

PARKS COLLEGE OF ENGINEERING, AVIATION, AND TECHNOLOGY

Theodosios Alexander, Sc.D.

Dean

Riyadh Hindi, Ph.D., P.Eng.

Director of Graduate Programs

Consistent with the mission of Saint Louis University, the mission of Parks College of Engineering, Aviation, and Technology (Parks College) is to prepare students to advance the frontiers of knowledge and technical expertise in engineering and aviation while instilling within them good ethical and professional character.

History

Oliver L. Parks founded Parks College, the first federally certified school of aviation in the United States, in 1927 in Cahokia, Illinois. After establishing a strong aviation program, the school's founder entrusted his legacy to Saint Louis University in 1947. Now, Parks College offers a variety of engineering and aviation programs.

Program Objectives

The Parks College post-baccalaureate engineering and aviation programs are organized around a unique curriculum that prepares students with a solid theoretical and practical foundation to become effective leaders in all facets of their chosen discipline. By involving students in fundamental and applied research, encouraging collaboration across departments, and partnering within and outside institutions and organizations, Parks College of Engineering and Aviation students gain a rich education in their chosen discipline. The college offers Master of Science and Doctoral of Philosophy degrees in the areas of Aerospace and Mechanical Engineering, Biomedical Engineering, Civil Engineering, Electrical and Computer Engineering, and Aviation Science. For more information, please visit Parks Graduate Programs webpage at parks.slu.edu/grad

The dedicated Parks College faculty and staff are prepared to mentor, guide, and support your education activities. Your program will be uniquely structured to provide a multi-disciplinary approach, curriculum design flexibility, and customized research opportunities to meet your specific career goals. Innovation and leadership will be emphasized throughout, producing highly-skilled professionals, well-prepared to pursue careers at multi-national firms, competitive government agencies, or prestigious academic institutions.

In parallel with these objectives and reflective of its mission, Saint Louis University also strives to engage its students in five interrelated dimensions: scholarship and knowledge; intellectual inquiry; community building; leadership and service; and spirituality and values. Graduates will be a part of the future workforce finding ethical solutions, meeting the needs of the society with emerging technologies, and educating leaders who are aware of their impact on the surrounding world from technical and ethical perspectives.

Criteria for Admission

Submission Deadlines: Complete applications must be submitted by January 31st for financial aid (fellowships or graduate research assistantships) for the Fall Semester.

Regular admission applications (without financial aid) must be submitted by June 30th for the Fall Semester or November 30th for the Spring Semester.

Criteria for Acceptance

A four-year undergraduate degree in engineering or a related field may be appropriate for admission to the engineering program. A four-year undergraduate degree in aviation or a related field may be appropriate for admission to the aviation program.

Admission Requirements:

1. Online application at www.slu.edu/graduate-admission-home/apply-now
2. Non-refundable application fee of \$55
3. Official GRE quantitative score
4. Official transcripts of all previous degrees
5. Three letters of recommendation & three Personal Potential Index (PPI) scores
6. Curriculum Vitae (CV)
7. Professional goals statement
8. Evidence of English language proficiency (when native language is not English) -
9. Minimum scores: TOEFL PBT 550, TOEFL IBT 80, or IELTS 6.5

Master of Science

The Master's Degree (M.S.) requires minimum of 30 credits beyond a Bachelor's degree. For students pursuing the research option, 6 of the total credits to the degree must be in Thesis Research. For students pursuing the project option, 3 of the total credits to the degree must be devoted to carrying out a project, approved by students' Faculty Advisor. Up to 12 credits may be transfer credits. Students are expected to maintain a cumulative grade point average (GPA) of 3.0; lower GPA may result in probationary status and/or dismissal from the program due to unsatisfactory academic performance. Lastly, all students are required to enroll each semester until degree is received.

M.S. students prepare a program of study that must be approved by his/her Faculty Advisor, department chair, and the Parks College Graduate Programs Director. This program of study is developed within the context of background and career goals of students allowing them to customize their program to suit their professional goals.

Course only option

Prior to registration, an admitted student, in consultation with his/her Faculty Advisor, will prepare a program of study. The program of study should include tentative courses to fulfill the requirement of 30 credits for an M.S. Degree.

Project Option

Prior to registration, an admitted student, in consultation with his/her faculty advisor, will prepare a program of study with tentative courses, to be taken over the course of the coming semesters, to fulfill the minimum of 30 credits required for an M.S. Degree. Three of the total credits will be dedicated to a project. Students' project details could be decided at a later date, in consultation with their Faculty Advisor.

