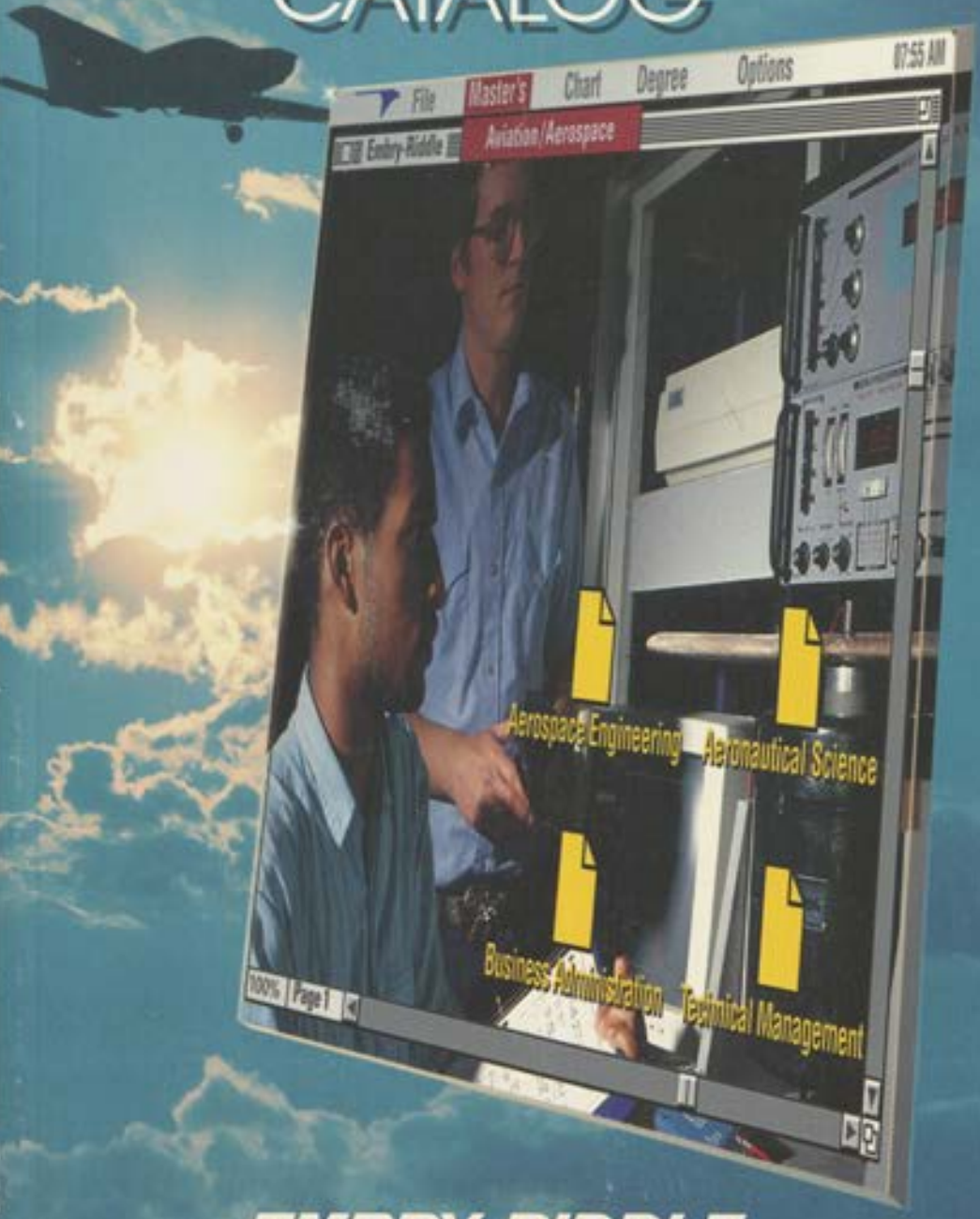
1992-93 GRADUATE CATALOG



EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

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AERONAUTICAL UNIVERSITY

GRADUATE CATALOG
1992-93

Master of Science in Aerospace Engineering

Master of Aeronautical Science

Master of Business Administration in Aviation

Master of Science in Technical Management

ADMISSIONS INQUIRIES

Embry-Riddle Aeronautical University
University Director of Admissions
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(904) 226-6115 (Worldwide) or
(800) 222-ERAU (Toll-free)

ON-CAMPUS PROGRAMS

Embry-Riddle Aeronautical University
School of Graduate Studies and Research
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(904) 226-6715

PROGRAMS AT OFF-CAMPUS RESIDENT CENTERS

Embry-Riddle Aeronautical University
College of Continuing Education
Admissions, Records and Registration Department
600 S. Clyde Morris Blvd.
Daytona Beach, FL 32114-3900
(904) 226-6910

CATALOG SCOPE

This catalog is designed for use during the one academic year period stated on the cover, effective date August 22, 1992. For all College of Continuing Education locations, this catalog becomes effective July 1, 1992. It is not intended that the provisions of this catalog constitute the statement of the terms of an irrevocable contract between the student and the University. The University reserves the right at all times to change any provisions or any requirement stated in this catalog, and it further reserves at all times the right to require any student to withdraw for cause.

STATEMENT OF POLICY

Embry-Riddle Aeronautical University adheres to the principle of equal education and employment opportunity without regard to race, sex, color, creed, or national origin. This policy extends to all programs and activities involving or supported by the University.

Embry-Riddle Aeronautical University does not discriminate on the basis of handicap in the recruitment and admission of students, the recruitment and employment of faculty, and the operation of any of its programs and activities. A coordinator for compliance with Section 504 of the Rehabilitation Act of 1973, as amended, has been appointed for each campus of the University. The coordinators are the Dean of Students, Prescott Campus; the Director of Health Services, Daytona Beach Campus; and the Provost, College of Continuing Education.

The University reserves the right to adjust tuition and fees as it deems necessary.

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EMBRY-RIDDLE CALENDAR
ACADEMIC YEAR 1992-93*

FALL SEMESTER 1992

August 22-25 ..... Registration
August 26 ..... Classes begin
August 28 ..... Last day for late registration
September 7 ..... HOLIDAY — Labor Day
November 26-27 ..... HOLIDAY — Thanksgiving
December 4 ..... Last day of classes
December 5, 7-10 ..... Final Examinations
December 12 ..... Commencement

SPRING SEMESTER 1993

January 5-6 ..... Registration
January 7 ..... Classes begin
January 11 ..... Last day for late registration
February 15 ..... HOLIDAY — President's Day
April 8-9 ..... HOLIDAY — Spring Break
April 16 ..... Last day of classes
April 17, 19-22 ..... Final Examinations
April 25 ..... Commencement

SUMMER SEMESTER (TERM A) 1993

April 30 ..... Registration for Terms A, B
May 3 ..... Classes begin
May 5 ..... Last day for late registration
May 31 ..... HOLIDAY — Memorial Day
June 18 ..... Last day of classes
June 19-21 ..... Final Examinations

SUMMER SEMESTER (TERM B) 1993

June 23 ..... Registration for Term B
June 24 ..... Classes begin
June 28 ..... Last day for late registration
July 5 ..... HOLIDAY — Independence Day
August 11 ..... Last day of classes
August 12-13 ..... Final Examinations

*Daytona Beach and Prescott Campuses only. College of Continuing Education students should contact the local Embry-Riddle Resident Center Director for the Academic Calendar applicable to their specific location.

A MESSAGE FROM THE PRESIDENT

As a world leader in aviation and aerospace education, Embry-Riddle Aeronautical University's faculty challenge graduate students to achieve academic excellence in the classroom and to complete a research project, both significant personal achievements.

Our graduate programs are distinctive because they are designed by the leaders of industry in conjunction with our faculty. Opportunities are provided within each degree program to tailor your course of study to meet your personal and professional objectives.

The graduate faculty is composed of academicians and those who have made significant contributions to the industry. This enables them to provide valuable insights and enhance the interaction within the classroom.

The School of Graduate Studies and Research offers the Master of Science in Aerospace Engineering degree, the Master of Aeronautical Science degree and the Master of Business Administration in Aviation Degree. The Master of Science in Technical Management degree is presently being offered at off-campus sites and will soon become available at our Daytona Beach campus. During the past year, this graduate program has been very popular with working professionals within the industry.

The University provides a stimulating environment for graduate research. In the past several years, the value of externally sponsored research, creative activities and special projects has increased dramatically to several million dollars a year.

Our academic and research facilities include the Daytona Beach based, Airway Science Simulation Laboratory, a unique systems-oriented laboratory for education, instructional material development and human factors/aviation safety research and development. The University's laboratories, wind tunnels, computer facilities and libraries are used by our graduate students to pursue research in other areas such as aircraft maintenance, aviation management and engineering.

Embry-Riddle has its own distinctive character. Every one you will meet at the University is passionate about aviation and aerospace.

The industry is poised for an era of prosperity which will require managers, engineers, communications experts, repair personnel and pilots. The leaders of aviation/aerospace will turn to Embry-Riddle for graduates, as they have since 1926, to meet these professional needs.

Sincerely,

Steven M. Sliwa, Ph.D.
President

GENERAL INFORMATION AND HISTORY

Daytona Beach campus

Since its beginning Embry-Riddle Aeronautical University has played a unique and important role in aviation. Embry-Riddle was established as a flying service, at Lunken Airport in Cincinnati, on May 19, 1926. In the latter part of 1928, the original company was sold and became the first unit of what is now American Airlines. Four years later one of the founders, J. Paul Riddle, left American Airlines and started a new company, under the Embry-Riddle name, devoted to aviation education. By the late 1920's Riddle and his new partner, John G. McKay, had expanded the operation into the world's largest aviation school, with flight training centers throughout Florida and one in Tennessee. With the advent of World War II, Embry-Riddle became a mecca for training pilots, mechanics and other aviation technicians. An estimated 50,000 individuals were trained at Embry-Riddle for the allied nations. After the war, the curriculum was further expanded, first as the Embry-Riddle International School of Aviation and then as Embry-Riddle Aeronautical Institute.

In 1962 the Institute hired Jack Hunt, an aviation consultant, as its business advisor. Mr. Hunt later became president of Embry-Riddle. During his tenure as president, from 1962 to 1984, Mr. Hunt reorganized Embry-Riddle as a non-profit institution and planned for expansion and further development. On April 24, 1965, Embry-Riddle Aeronautical Institute established its main campus in Daytona Beach, Florida, on an eighty-six acre tract of land with an enrollment of 260 students. This new location offered plenty of room for growth. In 1970, Embry-Riddle officially became a university.

