 3
- Non-Technical Elective ............ 3
The Electrical Engineering Program at Parks is accredited by the Accrediting Board of Engineering and Technology (ABET). It ensures that graduates have an opportunity to develop and integrate 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 Accrediting Board of Engineering and Technology (ABET).
Electrical Engineering
11 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 (12 hours) 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 plus 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 EENG 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
CHEM 161 ...............4 MATH 135 ...............3
CHEM Lab ...............0 MATH 143 ...............4
ENGL 1921 ...............3 PHYS 161 ...............3
EENG 101 ...............1 PHYS 162 ...............1
MATH 1422 ...............4 Soc & Beh Sc1 ...........3
THEO 100 ...............3 Humanities3 ...........3

          15                17

SOPHOMORE
CM M 293 ...............1 EENG 205 ...............3
CSCI 150 ...............4 EENG 206 ...............1
EENG 210 ...............3 EENG 211 ...............3
MATH 244 ...............4 EENG 212 ...............1
PHYS 163 ...............3 MATH 355 ...............3
PHYS 164 ...............1 MATH 311 ...............3

          16                16
Science or Math Elective or
CpE: CSCI 180 ...........3

          17

JUNIOR
EENG 301 ...............3 EENG 302 ...............3
EENG 303 ...............3 EENG 309 ...............3
EENG 305 ...............3 EENG 310 ...............1
EENG 306 ...............1 EENG 404 or
MATH 403 ...............3 CpE: CSCI 224 ...........3
EENG 307 or ............3 PHIL 205 ...............3
CpE: EENG 311 ...........3 Cultural Div7. ...........3

          16                16

SENIOR
EENG 407 or ........... EENG 403 or
CpE: EENG 419 ........... CpE: CSCI Elec II5 ........
EENG 490 ...............3 EENG 491 ...............3
EENG Elec1ve4 or Tech Elec6ve6 ...........3
CpE: CSCI Elective15 ........ EENG Elec1ve4 ...........3
Eng. Sc Elective8 ........ EENG Elec1ve4 ...........3
Gen Elective3 ...........3

          15

Total Credit Hours: 127

Parks College of Engineering, Aviation and Technology - 149

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.

7. Must not be used to satisfy another core requirement.

8. Must be taken from list of Engineering Science courses.

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
VLSI
Special Topics

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

Engineering Technology
Beshara I. Sholy, Ph.D., Chair

Faculty:
Sauvik Banerjee, Ph.D.
Terrence K. Kelly, B.S.
Armineh Khalili, M.S.
Stephen G. Magoc, M.B.A.
Beshara I. Sholy, Ph.D.
Alan J. Stolzer, Ph.D.

Mission of the department
Within the context of the missions of Saint Louis University and Parks College, the mission of the Department of Engineering Technology is to support excellence in education by promoting teaching, research, and scholarship. The Department is dedicated to the education of leaders that will contribute to the discovery of knowledge and who will in turn promote and disseminate such knowledge consistent with, Jesuit values, and intellectual ideals of Saint Louis University.
Degree Programs
The department offers the Bachelor of Science in Electronics Engineering Technology (EET), the Bachelor of Science in Mechanical Engineering Technology (MET), and the Bachelor of Science in Aeronautics with a concentration in Aircraft Maintenance (AMM). The department offers optional tracks in Aerospace Technology and Avionics to complement the MET and EET curricula respectively.

Electronics Engineering Technology (B.S.)
The Electronics Engineering Technology Program (EET) prepares graduates for careers in design, development, testing and the manufacturing of electronic and computer systems. The EET program covers selected subjects from a broad range of topics. These topics include, but are not limited to, theory and application of electricity, electronics, electrical machinery, digital systems, microprocessor-computer systems, instrumentation, automation systems, control systems, communications systems, telecommunications, and information technology. Combinations of the foregoing topics provide depth of knowledge in key areas such as automation and controls and aviation electronics-avionics. Typically, EET programs concentrate on a subset of these topics that are appropriate for regional employment. Students learn both design and practical applications in an environment that includes ample hands-on laboratory work. EETs on the Avionics Technology track are capable of gaining employment in the aerospace industry in support of the design, manufacture, modification and maintenance of aerospace avionics systems.

The undergraduate EET degree consists of a core of general studies, humanities, mathematics, sciences, theories of engineering electronics technology, and a vast laboratory practicum. The degree program offers an optional track in the theory and applications of Avionics. Students enrolled in this degree program should complete the outlined schedule; a minimum of 126 semester credit hours are needed to earn the B.S. degree in EET and EET-Avionics Track.