Research Thesis Option

First Semester in the M.S. Program

In the first semester, M.S. students will begin taking courses as indicated in the program of study. In parallel, students may also begin research in an identified research area, under the guidance of a Faculty Advisor.

The Faculty Advisor and students will form a **Guidance Committee** of at least three members. The Committee members should be persons who will likely provide expertise and guidance that will assist students in research. At least one member, besides the Faculty Advisor, must be in the home department of students. If the Faculty Advisor is in another department, then one Guidance Committee member in the home department will be designated as the Guidance Committee Chair.

Thesis Proposal

Students prepare a Thesis Proposal before the end of the first year activities. The title and outline for this proposal are approved by the Guidance Committee and reported on the *Thesis Proposal/Prospectus for Master of Science form*. After completing the thesis proposal, students meet with the Guidance Committee at least once every semester.

Thesis Defense

An oral Thesis Defense must be completed before graduation. The Defense typically includes a seminar that is open to the public. Following the open session, students and Guidance Committee discussion continues in a closed session. A written Thesis report is submitted ~4 weeks prior to the oral defense.

Based on the Defense, the Guidance Committee may:

- (1) Approve the Thesis,
- (2) Conditionally approve, with specific instructions on revisions to the Thesis document, or
- (3) Not approve the Thesis.

The Guidance Committee conveys the decision to the Department Chair and the Director of Graduate Programs.

Independent Studies and Special Topics Courses:

For all independent studies and special topics courses an outline of the topic(s) covered and students' evaluation process must be submitted and approved by the Faculty Advisor prior to registration.

Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) programs focus on a specific research topic. The students are expected to conduct original academic research that culminates in a dissertation and peer-reviewed publications. Additional coursework related to the chosen research area is also required.

Ph.D. students prepare a program of study that must be approved by his/her Faculty Advisor, Department Chair, and the Director of Graduate Programs. This program of study is developed and then reviewed within the context of students' background and career goals, allowing students to customize their program to suit their professional goals.

The Engineering Ph.D. degree requires a total of 60 credits beyond the Bachelor's degree with a minimum of 36 credits of coursework and a minimum of 12 credits of dissertation research. Of the 60 credits limited number of courses may be comprised of coursework at the 400 level; all other course credits must be at the 500 or 600 level. Those students who earn a Master of Science degree may include the associated Master of Science degree coursework credits, but not the thesis or project credits, in the 60 credits which are needed for the Ph.D. degree.

The Aviation Ph.D. degree requires a total of 63 credits beyond the Bachelor of Science degree, including a minimum of 12 credits of dissertation. The curriculum will include a minimum of 24 credits comprised of at least 12 credits of coursework in research methodologies and 12 credits in a secondary discipline intended to compliment knowledge of aviation. Students will work with their advisor and Ph.D. committee to determine the specific coursework to complete the program. Those students holding an appropriate Master of Science degree may include a maximum of 27 credits of the associated Master of Science degree course credits, but not the thesis or project credits, in the 63 credits required for the Ph.D. degree.

First Semester in Ph.D. Program

In the first semester, Ph.D. students will begin taking courses as indicated in the program of study. In parallel, students may also begin research in an identified research area under the guidance of a Faculty Advisor.

The Faculty Advisor and students will form a Guidance Committee of at least five members. The Committee members should be persons who will likely provide expertise and guidance that will assist students in their research. At least two members, besides the Faculty Advisor must be in students' home department. If the Faculty Advisor is in another department, then one Guidance Committee member in the home department will be designated as the Guidance Committee Chair.

Qualifying Exam

A qualifying exam will be administered according to the expectations of the academic discipline. For example, in engineering a qualifying exam may be administered relatively early in the doctoral studies. In aviation, the qualifying exam is structured to assess comprehensive knowledge of the discipline after all or nearly all of academic work has been completed and thus, it is administered closer to the completion of the degree.

The student's Guidance Committee will advise students on preparation for the Qualifying Exam. Ideally, the Guidance Committee will continue after the Qualifying Exam and through the dissertation research.

The Qualifying Exam is designed to determine if students are prepared to continue Ph.D. studies. Normally, it is a written exam, with the option for follow-up with an oral exam. The details of the exam are determined by the home department.

Qualifying examinations are arranged and administered by the home department. The result of the exam may be a pass, no-pass, or conditional-pass. The conditional-pass will normally require that students correct specific weaknesses, with appropriate modifications to the plan of study.