Today the multi-million dollar complexes in Daytona Beach and Prescott, Arizona serve approximately 7,000 students and offer associate and bachelor's degree programs in aerospace engineering, aeronautical science, aviation business administration, avionics engineering technology, aircraft engineering technology, electrical engineering, professional aeronautics, aviation maintenance management, and aviation computer science. Master's degree programs are offered in aerospace engineering, aeronautical science, aviation business administration and technical management. Many students include flight and/or aircraft maintenance training as part of their degree programs.

Since the first resident center opened at Fort Rucker, Alabama, in 1970, the College of Continuing Education has met the higher education needs of a particularly mobile segment of the population through unique methods of instructional delivery. The network of education centers has expanded to nearly 100 locations worldwide. The students served by the College of Continuing Education are mostly working professionals unable to participate in traditionally scheduled daytime classes. Consequently, instruction is designed to match the special needs of part-time students. Full-time study can be pursued at many locations as well. Approximately 12,000 full and part-time students participate in associate, bachelor's and

master's degree programs at locations served by the College of Continuing Education.

Today Embry-Riddle is a truly global institution in the forefront of aviation and aerospace education. Graduate programs are available at the Daytona Beach campus and at over 90 College of Continuing Education graduate locations in the United States and Europe.

PURPOSE OF THE UNIVERSITY

Embry-Riddle Aeronautical University is an independent, nonsectarian, not-for-profit, coeducational university with a history dating back to the early days of aviation. The University serves culturally diverse students motivated toward careers in aviation and aerospace. Residential campuses in Daytona Beach, Florida and Prescott, Arizona provide education in a traditional setting and an extensive network of continuing education centers throughout the United States and abroad serves civilian and military working adults.

It is the purpose of Embry-Riddle Aeronautical University to provide a comprehensive education to prepare graduates for productive careers and responsible citizenship to support the needs of aviation, aerospace, engineering and related fields. To achieve this purpose, the University is dedicated to the following:

To offer undergraduate and graduate degree programs which prepare students for immediate productivity and career growth providing a broad education with emphasis on communication and analytical skills.

To emphasize academic excellence in the teaching of all courses and programs; to recruit and develop excellent faculty and staff; and to pursue research and creative activities that maintain and extend knowledge in aviation, aerospace and related disciplines.

To develop mature, responsible graduates capable of examining, evaluating and appreciating the economic, political, cultural, moral and technological aspects of humankind and society, and to foster a better understanding of the working of the free enterprise system and its social and economic benefits, and of the profit motive, as vital forces to the potential of individuals and of groups. To promote ethical and responsible behavior among its students and graduates in the local, national and international aviation and aerospace communities and in the community at large.

To develop and effectively deliver educational programs for the adult student and professional at the undergraduate and graduate level, including off-campus degree programs, short courses, independent study, non-credit programs, seminars, workshops and conferences.

To support each student's personal development by encouraging participation in programs and services which offer opportunities for enhanced physical, psychological, social and spiritual growth; and, by complementing the academic experience, contribute to the

development of a well-rounded individual prepared for personal and professional success.

To engage in research, consulting services, and related activities that address the needs of the aviation, aerospace, and related industries.

ACCREDITATION AND AFFILIATION

Embry-Riddle Aeronautical University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award degrees at the Associate, Bachelor's and Master's level. Four master's degree programs are offered: the Master of Science in Aerospace Engineering (Daytona Beach campus only), the Master of Aeronautical Science, the Master of Business Administration in Aviation, and since March 1, 1991, a new educational program leading to a Master of Science in Technical Management (delivered on-site at selected industry locations).

All Embry-Riddle Aeronautical University degree programs offered at the College of Continuing Education locations and the Daytona Beach and Prescott campuses have been approved by the appropriate state approving agencies for the enrollment of veterans eligible for United States Department of Veterans Affairs educational benefits. Embry-Riddle Aeronautical University is also certificated by the Federal Aviation Administration (FAA) under Regulation Part 141 (Pilot Schools) and Part 147 (Aviation Maintenance Technician Schools).

Graduate students at one of Embry-Riddle's Continuing Education Centers

AFFILIATION WITH FLORIDA SPACE GRANT CONSORTIUM

Since August 31, 1989, Embry-Riddle's Daytona Beach campus has been an affiliate of the National Aeronautics and Space Administration's (NASA's) Florida Space Grant Consortium. NASA also has selected the Arizona Consortium, which includes the Prescott campus, as an affiliate. Both campuses of the University are thereby qualified to participate in the funded research activities of the consortia. The Space Grant Consortia provide leadership in the development of a broad, interactive network of universities involved in aerospace academic programs, research, and public service.

RESEARCH AND CREATIVE ACTIVITIES

In addition to specialized technical training, the graduate sector of the University has accepted the challenge to influence technological advancement through research and creative activities. Students benefit both directly and indirectly from research activities which promote the spirit of inquiry and afford an exceptionally high level of expertise by participating faculty.

Internal resource allocations for research at Embry-Riddle have been augmented by generous support from industry, foundations, government organizations, the alumni and others. Accelerated acquisition of facilities, equipment and personnel by the University has provided a stimulating environment for graduate study and research, enhanced quality and scholarly output.

The University now provides a complete range of supporting facilities including the library, numerous computers, and specialized research laboratories. The library maintains subscriptions to aviation-related periodicals and serial titles. Literature searches for specific topics can be conducted by computer, using national data bases. Computer facilities include microprocessors, PC's, Micro Vax II's and SUN workstations. Selected computer networking schemes via fiber optic cables have been placed in operation. Computer graphics capabilities, and a computer aided design system are available to students and faculty involved in engineering and computer science areas.

Traditional research projects involving the student and the professor, often highly innovative but without specific funding, have been, and will continue to be emphasized at the University. Funded research projects, however, have grown steadily in recent years. Grants for such creative endeavors come from Federal Aviation Administration (FAA), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), the State of Arizona, the State of Florida, Florida Space Grant Consortium, private industry, the Edyth Bush Foundation, and the Aviation Research and Education Foundation (AREF).

A significant amount of research has been conducted in the thrust area of human factors in aviation, including cockpit, aircrew and air

traffic controller interactions by faculty, students and research associates. Such activities are designed to enhance aviation/aerospace safety and to improve the effectiveness and efficiency of the National Airspace System. Future research thrusts will also include selected areas of aircraft maintenance and engineering as well as aviation management.

The pace of research in aviation and related fields at Embry-Riddle is expected to continue accelerating. Development and use of the extensive and often unique resources available at the University will also increase. Currently, these resources include laboratories, flight simulators, single and twin engine aircraft, specialized testing equipment, and wind tunnels. The combination of these technically advanced resources, highly skilled faculty and staff, and students with strong spirits of inquiry will make lasting contributions to air travel safety and efficiency, fulfilling in part Embry-Riddle's role as a world leader in aviation higher education.

Additional details of research activities and facilities at the University can be found in a publication entitled "Research and Creative Activities at Embry-Riddle Aeronautical University."

GRADUATE FACULTY

The graduate faculty is composed of a mixture of traditionally prepared academicians and those who have compiled records of significant and substantial contribution to the aviation industry. The faculty provides a very important link with the industry. Many of the graduate faculty have distinguished careers in aviation, management, or engineering and thus are able to provide valuable insights from their professional training and experience.

GRADUATE STUDENTS

The School of Graduate Studies and Research at the Daytona Beach campus, has approximately 150 graduate students. In addition, the College of Continuing Education enrolls approximately 3,000 graduate students who are pursuing degrees at over 90 graduate locations worldwide. Many graduate students have established careers in flight, aviation management, maintenance and maintenance management, air traffic control, and engineering. Their experience helps to enhance the interaction within the classroom by providing insight from their current experience within the military and civilian aviation industry.

ALUMNI NETWORK

The Alumni Relations Office is responsible for developing the alumni chapter network, coordinating the activities of the Alumni Association, communicating with alumni through the Embry-Riddle UPDATE magazine, and hosting special events on-campus and around the United States. The office also assists alumni with keeping in touch with their friends and classmates through the class notes section of UPDATE.

Graduates of the University become part of the worldwide Alumni Association with over 27,000 members. Alumni join together for social and professional interaction through the network of alumni chapters around the United States and in Europe. Alumni assist with the recruitment of students, provide the Career Center with job availability information, and assist with the development of financial resources. The Association has created the Mentor program which matches alumni with students to enhance the college experience and provide the student with real world perspective.

Embry-Riddle alumni contribute directly to the reputation enjoyed by the University. They benefit from our reputation and find that the value of their degree continues to grow as the University grows in stature and renown. The University augments the value of your degree by implementing new degree programs, developing research opportunities, recruiting highly qualified faculty, and continually enhancing the quality of our academic programs.

Embry-Riddle alumni can be found in every facet of the aviation and aerospace industry as well as many fields outside of aviation. More information about alumni activities can be obtained by writing or calling:

Embry-Riddle Aeronautical University
Alumni Relations Office
600 S. Clyde Morris Blvd.
Daytona Beach, Florida 32114-3900
(904) 226-6160 or
1-800-447-6818 (Florida)
1-800-643-0799 (Out-of-state)

GRADUATE INSTRUCTIONAL AND RESEARCH RESOURCES

Intelligent Simulation Training System being developed.

As a result of the employment of many of our graduate students, within the various sectors of the aviation industry, students enrolled in graduate programs at Embry-Riddle have access to many facilities beyond those directly provided by the University. In addition, many facilities and unique opportunities are made available to students through student, alumni and faculty contacts at many airports, airlines and defense contractors.

SPECIALIZED AEROSPACE FACILITIES, EQUIPMENT AND SOFTWARE

Embry-Riddle maintains a fleet of approximately 100 aircraft that log nearly 140,000 hours annually. In addition, the University maintains approximately fifteen flight simulators including multi-engine, turboprop and turbojet trainers. There are two weather laboratories which provide extensive meteorological data for weather analysis. The University operates a certified FAA repair station complete with jet engine and reciprocating engine test cells.

The Aerospace Engineering Department houses a fully instrumented 3x4 test subsonic wind tunnel with real time computerized data acquisition capability, a smoke tunnel and a supersonic blowdown nozzle that are available for teaching and research activities. The structures lab contains a number of industry grade machines and instruments that permit testing through a range of temperatures of isotropic as well as anisotropic materials. Various CAD and analysis software packages are available for use in design and development work. The composite materials lab and the electronics lab provide students and faculty alike with hands-on opportunities to enhance the theories explored in the classroom.

In addition to these facilities, the University maintains at its Prescott campus two wind tunnels, a smoke tunnel, a materials lab, a composites lab with an electron microscope, an electrical engineering lab, an engineering graphics and design lab, and an aircraft structures lab. Additional training aircraft and both single and multi-engine flight simulators are also available to students at the Prescott campus.

