



CURRICULUM AIRCRAFT



PIPER PA-31 NAVAJO

- Eight-place, twin-engine, retractable gear aircraft
- Lycoming TIO-540 J2B engines
- Full glass cockpit
- Students fly 2 labs in FTE 5703



PIPER PA-32-260 CHEROKEE SIX

- Six-place, single-engine, fixed landing gear light aircraft
- Lycoming O-540-E4B5 engine
- Students fly 6 labs in FTE 5701 and 6 labs in FTE 5702



ROBINSON R44 II

- Four-place, single-engine helicopter
- Lycoming IO-540 SER engine
- Students fly 2 labs in FTE 5704

ACADEMIC INSTRUCTORS

RALPH KIMBERLIN, Dr.Ing., wrote the text book *Flight Testing of Fixed-Wing Aircraft*. He is a Fellow of the Society of Experimental Test Pilots with 8,500 flight hours in over 250 different aircraft including 25 first flights. He earned a Doctor of Engineering from the Technical University of Aachen, Germany. He is a U.S. Naval Academy graduate and was commissioned as an Air Force officer. While serving in Vietnam, he was one of three officers responsible for the development and combat evaluation of the AC-47 side-firing gun ship. He was a test pilot and flight test engineer for Piper, Rockwell International and Beech Aircraft companies for 10 years. He was a professor and program chair at the University of Tennessee Space Institute for 27 years. Dr. Kimberlin has taught courses in Performance Flight Test and Stability and Control Flight Test at Florida Tech since 2012.



BRIAN KISH, Ph.D., is the chair of Florida Tech's Flight Test Engineering Program. He earned a Ph.D. in Aeronautical Engineering from the Air Force Institute of Technology. He is a graduate of the Air Force Test Pilot School and has accumulated over 1,300 flight hours as a flight test engineer in 49 different aircraft during his 20-year Air Force career. He held leadership positions at three flight test units and served as the vice chair of the Education Department of the Air Force Test Pilot School from 2005–2008. Since retiring from the Air Force in 2011, Dr. Kish has taught Control Systems, Aircraft Stability and Control, and Avionics courses at Florida Tech.



ABOUT FLORIDA INSTITUTE OF TECHNOLOGY

Florida Institute of Technology is an accredited, coeducational, independently controlled and supported university committed to the pursuit of excellence in teaching and research.

- Only independent, technological university in the Southeast.
- Tier One Best National University (*U.S. News & World Report*)
- One of U.S. top technological institutions (*Fiske Guide to Colleges*)
- Among top Southeastern colleges (*Princeton Review*)
- One of America's Best Colleges (*Forbes*)

WHAT OUR STUDENTS ARE SAYING

"Flight Test Engineering at Florida Tech is a fast-paced, hands-on program that gave me an opportunity to explore both fixed-wing and rotorcraft flight testing under the guidance of professors with years of industry experience."

—Christopher Kennedy, 2017

"What an awesome program! I flew 20 flights in five different aircraft. I traveled to Munich and Vienna for my thesis, where I flew a fly-by-wire Diamond DA42 as an evaluation pilot. Florida Tech set up my internship at Piper Aircraft, where I'm flying actual test missions as a flight test engineer. The highly experienced instructors really get you ready for the job."

—Jennifer Geehan, 2017

FOR MORE INFORMATION AND TO APPLY

WWW.FIT.EDU

CONTACT INFORMATION

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FLIGHT TEST ENGINEERING

MASTER'S DEGREE, GRADUATE CERTIFICATE AND SHORT COURSES



A unique graduate program designed to expand the student's knowledge, skills and abilities in the field of aircraft flight testing



FLIGHT TEST ENGINEERING PROGRAM OVERVIEW

The Flight Test Engineering Program seeks to expand the student's knowledge, skills and abilities in the field of Aircraft Flight Testing. Flight test engineering involves performance evaluation of existing aircraft, rather than designing aircraft to meet performance specifications. Core courses teach engineers how to test an aircraft safely, measure aircraft performance and determine aircraft flying qualities. Students learn the necessary measurement techniques, instrumentation and data analysis methods required to collect and reduce flight test data to standard atmospheric conditions and then expand those results for publication in pilots operating handbooks. Flight test results are also used for improving the design of future aircraft. Additionally, students learn how to test and evaluate various aircraft mechanical and electrical subsystems including propulsion, structure and avionics.

Administration Requirements

An accredited bachelor's degree in a field related to aerospace engineering. Applicants whose bachelor's degrees are in other fields may require additional undergraduate course work. In evaluating an international application, due consideration is given to academic standards in the country where the undergraduate studies have been performed.

Tuition

\$1,241 per credit hour (2018–2019).

Scholarship Information

- **UNIVERSITY GRADUATE SCHOLARS AWARD:** New, full-time graduate students receive tuition remission for 3 or 6 semester credit hours for a maximum of 3 consecutive semesters. Limited and available on competitive basis.
- **GRADUATE STUDENT ASSISTANTSHIPS:** Pays for course work and/or provides a stipend. Limited and available on competitive basis.
- **ADJUNCT TEACHING:** Part-time adjuncts receive tuition remission for each course taught on a one-to-one basis.