Qualifying exam procedures can be accessed at the Parks College Graduate Programs website. <http://parks.slu.edu/academics/grad-programs/doctoral-degree-programs/>

Dissertation Proposal Exam

Typically, after a year following the Qualifying Exam, students will present and defend a Dissertation Proposal. This Exam is based on their written proposal, and their oral defense of the proposal. Both components will be evaluated by the Guidance Committee.

Doctoral Candidate status will be given to students after successful passage of the oral defense of the dissertation proposal.

Dissertation Defense

At a time selected by students and the Guidance Committee, the doctoral candidates present the dissertation research in both written and oral format. The Defense typically includes a seminar that is open to the public. Following the open session, students and Guidance Committee continues the discussion in a closed session.

Based on the Defense, the Guidance Committee may: (1) approve the Dissertation, (2) conditionally approve, with specific instructions on revisions to the Dissertation document, or (3) not approve the Dissertation.

Independent Studies and Special Topics Course:

For all independent studies and special topics courses, an outline of the topic(s) covered and the evaluation process must be submitted and approved by the mentor/advisor of students prior to registration.

Annual Progress Review

Admitted students are expected to meet with their Faculty Advisors at least once each semester. Students must have their Faculty Advisor's permission to enroll in new academic work in anticipation of a new academic term.

For all M.S. and Ph.D. students, an annual progress review must be evaluated and completed in consultation with the Faculty Advisor and submitted to a respective Department Chair or the Graduate Programs office.

Annual review form may be found at Parks College Graduate Programs website or at the office of the Graduate Programs Director.
<http://parks.slu.edu/academics/grad-programs/forms-and-petitions/>

Post-baccalaureate Course Listing

AEROSPACE ENGINEERING

Sridhar Condoor, Ph.D.,

Department Chair

AENG.500 Seminar (0)	AENG.555 Guidance, Navigation and Estimation for Dynamic Vehicles (3)
AENG.513 Introduction to Computational Fluid Dynamics (3)	AENG.556 Modern Control Systems (3)
AENG 514 Hypersonics (3)	AENG.557 Advanced Control Systems (3)
AENG.515 Parachute Systems & Design (3)	AENG.558 Autonomous Systems Design (3)
AENG.516 Unsteady Aerodynamics of Bluff Bodies (3)	AENG.559 Advanced Space Mission Design (3)
AENG.518 Applied Aerodynamics (3)	AENG.593 Special Topics (1-3)
AENG.522 Flight Simulation (3)	AENG.598 Independent Study (1-3)
AENG.532 Aeroelasticity (3)	AENG.599 Master's Thesis Research (0-6)
ESCI.533 Composite Materials for Structure and Design (3)	AENG.698 Independent Study (1-3)
AENG.541 Space Dynamics and Control (3)	AENG.699 Doctoral Dissertation Research (0-6)
AENG.551 Space Mission Failures (3)	
AENG.554 Orbital Mechanics (3)	
AENG.553 Space Mission Analysis and Design (3)	

AVIATION SCIENCE

Stephen Belt, Ph.D.,

Department Chair

Aviation Science Core

ASCI.521 Aviation Org. Theory and Management (3)
ASCI.522 Aviation Safety Programs (3)
ASCI.523 Professional Ethics and Standards (3)
ASCI.546 Qualitative Analysis (3)
ASCI.547 Quantitative Analysis (3)
ASCI 599: Master's Thesis Research (0-6)
ASCI 699: Doctoral Dissertation Research (0-6) 100

Flight Operations Administration Track

FSCI.523 Economics of Air Transportation (3)
ASCI.601 Federal and International Regulatory Environment (3)
ASCI.602 Flight Operations Business and Administration (3)
ASCI.603 Aviation and Public Policy (3)

Collegiate Flight Education Track

EDL.564 The Student in Higher Education (3)
ASC.605 Legal and Ethical Issues in Collegiate Flight Education (3)
ASC.606 Aviation Curriculum Development and Management (3)
ASCI.607 Aviation Training Methods and Practice (3)

BIOMEDICAL ENGINEERING

Michelle Sabick, Ph.D.,

Department Chair

BME.500 Seminars (0)
BME.501 Current Topics I (1)
BME.502 Current Topics II (1)
BME.503 Current Topics III (2)
BME.504 Current Topics IV (2)
BME.510 Biomedical Signals (3)
BME.515 Sensory Neuroscience (3)
BME.520 Biomechanics (3)
BME.540 Tissue-Material Interfaces (3)
BME.541 Tissue Engineering (3)
BME.545 AFM Techniques and Training (3)
BME.550 Experimental Techniques and Design (0-2)
BME.560 Quantitative Physiology (3)
BME.580 Research Rotation (1-3)
BME.593 Special Topics (1-3)
BME.596 Masters Project (1-3)
BME.597 Research Topics (1-3)
BME.598 Independent Study (1-3)
BME.599 Master's Thesis Research (0-6)
BME.697 Research Topics (1-3)
BME.698 Independent Study (1-3)
BME.699 Doctoral Dissertation Research (0-6)