COMPUTERS

The Academic Computer Lab at Embry-Riddle houses approximately 28 SUN workstations and 75 IBM microcomputers for faculty and student use. The IBM microcomputers are connected to a Local Area Network (LAN) running the Novell Netware Operating System. The primary applications available on this network are WordPerfect, Lotus 1-2-3, Enable, Grammatik, Derive, True Basic and Writer's Helper. Twenty-four of the IBM microcomputers are set in a token ring configuration in a classroom with a projection system which may be reserved for group instruction. The SUN workstations are connected via Ethernet network. The primary

applications available on the workstations are the C, ADA, FORTRAN and LISP compilers; Interleaf Technical Publishing Software and MODSIM. The Ethernet network may also be accessed from the Airway Science Simulation Lab (ASSL) and the Engineering Building.

The Airway Science Simulation Laboratory houses a number of minicomputers, a Micro Vax II and Symbolics machines that are used for computerized instructional development and simulation Airway Sciences.

The Aerospace Engineering Department has a networked system of SUN workstations with IBM and Macintosh desktops and peripherals running a variety of CAD, solid modeling, CFD, finite element, and other analysis software used for instruction and research.

JACK R. HUNT MEMORIAL LIBRARY

The Jack R. Hunt Memorial library is a 42,000 square foot facility with a seating capacity of 800. The facility includes individual study carrels, group seating and group study rooms. The library has a comprehensive collection of books, periodicals, documents, newspapers, media programs, and a historical aviation collection which includes materials dating from 1909 to the present. Complete service is provided seven days a week throughout the academic term, with extended hours during final examinations. A computer link is maintained with the Southeastern Library Network (SOLINET) which connects 6,000 libraries nationwide for shared cataloging and rapid interlibrary loans. DIALOG service provides access to more than 200 databases that list documents, reports, conference proceedings, journal articles, doctoral dissertations and many other kinds of information.

CENTER FOR AVIATION/AEROSPACE RESEARCH

The Center for Aviation/Aerospace Research (CAAR) is the research operating arm of the University. One of its goals is to provide a public service through the transfer of information and technology to the aviation community and the general public. The approach taken with the CAAR to accomplish its research goals is a team approach, involving full-time research associates, faculty members and students.

The Center is destined to become the home of interdisciplinary research activities involving aviation and aerospace fields. The primary thrust of the center's work is to enhance aviation/aerospace safety and to improve the effectiveness and efficiency of the National Airspace System through the development of airway systems safety technology, improvements to air traffic control, innovative flight technology, cockpit resource management and related human factors gains. The center performs interdisciplinary research in human factors, advanced technology, and systems management

for aviation/aerospace applications. The capabilities of the center have recently been enhanced through the establishment of an Aviation Human Factors Research Laboratory which has aircraft simulation capabilities as well as state-of-the-art computer based cognitive/psychomotor and psychophysiological human performance measurement systems.

CENTER FOR APPLIED HUMAN FACTORS IN AVIATION

Embry-Riddle Aeronautical University and the University of Central Florida (UCF) have combined their extensive resources to jointly establish the Center for Applied Human Factors in Aviation (CAHFA). The two institutions share a vibrant commonality of academic and research interests which extend across the gamut of aviation human factors. CAHFA's mission is to enhance aviation safety through applied human factors research, design, and training support. For the partner institutions, CAHFA represents a combination of research resources for identifying and solving a vast array of aeronautical human factors problems.

CAHFA derives its strength from the unique combination of resources contributed by Embry Riddle and UCF. Embry-Riddle's contribution to CAHFA not only includes ready access to aircraft, simulators and laboratory equipment, but also to an abundance of research subjects having backgrounds as pilots, maintenance technicians, and air traffic controllers.

Since its inception, CAHFA has vigorously pursued a program aimed at improving the state-of-the-art in applied human factors for aviation. CAHFA's research proposals and contract awards have continued to grow steadily. Support has come from the parent institutions, the state of Florida, the federal government, and from industry. Expanded research facilities benefiting CAHFA are being planned for a 21 acre site in Daytona Beach across from Embry-Riddle's main campus.

Graduate students prepare a model for wind tunnel testing.

AIRWAY SCIENCE SIMULATION LABORATORY

The Airway Science Simulation Laboratory (ASSL) simulates the various elements of the National Airspace System: weather, airports, airways, air traffic control, flow control, as well as pilot and aircraft performance. The initial configuration of the laboratory is composed of six elements; a computer-based instructional system center, a flight simulator, the air traffic control simulation (non-radar trainers), an air traffic control intelligent simulation training system, a meteorological center, and a modern Micro Vax II computer. A major expansion of the ASSL was completed in early 1990 with the support of grants from the Federal Aviation Administration.

The laboratory has the potential of becoming a major simulation training and research laboratory for the National Airspace System. The University's objective is to develop a unique systems-oriented laboratory for education/training, instructional material development and human factors/aviation safety research and development.

CENTER FOR AEROSPACE SAFETY EDUCATION

In order to network the University's safety-related resources, Embry-Riddle has established a Center for Aerospace Safety Education (CASE). The Center is guided by an Advisory Board of national reputation which meets semiannually to provide direction and oversight.

Safety is integrated into all programs throughout the University curriculum. Courses that stress aspects of aviation safety are taught annually throughout the University. To achieve optimum results, the Prescott Campus resources focus primarily on accident investigation, accident prevention and airworthiness; and the Daytona Beach campus resources emphasize systems safety (human factors and information technology) in the National Airspace System. The College of Continuing Education with its connections to Army, Navy and Air Force operations throughout the world, provides real-world expertise and dissemination.

CENTER FOR PROFESSIONAL PROGRAMS

The Center for Professional Programs provides continuing education for those aviation professionals who desire to upgrade their skills in order to keep abreast of the latest developments in the aviation industry. The Center for Professional Programs develops and presents workshops, seminars and institutes to provide current information in areas of particular interest to a variety of aviation professionals. These seminars cover a wide range of topics, including flight, maintenance management, airport financial administration and management, aviation law, and engineering.

The Center for Professional Programs also provides specialized training courses to aviation industries. These courses are "tailor made" for a particular employee classification within an organization. In addition, the University has the capacity through the Center to provide consulting services to the aviation community. As a leader in aviation, the University can apply its expertise to solving a particular problem or developing a specific plan for an organization.

SPECIAL PROGRAMS AND SERVICES

FEATURES OF THE COLLEGE OF CONTINUING EDUCATION (CCE)

The first resident center opened in 1970 at the Army's Ft. Rucker in Alabama. Since then, the College of Continuing Education has met the higher education needs of those in all the military services and in the civilian sector who seek an education through means which fit into their personal and professional obligations. The network of resident education centers, each staffed by administrative personnel and faculty, has grown to include nearly 100 locations in the United States and Europe.

The College of Continuing Education is divided into the European Division and the United States Division. Each division is headed by a dean who reports to the Provost, College of Continuing Education. Both divisions have regional directors who supervise the various centers in their region. There are eight regions in the United States and three regions in Europe. United States centers are located in 31 states, including Hawaii and Alaska. European centers are located in Germany, Spain, United Kingdom, Italy, Netherlands and the Azores.

The students served by the College of Continuing Education are mostly working aviation professionals who are unable to participate in traditionally scheduled and administered daytime classes. Consequently, classes are designed and scheduled to match the special needs of such mobile and busy students. Each year approximately 12,000 full and part-time students participate in associate, bachelor's and master's programs at College of Continuing Education locations.

The first graduate programs offered by Embry-Riddle were at a site in Miami, Florida. Today graduate programs are available at more than 90 College of Continuing Education graduate sites in the United States and Europe. Graduate programs offered by the College of Continuing Education are the Master of Aeronautical Science (MAS), the Master of Business Administration in Aviation (MBA/A), and the Master of Science in Technical Management (MSTM).

At each center offering graduate programs, the student has the opportunity to interact with full-time graduate faculty and a cadre of part-time graduate adjunct faculty. All of the adjunct faculty must meet the same high standards for certification as full-time faculty. Most of the adjunct faculty spend their days working at the same aviation specialty which they teach. This ensures that all of the faculty in the College of Continuing Education meet not only the academic standards set by the University and outside accrediting agencies, but also are among the leaders, experts and visionaries in the aviation world.

CENTER FOR INSTRUCTIONAL DEVELOPMENT AND STANDARDS

The Center for Instructional Development and Standards (CIDS) works with departments and faculty throughout the University to provide media production and perform curriculum analysis, design, development, and evaluation. CIDS is responsible for ensuring standardization of curriculum and individual course content throughout the College and Continuing Education. CIDS works closely with faculty course monitors and CCE Department of Academic Support to ensure that appropriate, current, and quality support materials are available for CCE faculty and students. Additionally, CIDS supports CCE faculty development activities and serves as the focal point for institutional effectiveness.

CCE ACADEMIC SUPPORT

The Academic Support Department is responsible for providing appropriate research and teaching materials to off-campus students and faculty, such as course outlines, case studies, overhead transparencies, and technical reports. The Department coordinates periodical subscriptions for field locations, provides an article reprint service based on contents of the Aviation Tradescan periodical index, maintains a videotape catalog and loans videotapes, distributes aviation-related book collections, and develops guides to local library resources for resident centers. Each field location is also provided with a substantial group of aviation reference materials known as the Riddle Aviation Collection (RAC).

FEATURES OF THE DAYTONA BEACH CAMPUS

CAMPUS MINISTRY

The Office of Campus Ministry on the Daytona Beach Campus is staffed through a freewill association of on-campus clergymen. Their ministry is expanded through the concern of local clergy ministering to many students living off campus. While deeply concerned with students, the Office of Campus Ministry also reaches out to the whole academic environment of faculty, administrators, and staff. Ecumenical cooperation, team ministry, and a high concern for social justice questions and issues characterize the office. Counseling, prayer, Bible study, and discussion groups are among the ministries operative now.

CAREER CENTER

The Career Center encompasses career development and job search services. The staff assists students in making career choices, in preparing for their career and in obtaining career related employment in the aviation and aerospace industries. The Career Center is dedicated to helping students effectively use their education by providing them with the knowledge and skills necessary to compete in today's highly competitive employment market, and by assisting in their transition from campus to career.

