

COLLEGE/ UNIVERSITY
CURRICULUM DESCRIPTIONS

The preponderance of college-level aerospace programs in the United States today can be included in one or more of the below-listed generic curricular classifications. Each of these generalized areas of study is shown as a Part 1 tabular column heading beginning in page 7.

Aeronautical/Aerospace Engineering

Programs in this area concentrate on the design, development and testing of both air-breathing and rocket-propelled aircraft and space vehicles. The discipline is referred to as "aeronautics and astronautics" at some institutions. Students interested in pursuing degrees in this field should possess a strong background in mathematics and the physical sciences. A solid working knowledge of computers would also be helpful. Although there are only a few two-year or associate degree programs in this area, baccalaureate- and graduate-level study opportunities are numerous.

Aerospace Education

Offerings in this field concentrate on teacher pre- and in-service training to enhance and enliven the K-12 curriculum, particularly mathematics and science, through the integration of aviation- and space-related subject matter. The most frequently cited activities in this area are two-to-three week teacher workshops which are usually conducted during the summer months. An annually updated national listing of college-sponsored aerospace education teacher workshops is available from Headquarters Civil Air Patrol/ED, Maxwell AFB, AL 36112-5000.

Air Traffic Control

Studies in this area focus on the separation and sequencing of aircraft during flight and while operating on airport surfaces. A controller's responsibilities include functions in airport control towers, enroute radar centers and flight service stations. Successful performance requires uncommon attentiveness, memory, spatial visualization, and, at busy facilities, the ability to cope with high stress levels. The typical college program in this area will include course work in FAA regulations, meteorology, visual and non-visual navigation procedures, aircraft performance factors, the National Airport and Airspace System, radio procedures and radar operations.

Aircraft Maintenance

Programs in this popular field prepare students to inspect, replace, repair and maintain aircraft engines and structures as well as sundry hydraulic, pneumatic, electrical and environmental control systems. Successful completion of approved programs in this area usually leads to certification as an FAA Airframe and/or Powerplant Mechanic. Many colleges also award associate, and in some instances, bachelor's degrees to graduates of these programs who additionally fulfill the institution's general studies requirements.

Airway Science

This relative newcomer to the collegiate aviation scene is the result of a coordinated effort by the FAA, the University Aviation Association and selected aviation program-offering institutions of higher learning to develop a college-level curriculum to address the National Airspace System's forecast technical and managerial manpower needs. The program includes a specified 85 semester-hour core curriculum and a prescribed FAA-approved course sequence in one of the following 40 semester-hour programmatic areas of concentration:

- Aircraft Systems Management

A professional pilot-oriented option consisting of instruction leading

Airway Science (Continued)

to certification as a Commercial Pilot (with Instrument and Multiengine ratings) and Flight Instructor (CFI, CFII & MEI), plus the following classes: advanced aerodynamics and aircraft performance, advanced aircraft systems, meteorology, weather reporting and analysis, aviation management and air transportation.

- **Airway Computer Science**

This option includes course work in computer programming, assembler language, data structures, computer applications, office automation, mathematical modeling/simulation and computer architecture.

- **Airway Electronic Systems**

A mathematics-intensive option consisting of classes in theory of electronics, calculus, mathematical analysis, microprocessor theory and application, advanced computer programming, solid state devices, electrical/integrated circuits, engineering drawing, digital logic analysis, reliability/maintainability theory, systems engineering, and electrical and power principles.

- **Airway Science Management**

Included in this comprehensive option is introductory course work in sociology, interpersonal communication and administrative problems, plus classes in theories of personality, psychology of communication, communication theory and models, air transportation, airport management, theories of personnel management, concepts of air transport utilization, operations management, labor relations and management decision-making.

- **Aviation Maintenance Management**

This option focuses on aircraft maintenance shop supervision and includes course and laboratory work in engineering drawing, aircraft materials, propulsion, structures, systems, avionics, maintainability and reliability theory and systems engineering.

Astrophysics

Programs in this area focus on space phenomena and extra-atmospheric studies. Some institutions offer astrophysics under the broader title of "space science." Like aeronautical/aerospace engineering, students majoring in this field should be well versed in mathematics and the physical sciences, especially physics and astronomy. Unlike engineers, however, astrophysicists are more likely to be involved in research into the more abstract or theoretical aspects of space operations. Increased curricular and research activity in this area is expected as a result of the passage of a 1987 Congressional act establishing the National Space Grant College and Fellowship Program (see Appendix D, p. 101 for details).

Aviation Management

Offerings in this area concentrate on the preparation of persons to serve in various administrative and supervisory roles with the government and in private-sector positions such as airport, airline and fixed base operation management. Students interested in pursuing degrees in this field can anticipate an academic program with a strong business education core including extensive course work in accounting, banking, finance and statistics. Persons aspiring to professional flying careers frequently enroll in these programs in the hope that it will enhance their occupational versatility in the eyes of airline or corporate pilot employers.

Avionics

The meaning of the term, and the focus of this high-demand field, is aviation electronics. Avionics technicians inspect, repair, calibrate, test and install aircraft radios, instruments and electronic navigational equipment. College curricula in this area include many of the courses specified above under the Airway Science Airway Electronics Systems option. Due to both the highly technical nature of the work and the sophistication of modern avionics, a strong preparatory background in mathematics and science would be advantageous.

Professional Pilot

This increasingly popular field of study is viewed as a "magnet program" by scores of aviation program-offering postsecondary institutions. It is the program of choice for hundreds of flight-inspired college students who aspire to a flying career with the military, the airlines, air taxi operators or with a corporate flight department. Although virtually all programs in this area concentrate on the preparation of students to fulfill the FAA's pilot licensing requirements, usually at the Commercial Pilot level, the nature and scope of the curriculum will frequently differ according to the program's "home" within the institution. A flight training program located in a college of engineering, for instance, will usually have more rigid math and science curriculum requirements than, say, a program which is under the purview of a college of business. The curricular components of the typical college flight training program are very similar to those listed above under the Airway Science Aircraft Systems Management option.

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