CIVIL ENGINEERING

Ronaldo Luna, Ph.D.,

Department Chair

Structures Track

CVNG.405/505 Advanced Structural Analysis (3)
CVNG.407/507 Structural Dynamics (3)
CVNG.409/509 Advanced Reinforced Concrete (3)
CVNG.411/511 Advanced Steel Design (3)
CVNG.413/513 Bridge Engineering (3)
CVNG.515 Prestressed Concrete (3)
CVNG.517 Seismic Design (3)

Environmental and Sustainable Engineering Track

CVNG.419/519 Sustainable Land Development Engineering (3)
CVNG.421/521 Sustainable Water Management (3)
CVNG.423/523 Biological Treatment Systems (3)
CVNG.425/525 Physical/Chemical Treatment Systems (3)
CVNG.427/527 Design of Wastewater Treatment Facilities (3)
CVNG.429/529 Design of Drinking Water Treatment Facilities (3)
CVNG.431/531 Air Pollution (3)

Transportation Analysis and Planning Track

CVNG.445/545 Traffic Engineering (3)
CVNG.447/547 Urban Transportation Planning (3)
CVNG.449/549 Data Management and Analysis (3)

Geotechnical Engineering Track

CVNG.437/537 Slopes and Retaining Structures (3)
CVNG.439/539 Advanced Geotechnical Engineering (3)
CVNG.541 Soil Dynamics (3)
CVNG.543 Foundation Engineering II (3)

General Courses

CVNG 500 Seminar (0)
CVNG.593 Special Topics (1-3)
CVNG.596 Master's Project (1-3)
CVNG.599 Master's Thesis Research (0-6)
CVNG.699 Doctoral Dissertation Research (0-6)
CVNG.433/533 Solid and Hazardous Waste Regulation and Treatment (3)
CVNG.535 Groundwater Analysis and Site Remediation 101 (3)

ELECTRICAL AND COMPUTER ENGINEERING

Huliyar Mallikarjuna, Ph.D.,

Department Chair

ECE.510 Power Systems I

ECE.511 Power Systems II

ECE.520 Modern Control Theory

ECE.525 Hardware Software Co-design

ECE.526 Robotics

ECE.530 Advanced Semiconductor Devices

ECE.531 Low Noise Electronics Design

ECE.532 Analog Integrated Circuit Design

ECE.535 Digital IC Design

ECE.541 Radar System Design and Analysis

ECE.542 Microwave Theory and Techniques

ECE.543 Antenna Theory and Design

ECE.550 Advanced Filter Design

ECE.551 Image Processing

ECE.555 Stochastic Processing

ECE.560 Communication Systems

ECE.561 Spacecraft Communications

ECE.562 Cellular Communications

ECE.570 Energy Technologies I

ECE.593 Special Topics (1-3)

ECE.596 Master's Project (3)

ECE.597 Research Topics (1-3)

ECE.598 Independent Study (1-3)

ECE.599 Master's Thesis Research (0-6)

ECE.697 Research Topics (1-3)

ECE.698 Independent Study (1-3)

ECE.699 Doctoral Dissertation Research (0-6)

MECHANICAL ENGINEERING

Sridhar Condoor, Ph.D.,

Department Chair

MENG.500 Seminar (0)

MENG.501 Advanced Fluid Dynamics (3)

MENG.502 Technology Entrepreneurship (3)

MENG.503 Numerical Methods Using Matlab and Labview (3)

MENG.512 Experimental Methods in Fluid Dynamics (3)

MENG.517 Viscous Flows (3)

MENG.519 An Introduction to Turbulence (3)

ESCI .533 Composite Materials for Structure and Design (3)

MENG.534 Finite Element Analysis I (3)

MENG.535 Finite Element Analysis II (3)

MENG.536 Multidisciplinary Optimization (3)

MENG.537 Structural Reliability (3)

MENG.538 Advanced Mechanics of Solids (3)

MENG.539 Fracture Mechanics and Plasticity (3)

MENG.593 Special Topics (1-3)

MENG.598 Independent Study (1-3)

MENG.599 Master's Thesis Research (0-6)