ORGANIZATIONS AND ACTIVITIES FOR GRADUATE STUDENTS

The Student Activities Office is the central location for the programming of campus events. This office is the registration point for all chartered clubs and organizations. Students interested in joining an organization should contact the student activities staff for information concerning the organizations that are available to graduate students. One of such organizations is the Graduate Student Association (GSA). The overall goal of GSA is to enhance graduate student life at Embry-Riddle. The association promotes contact with professionals in the aviation industry through guest speakers and trips to aviation facilities. In addition, the GSA also sponsors a wide range of social activities as well as provides numerous opportunities for leadership and community service.

HEALTH SERVICES AND INSURANCE

Good health, which promotes a productive academic career, is the responsibility of the individual student. The Health Services staff is committed to providing students the education and guidance needed to achieve and maintain a healthy lifestyle. Available services include treatment of minor illnesses and injuries, individual health counseling, referrals, and educational programming. Reference materials and audiovisual learning aids complement the personal aspects of a preventive approach to student health care. Local hospitals with 24-hour emergency services are within a short distance of the Daytona Beach campus.

Health insurance is not mandatory for U.S. citizens and permanent residents but strongly recommended. Information on student group insurance premiums and benefits is available at Health Services, Daytona Beach campus. Rates are determined annually and premiums are non-refundable. Health insurance is mandatory for international students. For more information refer to the section on International Student Health Insurance.

SERVICES AND FACILITIES FOR DISABLED STUDENTS

All new students must learn to adjust to a new environment and University life. For the disabled, this adjustment is not always an easy one. Recognizing the possible need for additional or special services, the University has appointed the Director of Health Services as Coordinator for Disabled Student Services at the Daytona Beach campus. Each student's needs are addressed on an individual basis. Resource assistance is provided in such areas as barrier-free access, lifestyle management, testing arrangements, and tutoring referrals. Individuals who require special assistance with certain aspects of their education at Embry-Riddle are encouraged to contact Health Services on the Daytona Beach campus or the College of Continuing Education resident center which they plan to attend.

STUDENT HOUSING

University-managed housing is available to graduate students during the summer semester *only*. Applications and housing deposits are accepted and processed on a first-come, first-served basis. The University can facilitate housing only to those handicapped students who are self-sufficient or require minimal assistance, as determined by the Director of Housing.

OFF-CAMPUS HOUSING

The Off-Campus Housing Office strives to meet the needs of the commuter student population. The office operates a rental listing service which maintains an up-to-date list of properties available for students to rent and a list of students seeking roommates. To take advantage of this service, students must visit the office. NOTE: The office cannot reserve housing for individuals or give out listings over the telephone.

INTRAMURALS AND RECREATIONAL SPORTS FACILITIES

The Department of Intramurals and Recreational Sports provides a variety of intramural sports and contests with opportunities for team and individual competition. Activities include tennis, volleyball, softball, soccer, floor hockey, flag football, and other sports upon request. Educational programs are also offered, with the focus on mental, social, and physical well-being. All currently enrolled students, staff or faculty are welcome to participate in the various activities.

The Daytona Beach campus recreation facilities include a competitive-size swimming pool, lighted outdoor basketball and tennis courts, air conditioned indoor racquetball courts and lighted outdoor volleyball courts adjacent to the lighted softball field. A fitness

center, featuring 13 Nautilus machines, exercise bicycles, and rowing machine, complemented by an adjoining free weight room, round out the recreation facilities.

The Intramurals and Recreational Sports Department works with clubs and organizations to help plan and implement sports programs and activities. The department provides most of the equipment needed for sports activities; however, students are encouraged to bring basic sporting equipment with them.

INTERNATIONAL STUDENT SERVICES

The Office of International Student Services in Dorm II, Room 179, Daytona Beach campus, assumes primary responsibility within the University for the general welfare of international students. The staff provides a variety of special technical and advisory services which include the processing of forms and documentation required by the student's government, sponsor, the University, and the U.S. Government. In addition, the office coordinates a wide variety of campus and community programs which strive to facilitate an interchange of cultures and enrich the students' stay in the United States. Staff members also provide information and orientation about the American educational system and the University at large.

INTERNATIONAL STUDENT HEALTH INSURANCE

The Office of International Student Services administers the health insurance group policy for international students. Health insurance is mandatory for international students. The premium is added to the student's tuition invoice each semester. Alternative insurance policies must be evaluated to determine the adequacy to cover medical costs in the United States.

FINANCIAL INFORMATION

TUITION AND FEES
REFUNDABLE FEES AND CHARGES
PAYMENT PROCEDURES

For information concerning tuition and fees, refunds and the procedures used for making payment, consult the 1992-93 Financial Information brochure which by reference is a part of this catalog. Students attending a College of Continuing Education location may also consult with the director of the resident center they will be attending for financial information.

FINANCIAL ASSISTANCE PROGRAMS

Embry-Riddle believes the primary responsibility for financing an education lies first with the student. However, the University also participates in a number of programs which enable students to meet educational costs.

Financial Aid awards are meant to supplement what the student can contribute toward costs and rarely cover all educational expenses. Graduate students in need of financial assistance to enable them to pursue their post-baccalaureate goals should obtain a brochure from the Financial Aid Office entitled "Financial Assistance Programs," which describes all of the programs, eligibility requirements and application procedures.

Eligibility Requirements

To be considered eligible to apply for most financial assistance programs, students must:

1. Be U.S. citizens or eligible non-citizens;
2. Be enrolled or accepted for admission into a graduate degree program as at least a half-time student;
3. Be registered with Selective Service if required to do so;
4. Establish financial need;
5. Not be in default on a loan or owe a repayment of a previous financial aid award received at any institution.
6. Not be engaged in the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance.

Financial aid applicants must meet University academic requirements and maintain the standards of academic progress described in the Procedures and Regulations section of the catalog. Additionally, financial aid recipients must maintain the standards of satisfactory progress established in accordance with Federal guidelines.

Complete, detailed information about these requirements can be found in the "Standards of Satisfactory Progress for Financial Aid Applicants," a publication available from the Financial Aid Office.

Programs Available

The major categories of financial assistance programs available to graduate students include loans and student employment. Loans from state and federal government sources or from private lenders must be repaid; however, the interest rate is usually low and the repayment period is extended. Most of these programs are based on the financial need of the student; however, there are programs designed to assist students who do not have substantial financial need.

The financial assistance programs available to qualified graduate students are:

- Stafford Student Loans (SSL)
- Parent Loans for Undergraduate Students (PLUS)
- Supplemental Loans for Students (SLS)
- Embry-Riddle Student Employment Program
- Short term loans
- Scholarship programs

Not all programs are available at each Embry-Riddle location.

EDUCATIONAL FINANCING OPTIONS

In addition to the programs administered by Embry-Riddle, a number of privately sponsored programs exist to help students and their families pay for education costs. These programs help by making available loans, line-of-credit plans, and payment plans. The Financial Aid Office provides information on the companies which offer such programs. Information about other financing programs can be found in the brochure entitled "Financing Options For Parents and Students."

VETERANS' EDUCATION BENEFITS

All Embry-Riddle degree programs have been approved by the appropriate State Department of Veterans' Affairs (State Approving Agency) for enrollment of persons eligible to receive education benefits from the U.S. Department of Veterans' Affairs (DVA).

Eligible persons planning to receive DVA Education Benefits while attending Embry-Riddle should contact the CCE resident center or the Veterans' Affairs Office at the Daytona Beach campus for further information and applications for benefits. Students must be pursuing a degree in a specific program to be eligible to receive benefits. Admission procedures for veterans and other eligible persons are the same as those for other students. Students who do not satisfy all requirements for full admission may be certified for two semesters/terms; however, they may be required to repay the DVA for any/all benefits received if they do not achieve full admission status during that time.

Title 38, United States Code, sections 1674 and 1724, requires that education assistance benefits to veterans and other eligible persons be discontinued when the student ceases to make satisfactory progress toward completion of his or her training objective. Accordingly, the University will discontinue certification of enrollment and will inform the DVA of a termination due to unsatisfactory academic progress for graduate students who are subject to dismissal. A specific request must be submitted by the student to reinstate benefits. The U.S. Department of Veterans' Affairs will determine eligibility for reinstatement.

Veterans' progress will be measured according to University standards as published in this catalog and the rules and regulations of the Department of Veterans' Affairs apply.

The criteria used to evaluate progress are subject to change. Application and interpretation of the criteria are solely in the discretion of Embry-Riddle. Students are responsible for notifying the Veterans' Affairs Office of any change in their enrollment, change in personal information affecting their eligibility, and for maintaining compliance with University and Department of Veterans' Affairs requirements.

Students may receive education benefits only for courses which are required for their designated degree program. Students who receive DVA benefits may be subject to stricter academic regulations and should be aware of how auditing courses, enrollment status, withdrawals, repeating a course, changing degree program, and other actions may affect their eligibility to receive benefits.

MILITARY TUITION ASSISTANCE

Military tuition assistance may be available to graduate students on active military duty. The Educational Services Officer at their assigned installation should be contacted for further information.

GRADUATE ASSISTANTSHIPS

Graduate assistantships are academic appointments that are reserved for qualified graduate students at the Daytona Beach Campus. A graduate teaching assistant helps in teaching undergraduate students in specified courses or laboratories under the general supervision of a faculty member. A graduate research assistant is involved in research activities under the direction of a faculty member or a research associate.

To be eligible for a graduate assistantship, a student must be admitted to the graduate school as a full status student and be in good academic standing with a minimum CGPA of 3.00 on a 4.00 basis in all graduate level courses. Entering graduate students must have a minimum of 2.75 undergraduate CGPA. All graduate assistants must be able to demonstrate adequate communication and technical skills.

Assistantship applications can be submitted as part of the admissions application. Qualified graduate students currently enrolled are also encouraged to apply to the School of Graduate Studies and Research at least three months before the beginning of a new semester or term in which an assistantship is sought. Graduate assistantships are awarded on a competitive basis by the Dean of the School of Graduate Studies and Research, following a review and recommendation by the faculty, the Graduate Program Coordinator, and the Department Chair.

In addition to program and sports activities fees and tuition waiver for up to nine (9) credits per semester, graduate assistantships carry a monthly stipend set by the University. Graduate assistants are expected to devote twenty (20) hours each week to effectively carry out assignments under supervision. All graduate teaching or research assistants must be registered for at least six (6) graduate credits at Embry-Riddle for any semester of their appointment. Summer registration is not required but encouraged. Graduate assistants are not permitted to accept other University employment.

GRADUATE INTERNSHIPS

Graduate internships are externally funded, temporary professional or industrial work appointments made available to graduate students enrolled at the Daytona Beach campus. There are two types of internships: resident and non-resident. Resident internships are professional work activities supported by industry, government or similar organizations and conducted on campus under the supervision of a faculty/staff sponsor. Non-resident internships are professional work activities conducted off campus at the supporting organization facility, or equivalent. An on-campus sponsor will coordinate these activities and act as the on-campus liaison during the term of the appointment. Full-time employees of the offering organization are not eligible for an internship appointment and cannot receive elective credit for their professional work service.