Typical Course of Study

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<thead>
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<th>Second Semester</th>
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<tr>
<td>EET 305-6</td>
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The Avionics track course work will be similar to the EET as listed above with substitutes in the Junior and Senior years as follows:

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<thead>
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<tbody>
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<td>CM M A 120</td>
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Total Credit Hours: 126

*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. Humanistic courses shall be chosen from Fine Arts, Literature, History, or Foreign Language. At least one of the selected Humanistic courses should satisfy the Cultural Diversity requirement. The Cultural diversity courses shall be chosen from the list of courses provided by the College of Arts and Sciences, during each semester.

**Electives are to be selected and approved by the department.**
**Mechanical Engineering Technology (B.S.)**

The Mechanical Engineering Technology program prepares students for challenging and rewarding careers as engineering technologists employed in the product development and manufacturing processes of an ever-expanding variety of mechanical systems and processes. The Mechanical Engineering Technology Program educates students in the theory and applications of mechanical design. Mechanical design is the process of developing a product or system that may impact the quality of life in our society.

Mechanical Engineering Technologists are involved in almost every area of your life, including vehicle design, medicine, robotics, high tech materials and computers. The Mechanical Engineering Technology program with an option in Aerospace Technology prepares students for challenging and rewarding careers as mechanical engineering technologists employed in the aerospace industry supporting the design and manufacture of, and the modification and repair of aircraft and aerospace vehicles.

A graduate of the MET program will be capable of applying skills in areas such as equipment development, manufacturing, design and development, production, testing and operation of prototypes as well as existing mechanical systems. METs with the Aerospace Technology option are can gain employment in the aerospace industry supporting the design, manufacturing, modification and repair of aircraft and aerospace vehicles.

**Typical Course of Study**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td><strong>FRESHMAN</strong></td>
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<td>ENG 150</td>
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</table>

Total Credit Hours: 125

*Electives are to be selected and approved by the department.

**Aircraft Maintenance Management (B.S. in Aeronautics)**

The AMM program is open to those that hold the Federal Aviation Administration's Airframe and Powerplant Certificate or intend to earn the certificate prior to graduation. The Aircraft Maintenance Management Program (AMM) prepares the graduate for careers as qualified maintenance technicians who are also educated in business and management skills. Graduates of this program are qualified to provide technical guidance for general maintenance, overhaul, repair, and modification of aircraft and aerospace vehicles. They are qualified for first-level supervisory positions leading to management roles with airlines, aircraft manufacturers and fixed base operators. The student, prior to graduation, must earn the FAA Airframe and Powerplant Certificate.
Typical course of study

Credit hours received for holding a valid FAA Airframe and Powerplant Certificate: 48

First Semester  Second Semester
REMAINING SOPHOMORE
AS 100  . . . . . . . . . . . . . . . . . .2
CM M 293  . . . . . . . . . . . . . . . .1
ENGL 150  . . . . . . . . . . . . . . . .3
MIS 200  . . . . . . . . . . . . . . . . .3
MATH 120  . . . . . . . . . . . . . . . .3
PSY 101  . . . . . . . . . . . . . . . . .3
15

JUNIOR
ECON 190 . . . . . . . . . . . . . . . . .3  AMM 325  . . . . . . . . . . . .2
ENGL 192  . . . . . . . . . . . . . . . . .3  MATH 132  . . . . . . . . . . . .3
AM M 301  . . . . . . . . . . . . . . . . .3  MG T 218  . . . . . . . . . . . .3
MATH 141  . . . . . . . . . . . . . . . . .3  MK T 300  . . . . . . . . . . . .3
THEO 100  . . . . . . . . . . . . . . . . .3  PHYS 135  . . . . . . . . . . . .4
15 15

SENIOR
AMM 320  . . . . . . . . . . . . . . . . .3  AM GT 405  . . . . . . . . . . . .3
DSCI 207 . . . . . . . . . . . . . . . . .3  AM M 405  . . . . . . . . . . . .3
MG T 300  . . . . . . . . . . . . . . . . .3  Humanities  . . . . . . . . . . . .3
PHIL 205 . . . . . . . . . . . . . . . . .3  MG T 410  . . . . . . . . . . . .3
Humanities  . . . . . . . . . . . . . . . . .3  AM M 429  . . . . . . . . . . . .3
15 15

Total Credit Hours: 123

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

Physics

William D. Thacker, 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 Nikol, 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 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, allows 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 some other field, a double major in physics and mathematics, or, in nine or ten semesters, to earn a double major in physics and engineering, or computer science. A student might use these electives to prepare for graduate school in physics or a related field, or for medical school.