Master's Degree

The M.S. in Flight Test Engineering program consists of 30 semester credit hours in three main components:

- A 12-hour core component: Flight test courses in Performance, Stability and Control, and Avionics as well as Project Engineering.
- A 12-hour electives component: Students select four courses from a list of 16 courses. Students have the option to substitute a thesis for two of the four electives courses.
- A 6-hour math component: Students select two courses from a list of seven courses.

Short Course Option

All flight test courses (Performance, Stability & Control, Avionics, Helicopter, and Weapon Systems) are offered in two-week, short-course versions. For a given course, the same content covered in 48 contact hours of a 16-week semester is condensed into two weeks. Short courses may be taught at Florida Tech or off site. Classes run 8 hours a day for the duration. If the student is in the graduate program, the short course will result in a letter grade and count toward the master's degree or graduate certificate. Students who are not admitted to the graduate program but simply wish to expand their knowledge, skills and abilities in aircraft flight testing can earn continuous learning points. Tuition and lab fees for a short course are the same as a 3-hour, semester-long course.

Graduate Certificate Option

Students wishing to take the 12-hour core component without completing the rest of the master's program will be awarded a Graduate Certificate in Flight Test Engineering. This option may appeal to students who wish to receive their master's degree in a different discipline but still seek to expand their knowledge, skills and abilities in aircraft flight testing. This option may also appeal to professionals who may not have the time or resources to complete the full master's program. Students must still meet the standard admission requirements. Tuition is the same.

CORE COURSE DESCRIPTIONS

FTE 5701 Performance Flight Testing (3-hour)

Examines flight test engineering techniques to determine airplane performance. Includes flight labs for data collections. Presents data analysis and interpretation methods, and uses airplane performance theory to develop the equations necessary to reduce flight test data taken at altitude to sea-level. Covers both propeller and jet aircraft. \$450 lab fee.

FTE 5702 Stability and Control Flight Testing (3-hour)

Examines techniques to evaluate airplane stability and control by flight testing. Includes flight labs for flight test data collection. Presents methods for stick fixed and stick free extrapolation of stability neutral points and control characteristics. Also includes effects of high speed and transonic flight due to aircraft configuration. \$450 lab fee.

FTE 5703 Avionics Flight Testing (3-hour)

Reviews current avionics systems for testing in flight. Includes flight labs to demonstrate testing methods and data collection. Also includes communications and navigation systems, sensor systems, avionics systems integration, human factors and radar for severe weather avoidance systems and tests to determine stability. \$450 lab fee.

ENM 5200 Project Engineering (3-hour)

Principles of project management to design and develop products and services within budget, on time and to specification. Includes work planning, organization design, requirements analysis, project control and PERT/CPM. (ENM: Engineering Management)

Elective Course Choices (four are required with no thesis)

AVS 5207 Aviation Safety Management Systems (3-hour)

AEE 5120 Aerodynamics of wing bodies (3-hour)

MEE 5318 Instrumentation and Measurement Systems (3-hour)

MEE 5320 Internal Combustion Engines (3-hour)

MEE 5350 Gas Turbines (3-hour)

AEE 5480 Structural Dynamics (3-hour)

AEE 5486 Crash Worthiness (3-hour)

FTE 5704 Helicopter Flight Testing (3-hour) \$450 lab fee

FTE 5705 Weapon Systems Flight Testing (3-hour)

AEE 5801 Advanced Flight Dynamics and Control (3-hour)

AEE 5802 Multivariable Feedback Control Systems (3-hour)

AEE 5803 Nonlinear Control Systems (3-hour)

AEE 5804 Guidance and Navigation of Aerospace Vehicles (3-hour)

ECE 5245 Digital Signal Processing 1 (3-hour)

ECE 5251 Radar Systems (3-hour)

ECE 5350 Optical Electronics (3-hour)

SYS 5360 Electro-optics/Infrared Systems Engineering (3-hour)

Thesis Option

Students can substitute a thesis for two of the four electives. A thesis involves individual work under the direction of a member of the graduate faculty on a selected topic. Topics will involve some aspect of aircraft flight testing or simulation. Opportunities exist to conduct research off site at military flight test centers or commercial companies. The student will publish the thesis upon completion.

Math Course Choices (two are required)

MTH 5102 Linear Algebra (3-hour)

MTH 5130 Theory of Complex Variables (3-hour)

MTH 5201 Mathematical Methods in Science & Engineering 1 (3-hour)

MTH 5202 Mathematical Methods in Science & Engineering 2 (3-hour)

MTH 5401 Applied Statistical Analysis (3-hour)

MTH 5411 Mathematical Statistics 1 (3-hour)

MTH 5412 Mathematical Statistics 2 (3-hour)