To be eligible for an internship appointment, graduate students must be admitted to a graduate program as a full status student and be in good standing with a minimum of 12 completed graduate credit hours and a CGPA of 3.00 on a 4.00 basis. All students must be able to demonstrate adequate communication and technical skills. Internship applications are submitted to the Career Center for any particular appointment and approved by the appropriate academic department.

Students accepted in the internship program must register for the approved number of credit hours in the appropriate departmental internship course and pay all tuition and fees on or before the first day of class in the semester for which the internship is to be applied. Graduate academic credit will be awarded at a rate of one credit hour for every 200 clock hours of work completed up to a

maximum three credit hours in one semester. No more than three (3) internship credit hours may be applied as elective towards the student's degree program. Students will be remunerated for their professional involvement at a rate determined by the sponsoring organization.

ADMISSION POLICIES

There are three ways that a student is able to take classes in the graduate program. The first two are through formal (full or conditional) admission. The third is for qualified students who wish to take individual classes for personal or professional development as non-degree seeking students.

FULL ADMISSION

Prospective graduate students must meet the following criteria, as appropriate, for each program in order to be admitted to full graduate status:

Master of Science in Aerospace Engineering (MSAE)

1. Applicants must possess an earned Bachelor of Science degree in Aeronautical or Aerospace Engineering from an ABET accredited program. Students with accredited Bachelor of Science degrees in other engineering disciplines, mathematics, or physical science who otherwise meet the requirements for full graduate status, may be admitted under conditional graduate status to the MSAE program.
2. Applicants must have earned a minimum overall cumulative grade point average (CGPA) of 2.50 out of a possible 4.00 and must have earned a minimum CGPA of 3.00 out of a possible 4.00 in their junior and senior years, at the institution which awarded the bachelor's degree.
3. A minimum combined score of 1000 on the verbal and quantitative sections of the Graduate Record Examination (GRE) is required.

Master of Aeronautical Science (MAS)

1. Applicants must possess an earned baccalaureate degree from an accredited college or university.
2. Applicants must have earned a minimum overall CGPA of 2.50 out of a possible 4.00, at the institution which awarded the bachelor's degree.
3. A minimum combined score of 1000 on the verbal and quantitative sections of the GRE is required.

Master of Business Administration in Aviation (MBA/A)

1. Applicants must possess an earned baccalaureate degree from an accredited college or university.
2. Applicants must have earned a minimum overall CGPA of 2.50 out of a possible 4.00, at the institution which awarded the bachelor's degree.

3. A minimum combined score of 1000 on the verbal and quantitative sections of the GRE is required. Applicants for admission to the MBA/A program may take the Graduate Management Admission Test (GMAT) in lieu of the GRE. A minimum score of 500 in the GMAT is required.

Master of Science in Technical Management (MSTM)*

1. Applicants must possess an earned baccalaureate degree from an accredited college or university.
2. Applicants must have earned a minimum overall CGPA of 2.50 out of a possible 4.00, at the institution which awarded the bachelor's degree.
3. An admissions interview is required.

*The MSTM degree program is delivered only on-site at selected industry locations.

CONDITIONAL ADMISSION

Students who are not eligible for full admission may be granted conditional admission under certain circumstances. Students may be granted conditional admission until requisite examination scores or final grade records are available. Students may also be granted conditional admission to ascertain their ability to pursue graduate work if previous grades or their GRE or GMAT scores are on the borderline of acceptability or when specific prerequisite courses are required. However, no student will be accepted for admission to graduate programs whose undergraduate cumulative grade point average at the institution which awarded the baccalaureate degree was less than 2.00 out of a possible 4.00.

Students admitted on conditional status will be monitored closely as to scholarly performance and will be restricted to a maximum of twelve credit hours of graduate work. An average of B or better must be maintained and no more than one C may be earned while on conditional status. Failure to do so will result in dismissal of the student from the graduate program.

Deficiencies in prerequisites must be made up in appropriate Embry-Riddle undergraduate courses or their equivalent (see Prerequisite Knowledge Requirements section). These courses do not count toward credits required for the graduate degree.

Students granted conditional admission will be notified of the conditions under which they are admitted. When these conditions have been satisfied, the student will be fully admitted to the program. Eligible course work taken while a student is in conditional status is applicable toward a graduate degree.

Students failing to meet any condition of admission will be barred from further graduate registration.

NOTE: **College of Continuing Education students** may enroll in up to twelve credit hours of graduate courses on a conditional basis without full admission to a graduate program.

Students must earn an average of B or better and no more than one C in order to qualify for full admission into a graduate degree program. Students who fail to achieve the above stipulation will be dismissed.

NON-DEGREE SEEKING STUDENTS

Students possessing a bachelor's degree from an accredited post-secondary institution who have not been admitted to an Embry-Riddle graduate degree program may enroll in graduate courses with the permission of the Dean of the School of Graduate Studies and Research/Provost of the College of Continuing Education. An undergraduate transcript must be submitted to the University before the student will be allowed to enroll, but the GRE/GMAT examinations are not required.

Should a non-degree student subsequently apply for entry into a degree program, **all admission requirements must be met.** Not more than 12 graduate credit hours earned as a non-degree student may be applied to a graduate degree program, and all such credit must have been earned within the seven calendar year period immediately prior to admission to the degree program.

INTERNATIONAL STUDENTS

All international students seeking admission are required to submit satisfactory scores on the GRE or GMAT, as appropriate, and achieve a minimum score of 550 on the TOEFL (Test of English as a Foreign Language) with the following exceptions:

1. International students whose native tongue is English, or who have studied at a United States college or university for at least one year, need not submit TOEFL scores but must submit satisfactory scores on the GRE or GMAT, before their application for admission can be considered.
2. Students educated in foreign countries that do not offer the GRE or GMAT, who apply for admission while residing outside the United States, may be granted, on the basis of hardship, a one-semester postponement of the GRE or GMAT, but not the TOEFL. Permission to register for subsequent semesters will depend upon the submission of scores on the GRE or GMAT.

International students whose scores on the TOEFL and verbal portion of the GRE are not indicative of adequate writing skills are required to write a short essay for examination. If the skills demonstrated in the essay are not acceptable for pursuing graduate work, the examination will be used as a diagnostic tool for placement in appropriate courses which will not count toward a graduate degree.

Graduate students whose native language is not English may be asked to submit satisfactory scores on the Test of Spoken English (TSE) to be eligible for graduate teaching assistantships.

Education received at schools outside of the United States must be evaluated to determine its equivalency to a baccalaureate degree from an accredited institution (ABET for engineers; regional accreditation for others) in the United States. Applicants educated in foreign schools may obtain the required evaluation by submitting official, certified documentation of their educational achievements to Educational Evaluators International, Inc. or Educational Credentials Evaluators, Inc. A form requesting this evaluation can be obtained from the University Director of Admissions Office.

ADMISSION PROCEDURES

Applications for admission for the Daytona Beach campus are to be submitted to:

Embry Riddle Aeronautical University
University Director of Admissions
600 S. Clyde Morris Blvd.
Daytona Beach, Florida 32114-3900
Toll Free (800) 222-ERAU or
Worldwide (904) 226-6115

To apply for admission to graduate programs in the College of Continuing Education, all required credentials must be sent to the resident center which the applicant plans to attend. A listing of the centers can be found in the back of this catalog.

Applications will not be processed until all required credentials are received. Applications received after the submission deadlines specified below will be processed as quickly as possible, but acceptance for admission may not be early enough for the applicant to begin the program as soon as desired.

United States Citizens (and permanent residents of the United States)

All of the following items must be received by the University Director of Admissions at the Daytona Beach campus or the appropriate resident center **at least 15 days** before the first day of the initial term in which the applicant plans to enroll:

1. Completed application form with application fee.
2. Official transcripts of all undergraduate course work from institutions where the baccalaureate degree was earned, for courses which are prerequisites to graduate courses, and for all graduate course work attempted, should be sent directly from each college or university attended. In some cases, applicants wishing to transfer graduate credit may be requested to submit the catalog(s) from the institution where the credit was earned. The catalog must be marked to indicate the courses to be reviewed.

3. Official test result reports for DANTES or CLEP examinations, applicable to undergraduate prerequisite requirements, sent directly from the testing authority.
4. GRE or GMAT scores, as appropriate.

International Student Admission Procedures

International applicants are those non-resident, non-immigrant applicants entering the United States on visas valid for educational purposes.

Embry-Riddle is authorized under federal laws to enroll non-immigrant alien students. International applicants may enroll at the Daytona Beach campus, in the Florida region, and with special approvals, at certain European Division locations. International students interested in enrolling at European locations should contact the local center director or the European Division Headquarters at Wiesbaden, West Germany.

All the following items must be received at the appropriate CCE resident center or by the University Director of Admissions at the Daytona Beach Campus **at least six months** before the first day of the initial term in which the applicant plans to enroll:

1. Completed application form with application fee.
2. Detailed evaluation of all foreign college/university educational credentials by:

   Educational Evaluators International, Inc.
   P.O. Box 5397
   Los Alamitos, CA 90721
   FAX (213) 493-5021 OR

   Educational Credential Evaluators, Inc.
   P.O. Box 17499
   Milwaukee, Wisconsin 53217

   The fee charged for this service is paid by the applicant. The current rate can be obtained from the company, or the University Director of Admissions at Daytona Beach. Since the evaluation process takes some time, allowances should be made so that the six-month application deadline can be met.
3. Official transcripts of course work from U.S. institutions where the baccalaureate degree was earned, for courses which are prerequisites for graduate courses, and for all graduate course work attempted, should be sent directly from the institution attended.
4. All applicants whose native language is not English or who were educated at schools where English was not the language of instruction in all disciplines **must submit** evidence of English language proficiency. Evidence consists of an official test result report for the Test of English as a Foreign Language (TOEFL) received **directly** from the testing agency. The minimum acceptable score is 550.

5. Bank letter, affidavit of financial support, or official notification of public or private organizational sponsorship. International students must be fully prepared upon arrival at the University to meet all normal living expenses and manage their finances throughout their stay.

Upon notification of acceptance for graduate study, international applicants must remit the required advance tuition deposit. The amount of the required deposit and associated procedures are described in the 1992-93 Financial Information brochure. Upon receipt of the deposit, the University will send written confirmation of enrollment eligibility and issue the Certificate of Eligibility (U.S. Immigration and Naturalization Service form I-20). The I-20 form must be in the students' possession before departure from their home country. Students must present the I-20 form to the nearest U.S. embassy or consulate to obtain the necessary entry visa. Changing U.S. immigration status from tourist (or other) to student is not possible after arrival at the University.