Requirements of the B.S. Degree

Prerequisites:

PHYS111 Introduction to Physics
CHEM161 Introduction to Chemistry I/Lab
CSCI145 Scientific Programming
PHYS161 Engineering Physics I
PHYS162 Engineering Physics I Lab
PHYS163 Engineering Physics II
PHYS164 Engineering Physics II Lab

Knowledge of Differential and Integral Calculus:

MATH142 Calculus I
MATH143 Calculus II
MATH244 Calculus III

Required Courses:

PHYS261 Modern Physics
PHYS262 Modern Physics Lab
PHYS311 Classical Mechanics
PHYS331 Optics
PHYS332 Optics Laboratory
PHYS341 Thermodynamics and Statistical Mechanics
PHYS351 Analog and Digital Electronics
PHYS421 Electricity and Magnetism I
PHYS461 Quantum Mechanics
MATH355 Differential Equations
MATH370 Advanced Mathematics for Engineers
MATH403 Probability and Statistics for Engineers
CSCI320 Numerical Methods

Two additional courses selected from:

PHYS312 Classical Mechanics II
PHYS422 Electricity and Magnetism II
PHYS462 Applications of Quantum Mechanics

Allied Electives:

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

Research Experience:

PHYS386 Physics Research I
PHYS487 Physics Research II
PHYS488 Physics Research III

College Core:

ENGL192 Advanced Writing for Professionals
CM M 293 Small Group Presentation
THEO100 Theological Foundations
PHIL205 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:

First Semester  Second Semester
FRESHMAN YEAR
CHEM 161  . . . . . . . . . . . . . . . . . .4  CSCI145  . . . . . . . . . . . .3
ENGL192  . . . . . . . . . . . . . . . . . .3  MATH 143  . . . . . . . . . . . .4
PHYS111  . . . . . . . . . . . . . . . . . .1  PHYS161  . . . . . . . . . . . .4
Humanities Elective  . . . . . . . . . . . .3  PHYS162  . . . . . . . . . . . .1
MATH 152  . . . . . . . . . . . . . . . . . .4  THEO100  . . . . . . . . . . . .3
15 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 requirements 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:
- PHYS161 Engineering Physics I
- PHYS162 Engineering Physics I Lab
- PHYS163 Engineering Physics II
- PHYS164 Engineering Physics II Lab

Knowledge of differential and integral calculus including:
- MATH142 Calculus I
- MATH143 Calculus II
- MATH244 Calculus III

Required Courses (in addition to core requirements):
- PHYS261 Modern Physics
- PHYS262 Modern Physics Laboratory
- PHYS311 Classical Mechanics
- PHYS342 Electricity and Magnetism I
- PHYS346 Quantum Mechanics
- CHEM161 Introduction to Chemistry I
- MATH351 Differential Equations I
- MATH315 Introduction to Linear Algebra
- MATH451 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:
  - PHYS484 Thesis
  - PHYS488 Research Project
  - PHYS489 Comprehensive Examination

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

FRESHMAN

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SOPHOMORE

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JUNIOR

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SENIOR

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<tr>
<td>Core: PHIL upper div</td>
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<td>Core: Social Science</td>
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<td>Senior Core</td>
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Recommended:

Additional upper division courses for students who intend to pursue graduate studies in Physics:
- PHYS312 Advanced Classical Mechanics
- PHYS331 Optics
- PHYS332 Optics Laboratory
- PHYS431 Thermodynamics and Statistical Mechanics
- PHYS435 Analog and Digital Electronics
- PHYS422 Electricity and Magnetism II
- PHYS462 Applications of Quantum Mechanics

Physics Minor (Parks College)

A student enrolled in Parks College of Engineering, Aviation and Technology can earn a minor in physics by completing at least 18 hours of physics consisting of:

I. PHYS161 through 164 and PHYS261, and
II. Three upper division physics courses numbered between PHYS300 and PHYS470.

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. PHYS161 through 164 and PHYS261-262, and
II. Two upper division physics courses numbered between PHYS300 and PHYS470.
Students transferring physics credit from other colleges or universities must as a minimum take Modern Physics with laboratory (PHYS261, 262) at Saint Louis University along with at least one 300/400 level course, selected in consultation with the Physics Department.