The foregoing rules and procedures apply equally to international students already studying in the United States who wish to pursue graduate study at Embry-Riddle. The only exception is that they must follow the required procedures to obtain approval of the U.S. Immigration and Naturalization Service for the transfer. It is recommended that they seek the assistance of the international student advisor at the school from which they wish to transfer.

ADMISSION TIME LIMIT

Applicants who have been accepted for admission into Embry-Riddle graduate programs must enroll in Embry-Riddle graduate courses within one year from the date of the letter notifying them of acceptance. Those who do not enroll within the specified time period must reapply for admission according to the regulations and procedures in effect at the time of reapplication.

TRANSFER AND ADVANCED STANDING CREDIT

The combined total of transfer and advanced standing credit applied to an Embry-Riddle graduate degree may not exceed twelve credit hours. Subsequent to initial enrollment at Embry-Riddle, all graduate degree requirements must be completed at the University unless an articulation agreement with the other institution is in force at the time. Credit for Embry-Riddle graduate courses has precedence over credit from other sources and, therefore, is applied toward degree requirements before any other credit.

Transfer or advanced standing credit will be applied to the requirements for a degree only if the subject matter is management or aeronautically oriented and is specifically relevant to the applicant's Embry-Riddle graduate degree program. Credit for graduate courses or advanced standing used to satisfy the requirements for

an undergraduate degree will not be applied to the requirements for a graduate degree.

A maximum of twelve semester credit hours of appropriate course work for which graduate credit was earned (not credit by examination) at other ABET accredited programs may be applied towards the MSAE. Up to a maximum of twelve semester credit hours earned in graduate courses completed at other regionally accredited colleges and universities may be considered for transfer and application to the requirements for all other Embry-Riddle master's degrees.

A transfer course may be used to satisfy a graduate degree core requirement only after it has been determined to be fully equivalent to the required course. Transfer credit will be accepted only if all of the following conditions are satisfied:

1. Official transcripts from the institution where the credit was earned are received directly from that institution.
2. The courses were completed with a minimum grade of B.
3. The courses were completed within the seven year period immediately preceding the date the application for admission is received at the College of Continuing Education Admissions, Records and Registration Office or the Office of University Director of Admissions on Daytona Beach campus.

Advanced standing credit may be granted for successful completion of certain senior United States military service schools. Credit for the completion of senior service schools will be applied to degree requirements if the subject matter is relevant to the applicant's degree program. The seven-year time limit will not be applied to advanced standing credit for eligible senior military service schools if the service member is on active duty when accepted for admission. The seven-year time limit commences on the date the service member separates from active military service. The eligibility of a school for advanced standing credit and the level of credit to be granted is in accordance with the current "Guide to the Evaluation of Educational Experiences in the Armed Services" published by the American Council on Education and established University procedures. Official documentation of the successful completion of senior service schools must be submitted with the application for admission.

Transcripts or other credentials for learning acquired prior to admission, but not submitted as part of the application for admission are not acceptable after students have been admitted. Such credentials will not be evaluated for credit.

Individual petitions for credit for prior learning beyond the provisions described above are not acceptable.

UNDERGRADUATE ENROLLMENT IN GRADUATE COURSES

Embry-Riddle undergraduate students who anticipate applying for graduate programs may request permission to take 500-level Embry-Riddle courses in excess of their undergraduate degree requirements during their senior year. College of Continuing Education students must be within two courses of completion of requirements for the bachelor's degree. The credits will be held in escrow until the student receives the bachelor's degree and has been accepted into a graduate program. A grade of B or better must be earned in any such courses in order for them to apply against graduate degree requirements. Any 500-level courses used to fulfill undergraduate elective requirements cannot be used for graduate credit.

CREDIT BY EXAMINATION

An MSAE student may obtain graduate credit by examination in approved 500-level courses. The pass-fail examination must be passed as certified by the examiner. Credit by examination cannot be earned for 600-level courses. Conditional status enrollment students are not eligible for credit by examination.

REGISTRATION

All students are required to register for each semester/term in which they plan to attend classes. Tuition deposits, registration, and fee payments must be made in accordance with the instructions published by the Office of Records and Registration or CCE Center Directors. A student is not officially enrolled until all the registration requirements are completed.

Penalties will be charged for late payment. Late registration will be allowed during the first few days of classes if unusual circumstances prevent the student from registering during the normal registration period. However, registration will not be allowed after the last day for late registration, as designated in the Academic Calendar or first week of classes for CCE students. CCE students must see the resident center director for specific registration information.

PREREQUISITE KNOWLEDGE REQUIREMENTS

The prerequisite knowledge requirements listed after the descriptions of some graduate courses signify that comprehension of the major concepts of those subjects is necessary to benefit fully from the graduate courses. Students must demonstrate comprehension of the requisite knowledge before registration in the graduate courses is permitted. Evidence of prerequisite satisfaction must be submitted for inclusion in students' official academic files. Satisfaction of prerequisite requirements may be demonstrated by any of the following means:

1. Completion of the Embry-Riddle undergraduate courses equivalent to the prerequisite requirements with a minimum grade of C.
2. Submission of official transcripts from regionally accredited colleges/universities showing completion of courses substantially equivalent to the Embry-Riddle undergraduate courses with a minimum grade of C.
3. Satisfactory completion of Embry-Riddle comprehensive subject examinations. Special concentrated review courses in accounting and economics, ABA 500 and ABA 501, are offered at many locations as refreshers for students who choose this alternative.
4. Submission of official CLEP/DANTES test result reports showing satisfactory scores on tests equivalent to the designated courses.
5. Evaluation of prior learning based on recommendations of the American Council on Education.
6. Aeronautical Science prerequisites may be satisfied by documenting possession of certain FAA certificates and/or military flight experience. Details may be obtained from the Aeronautical Science Department or CCE resident center.
7. Students who believe they possess the required prerequisite knowledge by virtue of experience and training not covered in the list above may receive written permission from the instructor to enroll, provided that they can demonstrate readiness based upon an interview.

PREREQUISITE KNOWLEDGE EQUIVALENCIES

Prerequisite Requirements	ERAU Undergrad. Courses	Other Credentials
Aircraft systems and components	AS 356 or AMT 271	FAA certificates: Commercial pilot Airframe mechanic U.S. military flight officers
Basic aerodynamics	AS 309	FAA certificates: Airline Transport pilot (ATP) U.S. military pilots
Basic aircraft performance	AS 310	FAA certificates: ATP with type rating Flight Engineer U.S. military pilots
Basic meteorology	AS 201	FAA certificates: Commercial pilot U.S. military flight officer Meteorologists, weather forecasters and specialists
Basic navigation	AS 240	FAA certificates: Instrument rating U.S. military flight officer
Flight rules and regulations		FAA certificates: Commercial pilot U.S. military flight officer
Principles of management	MS 201	U.S. military officers U.S. military NCO's/Petty Officers with NCO/Senior Enlisted Academy

NOTE: The term military flight officers as used above refers to pilot and non-pilot officers with cockpit duties. Examples include navigators, electronic warfare officers, navigator/bombardiers, etc.

GRADUATE ACADEMIC PROCEDURES AND REGULATIONS

All University graduate academic and non-academic procedures and regulations are subject to change. Therefore, all procedures and regulations in effect at a given time may not be reflected in the current catalog. When such changes do occur, notice of the change may be in the form of an addendum to the current graduate catalog. Catalog addenda are effective on the date published.

STUDENT RESPONSIBILITIES

Students are responsible for being fully informed about all procedures and regulations governing their participation in Embry-Riddle graduate programs. The necessary information may be found in the current graduate catalog, Student Handbook, orientation and information packets published and distributed by the campuses and resident centers, and periodic announcements published by the University. University regulations will not be waived because a student pleads ignorance of established standards and procedures.

STANDARDS OF CONDUCT

Graduate students are expected to observe the generally recognized standards of acceptable personal conduct. As present and future aviation and business leaders, they are expected to assume personal responsibility for their actions and the conduct of their personal affairs. The University reserves the right to suspend or dismiss a student at any time and without further reason, should the student's conduct, academic or other performance be regarded as undesirable. "Undesirable conduct" is defined by the University as any conduct which poses a risk of danger to the health, safety, or property of members of the University community, including but not limited to, other students, faculty, staff, administrative officers or the student himself or herself; or conduct which is disruptive of the educational process of the University; or any other just cause.

Success in aviation requires a commitment to excel and the discipline to avoid unsafe practices or habits. The use of drugs constitutes an unsafe practice and is totally incompatible with the aviation environment. In recognition of this, it is the policy of Embry-Riddle that using or possessing marijuana, or any narcotic, stimulant or hallucinogenic drug will be cause for immediate suspension or dismissal.

Embry-Riddle Aeronautical University is committed to intellectual integrity in all its academic pursuits. Sanctions may, therefore, be imposed by faculty, departments, divisions, or campuses of the University for cheating (defined as using inappropriate sources of information on a test), or being a party to obtaining or possessing an examination prior to the time the examination is scheduled, or plagiarism (defined as presenting as one's own the ideas, words, or products of another).

Such sanctions may involve a failing grade on the assignment, a failing grade for the course, suspension or even dismissal from the University.

Academic dishonesty is further defined to include the following:

1. Forgery and unauthorized alteration or misuse of one's own or another's academic records or transcripts.
2. Knowingly furnishing false or misleading information to the University when seeking admission to the University or campus.
3. Forging, altering, falsifying, destroying, or using without authorization a University document, record, or identification. (Using Embry-Riddle stationery, business cards, logo, or otherwise identifying oneself as an agent of the University for personal, non-University business.)
4. Misuse of computing facilities and/or security violations (including attempted violations) of computing facilities.

ACADEMIC ADVISING

At the Daytona Beach campus, each new student is assigned an academic advisor. At College of Continuing Education locations, the resident center director is responsible for academic advisement. The academic advisor assists the student in determining and scheduling an academic program to meet the student's educational aims and goals. The advisor's signature on a student's registration form is required before a student will be allowed to register.

Academic advisors post a schedule of office hours, and all students should feel free to call on their advisors at any time for assistance or discussion, as appropriate.

ATTENDANCE

Students are expected to attend all scheduled classes. As active participation in class is an important element of graduate study, it will be considered by instructors and reflected in the assignment of final course grades. At times, circumstances will force a student to be absent from class. On such occasions, all matters related to the absence, including making up missed work, are to be arranged between the student and the instructor. Should an absence be anticipated, the student should contact the instructor in advance to make arrangements that might include the audio recording of the missed session.

GRADUATE CLASS SCHEDULES

A schedule of classes is prepared for each semester/term and is made available to students prior to registration.

The length of a term varies throughout the College of Continuing Education according to the needs of the student population served by the different graduate locations. Thus, the academic year may be composed of three to five terms. Classes meet from one to three times per week, typically on weekday evenings or during the day on weekends.

The course offerings for each term are planned to meet the academic needs of the majority of students. All core courses for the degree programs offered at a resident center are scheduled at a frequency which depends largely on the size of the program at a particular location. Elective course offerings are subject to other variables such as perceived student interest and the availability of appropriately qualified faculty.

The University reserves the right to make adjustments to the published schedule, including the cancellation of classes, whenever deemed necessary and appropriate.

COURSE LOAD

The maximum permissible course load is twelve credit hours per term. The Dean of the School of Graduate Studies and Research on the Daytona Beach campus or the College of Continuing Education resident center director may restrict a student's enrollment when deemed in the best interests of the student. If a student demonstrates exceptional academic performance, the department chair/resident center director may approve a one-course overload. Any additional overload must be approved by the Dean of the School of Graduate Studies and Research/the Provost of the College of Continuing Education.

Full-time enrollment status varies by length of term as follows:

Term Length	Credit Hours
5 Weeks or less	3
6–12 Weeks	6
13–18 Weeks	9

AUDITING A COURSE

Any student eligible for admission to the graduate program may register to audit any graduate course providing all prerequisite requirements are satisfied. Regular class attendance is required. A student who fails to maintain satisfactory attendance, as determined by the instructor, will be assigned a grade of W. A student may change registration from audit to credit only during the "Add" period at the beginning of the semester/term. At the Daytona Beach Campus, the "Add" period is shown as the last day for late registration on the calendar in the front of this catalog. For College of

Continuing Education students, the "Add" period is defined by the individual resident center in accordance with the terms of any contract or memorandum of understanding/agreement in force. A change of registration from credit to audit may be made only during the authorized withdrawal period.

WITHDRAWAL FROM A COURSE

A Daytona Beach Campus student may withdraw from a course at any time during the first eight weeks of a semester and during the first four weeks of a summer term. A College of Continuing Education student may withdraw from a course until mid-term or as stated in the contracts or memoranda of understanding/agreement in effect at certain graduate locations. A student may not drop a course after the officially designated date. In the latter situation, the resident center will publish and display notification of the applicable regulation. The student must complete and sign the proper university form to accomplish a withdrawal. The effective date of the request is the date it is received by the center director/Office of Records and Registration. An official withdrawal cannot be accomplished simply by ceasing regular class attendance. When a course has not been completed and the official withdrawal procedure has not been properly followed, a grade of F will be assigned.

WITHDRAWAL FROM THE UNIVERSITY

Withdrawal from all University graduate courses constitutes withdrawal from the University. When students file for withdrawal from the University after the end of the official withdrawal period, a grade of WF (Withdrawal-Failing) will be assigned for each course in which they are enrolled. A student may withdraw from the University when the following conditions are met:

1. The proper University form, fully completed and signed, has been submitted to the center director/Office of Records and Registration prior to the scheduled administration of any final examinations for courses in which the student is enrolled.
2. All financial obligations to the University have been satisfied prior to submission of the withdrawal request.

An official withdrawal cannot be accomplished by simply ceasing class attendance. When courses have not been completed and the official withdrawal procedure has not been followed, grades of F will be assigned. In situations that do not meet the above criteria but involve exceptional circumstances that may create severe hardship for the student, the student may petition the Dean of the School of Graduate Studies and Research at the Daytona Beach Campus or the Provost, College of Continuing Education for special consideration.

GRADING POLICY

The following four-point scale is used to document student performance:

GRADE	ACHIEVEMENT RATING	GRADE POINTS
A	Excellent	4
B	Satisfactory	3
C	Passing	2
F	Failure	0
AU	Audit	0
I	Incomplete (passing)	0
IP	Thesis in progress	0
N	No grade submitted by instructor	0
P	Passing grade (credit)	0
T	Credit accepted by transfer	0
W	Withdrawal from a course	0
WF	Withdrawal from the University (failing)	0
X	Credit by examination or advanced standing	0

Incomplete Grade

The incomplete grade of I is a temporary grade. An instructor may assign an I grade to a student who is passing but unable to complete the course requirements before the scheduled end of the term because of severe hardship beyond the control of the student as determined by the instructor. At all locations, an I grade must be redeemed no later than the end of the third calendar month following the term in which the I grade was assigned. Incomplete grades which are not redeemed are automatically converted to course grades of F upon expiration of the redemption period.

The resident center director/or the CCE Office of Records and Registration may restrict the enrollment of students who have outstanding incompletes or a history of repeated incompletes.

Graduate Internship Grading

Upon completion of each work assignment a final grade of P or F will be assigned by the academic department faculty advisor based on direct review of the intern's final report and on recommendations offered by the employing manager of the sponsoring organization, as appropriate.

Graduate Research Project Grading

Upon completion of the graduate research project, a final grade of P or F will be awarded as determined by the student's project review committee consisting of two faculty members: a graduate research project advisor and a project reader.

Thesis Grading

Research for a Master's thesis normally extends over a period of two or more terms. While the research is in progress, a temporary grade of IP will be awarded at the end of each term. Upon completion of the research, a final grade of P or F will be awarded as determined by the candidate's thesis committee. The thesis option is not available to CCE students.

CALCULATION OF THE GRADE POINT AVERAGE

The grade point average (GPA) is determined by dividing the number of grade points earned at Embry-Riddle by the total number of credit hours attempted. Only courses for which grades of A, B, C, F, and WF are awarded count as hours completed. A GPA for each term and a cumulative GPA (CGPA) are computed for each student for graduate work completed with the University.

A repeated course is considered an additional course. All attempts at a course will be included in the calculation of the GPA. An exception may be granted under the following conditions:

A student may, upon written request, be permitted one opportunity to repeat a course in which a grade of less than B has been earned for the purpose of improving the student's cumulative GPA during the pursuit of a graduate degree. Both grades will be shown on the ERAU transcript, but only the grade attained by retaking the course will be included in the calculation of the CGPA. This policy does not apply to students under non-degree or conditional admission status.

GRADE REPORTS

Grade reports are issued to students at the end of each term. All reports of grades are mailed directly to the addresses provided by students in compliance with the provisions of the Federal statute, Public Law 93-380, cited as the Education Amendments of 1974, Section 438, Protection of the Rights and Privacy of Parents and Students.

The University is prohibited from releasing grade information without the express written authorization of the student. Such authorizations must be granted each term as blanket authorizations are prohibited by law.

PRIVACY OF STUDENT RECORDS

The rights and privacy of students are the subject of Public Law 93-380 which became effective in 1974. The law requires that a student sign individual release forms for each company, school, or individual to whom he or she desires that information be released. The University may disclose certain items of directory information

without prior written consent, unless notified in writing to the contrary by the student. Directory information consists of the following: student name, address, telephone number, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees and awards received, most recent previous school attended and photograph. Additionally, the law authorizes students to review their files. Any student desiring additional information concerning the law should contact the Dean of Students Office or a CCE Center Director.

TRANSCRIPT REQUEST

Upon the written request of the student when applying for graduation, one complete official transcript marked "Issued to Student" will be furnished to the student without charge. For additional transcripts, **a signed request** for the academic transcript, accompanied by a fee (see 1992-93 Financial Information Brochure), must be made by the student to the campus Student Records Office. Transcripts will not be released for students who have failed to meet their financial obligations to the University.

STANDARDS OF ACADEMIC PROGRESS

Academic Warning

Academic Warning is imposed and entered on the permanent record of students when the cumulative grade point average (CGPA) falls below 3.00. Students admitted on conditional status are considered to be on Academic Warning at the time of entry.

After the term in which the CGPA fell below 3.00, students placed on Academic Warning are **entitled to attempt no more than twelve additional graduate credit hours in order to raise** their CGPA to the required minimum of 3.00. Students on Academic Warning may be subject to course/load limitations by the Dean of the School of Graduate Studies and Research/Provost of the College of Continuing Education. Since a limited enrollment opportunity to remediate a grade point deficiency is provided, students on Academic Warning are still considered to be in good standing with the University.

Dismissal

Students will be dismissed from the graduate program when any of the following conditions occur:

1. Students admitted on conditional status who fail to satisfy the conditions of their admission by earning less than a B average or more than one C during the first twelve credit hours of graduate work attempted.

2. A final grade of less than a B is earned in any three graduate courses.
3. A final grade of F has been awarded for any two graduate courses. (Students in the Master of Science in Technical Management program earning a grade of F in TM 500, Communications and Computer Skills with Quantitative Methods.)
4. The cumulative grade point average has not been raised to at least 3.00 within the next 12 graduate hours attempted after the term in which the CGPA fell below 3.00.
5. The cumulative grade point average has fallen below 2.50.

Students may appeal an academic dismissal by submitting a petition in writing detailing the existence of any exceptional mitigating circumstances to the Dean, Schools of Graduate Studies and Research or Provost, College of Continuing Education within 30 calendar days of receipt of the dismissal notice. The Dean/Provost will refer the student petition to an appropriate appeals committee for recommendation. Upon recommendation of the appeals committee, the Dean of the School of Graduate Studies and Research/Provost of the College of Continuing Education reviews the case(s) and makes the final determination of the action to be taken. Such action shall be taken in a timely manner not to exceed 30 days of the receipt of the petition. Once confirmed, the academic dismissal is final and the student will not be permitted to take any further graduate or undergraduate courses with the University.

DEGREE COMPLETION TIME LIMIT

All requirements for an Embry-Riddle master's degree must be completed within seven years from the date of initial enrollment.

CONTINUOUS ENROLLMENT

Students are not considered to be continuously enrolled if they:

1. Do not enroll in an Embry-Riddle graduate course for more than two years,
   or
2. Have been suspended or dismissed from the University,
   or
3. Did not complete an Embry-Riddle master's degree within the seven year time limit.

Students who fail to maintain continuous enrollment for any reason must reapply for admission.

READMISSION TO THE GRADUATE PROGRAM

Application for readmission is made on the standard application for graduate admission form and submitted to the Office of University Director of Admissions on the Daytona Beach Campus or the College of Continuing Education resident center which the student

plans to attend. Documentation supporting the readmission must accompany the application. Upon recommendation of a review committee, the Dean of the School of Graduate Studies and Research, Daytona Beach, or the Provost, College of Continuing Education renders the final acceptance decision. If the readmission is approved, the student must follow the provisions of the catalog in effect at the time of approval.

At the time of readmission, the criteria for transfer credit and advanced standing are applied to all previous graduate study, including previously completed Embry-Riddle graduate courses, and any relevant experience.

RESIDENT CREDIT

A minimum of twenty-four credit hours of graduate work including the last nine credit hours must be completed at Embry-Riddle to qualify for a master's degree.

ADDITIONAL GRADUATE DEGREES

A graduate student is allowed to apply up to twelve applicable credit hours from one graduate degree program to meet the requirements of another graduate degree program. In order to be awarded a second graduate degree, a minimum of twenty-four additional graduate credits must be earned in residence at Embry-Riddle.

GRADUATION REQUIREMENTS

Before an Embry-Riddle master's degree will be conferred on any student, the general requirements of the University and the specific requirements of the degree sought must be satisfied. A summary of the graduation requirements for all students follows:

1. Successfully complete all required courses listed in the applicable University graduate catalog for the degree sought.
2. Successfully complete a minimum of thirty-six graduate credit hours acceptable toward a single master's degree.
3. Satisfy the Embry-Riddle graduate residency requirement by completing the last nine graduate credit hours at Embry-Riddle and a minimum total of twenty-four Embry-Riddle graduate credit hours.
4. Successfully complete a thesis or graduate research project in partial fulfillment of the requirements for the degree.
5. Earn a cumulative GPA of at least 3.00 for all Embry-Riddle graduate course work.
6. Satisfy all debts and obligations to the University or a diploma or transcript will not be issued.
7. Be recommended by the graduate faculty, appropriate College of Continuing Education resident center director, and the

Dean, School of Graduate Studies and Research/Provost, College of Continuing Education.

8. A diploma will not be granted to a student on probation for conduct.

APPLICATION FOR GRADUATION

Daytona Beach campus students may graduate only on the commencement dates specified in the calendar on page 5 of this catalog. College of Continuing Education students may graduate several times during the year. (See resident center director for details.) An application for graduation must be initiated by the student and received by the appropriate Records and Registration Office within the time limit specified. In the event the graduating student does not attend the scheduled graduation exercise, the diploma will be mailed to the address requested by the student.

GRADUATE CATALOG APPLICABILITY

The provisions of the catalog in effect the semester/term a student initially matriculates remain applicable unless the student changes degree programs, fails to maintain continuous enrollment, or formally petitions to come under a later catalog. The applicable catalog for College of Continuing Education students is determined by the date the admission application is signed and the application fee is paid. In the event that a student changes degree programs, or petitions for a later catalog while remaining in the same degree program, the catalog in effect on the date the change of program/petition was approved becomes applicable.

PROGRAMS OF STUDY

Professor Frank Wencel and a student discuss hurricane behavior.

INTRODUCTION

Status quo is virtually an unknown concept in the aviation industry. The technology with which aviation works and the national and international regulations by which it must abide are subject to rapid, frequent, and sweeping change. Aviation touches every sphere of modern personal and business life and, therefore, must be sensitive to and respond to stimuli from a variety of unrelated sources. A healthy aviation industry is critical to the nation's economic well-being and security.

Embry-Riddle Aeronautical University graduate degree programs are designed to stress pragmatic solutions to the managerial, technological and organizational problems likely to arise in the aviation and aerospace industry today. The actual problems presently confronting industry are brought into the classroom for analysis making use of the latest theories, tools, and techniques available to engineers, operations personnel and the managers. Case studies, simulations, computer-aided analysis and computer-assisted design as well as experiential exercises are interspersed throughout the curricula to achieve a balance between theory and the realities of the aviation/aerospace industrial world of the 1990's.

Opportunities are provided within each degree program to tailor the curriculum to meet specific, individual career objectives. Classes are scheduled to accommodate both full and part-time study. Many of the graduate courses are non-sequential, allowing study to begin in any term. Electives needed to complete the requirements of any graduate degree may be selected from among the 500/600 numbered courses (except ABA 500 and ABA 501) listed in this catalog. Each graduate degree program requires a minimum of thirty-six credit hours of graduate course work.

MASTER OF SCIENCE IN AEROSPACE ENGINEERING (MSAE)

The Master of Science in Aerospace Engineering provides formal postbaccalaureate study in areas of knowledge required by engineers engaged in aircraft/aerospace oriented research and development and design activities for public and private aerospace enterprises. Embry-Riddle's MSAE program allows specialization in aerodynamics, structures, and propulsion. Candidates for the MSAE degree can select courses beyond the required core with the goal of building a program that supports going either directly into the aerospace engineering profession or on to doctoral studies elsewhere.

The MSAE degree requires a minimum of thirty-six credit hours of course work. This degree consists of a twelve credit hour core course requirement and an elective component composed of either (1) eighteen additional credit hours plus a six credit hour thesis (the thesis option), or (2) an additional twenty-one credit hours and a three credit hour graduate research project (graduate research project option).

MSAE DEGREE REQUIREMENTS

Required Courses

The following twelve credit hours of core courses are required of all MSAE students:

COURSE	NUMBER/TITLE	Credits
MA 502	Boundary Value Problems	3
AE 502	Strength and Fatigue of Materials	3
AE 504	Advanced Compressible Flow	3
AE 506	Airplane Dynamic Stability	3

Elective Courses

The remaining courses are to be selected with a graduate advisor's approval from the following list:

COURSE	NUMBER/TITLE	Credits
AE 508	Heat Transfer	3
AE 510	Aircraft Structural Dynamics	3
AE 512	Combustion I	3
AE 590	Graduate Seminar*	1-3
MA 504	Theory of the Potential	3
MA 506	Probability for Engineers	3
MA 508	Applied Stochastic Processes	3
MA 510	Optimization Techniques	3
AE 601	Combustion II	3
AE 602	Continuum Mechanics	3
AE 604	Finite Element Fundamentals	3
AE 606	Finite Element Aerospace Applications	3
AE 608	Introduction to Computational Aerodynamics	3
AE 610	Computational Aerodynamics	3
AE 612	Analysis of Aircraft Plate and Shell Structures	3
AE 614	Analysis of Aircraft Composite Structures	3
AE 616	Advanced Aircraft Structural Dynamics	3
AE 620	Boundary Layer Theory	3
AE 640	Turbine Engine Propulsion Systems	3
AE 642	Rocket Engine Propulsion Systems	3
AE 690	Graduate Research Project	3
AE 696	Graduate Internship in Aerospace Engineering	1-3
AE 699	Special Topics in Aerospace Engineering	1-3
AE 700	M.S. Thesis	6

* State-of-the-art design topics are regularly offered through the graduate seminar course and may be a component of the student's research activity.

MASTER OF AERONAUTICAL SCIENCE (MAS)

The Master of Aeronautical Science program is designed to enable the aviation/aerospace professional to obtain a generalist education oriented degree. It provides an opportunity for flight crew members, air traffic control personnel, flight operations specialists, industry technical representatives and aviation educators to enhance their knowledge and pursue additional career opportunities.

Entry into the MAS program requires possession of an undergraduate foundation in the areas of college-level mathematics, introduction to computers, economics, behavioral science, and aviation rules and regulations.

There are four specializations which the student may choose from: Aeronautics, Aviation/Aerospace Operations, Aviation/Aerospace Education, and Aviation/Aerospace Management. All students must complete the Advanced Aviation/Aerospace Science Core consisting of twelve credits. The student then completes twelve credits which make up the selected aviation/aerospace specialization. The remaining twelve credits consist of electives and either a thesis or a graduate research project. The thesis option is not available to CCE students.

MAS students can also opt for a dual specialization. This can be accomplished by taking all elective courses toward the second specialization and a minimum of three additional credit hours for a total of 12 credit hours which make up a specialization. Students must declare the dual specialization before completion of the program.

MAS DEGREE REQUIREMENTS

MAS AERONAUTICS SPECIALIZATION

Advanced Aviation/Aerospace Science Core	**Credits**
MAS 602 The Air Transportation System	3
MAS 603 Aircraft and Spacecraft Development	3
MAS 604 Human Factors in the Aviation/Aerospace Industry	3
MAS 605 Research Methods and Statistics	3
	12

Aeronautics Specialization	**Credits**
MAS 509 Advanced Aerodynamics	3
MAS 515 Aviation/Aerospace Simulation Systems	3
MAS 517 Advanced Meteorology	3
MAS 607 Advanced Aircraft/Spacecraft Systems	3
	12

Electives	**Credits**
Option I	
MAS/ABA (500-600 Level) Electives AND	6
MAS 700 Thesis OR	6
Option II	
MAS 690 Graduate Research Project AND	3
MAS/ABA (500-600 Level) Electives	9
	12
Total Required	36

MAS AVIATION/AEROSPACE OPERATIONS SPECIALIZATION

Advanced Aviation/Aerospace Science Core	**Credits**
MAS 602 The Air Transportation System	3
MAS 603 Aircraft and Spacecraft Development	3
MAS 604 Human Factors in the Aviation/Aerospace Industry	3
MAS 605 Research Methods and Statistics	3
	12

Operations Specialization	**Credits**
MAS 606 Aviation/Aerospace Communication/Control Systems	3
MAS 608 Aviation/Aerospace Accident Investigation and Safety Systems	3
MAS 620 Air Carrier Operations	3
MAS 622 Corporate Aviation Operations	3
	12

Electives	**Credits**
Option I	
MAS/ABA (500-600 Level) Electives AND	6
MAS 700 Thesis OR	6
Option II	
MAS 690 Graduate Research Project AND	3
MAS/ABA (500-600 Level) Electives	9
	12
Total Required	36

MAS AVIATION/AEROSPACE EDUCATION SPECIALIZATION

Advanced Aviation/Aerospace Science Core	**Credits**
MAS 602 The Air Transportation System	3
MAS 603 Aircraft and Spacecraft Development	3
MAS 604 Human Factors in the Aviation/Aerospace Industry	3
MAS 605 Research Methods and Statistics	3
	12

Education Specialization	**Credits**
MAS 515 Aviation/Aerospace Simulation Systems	3
MAS 550 Aviation Education Foundations	3
MAS 652 Continuing Education's Role in Aviation	3
MAS 654 Adult Teaching and Learning Techniques	3
	12

Electives	**Credits**
Option I	
MAS/ABA (500-600 Level) Electives AND	6
MAS 700 Thesis OR	6
Option II	
MAS 690 Graduate Research Project AND	3
MAS/ABA (500-600 Level) Electives	9
	12
Total Required	36

MAS AVIATION/AEROSPACE MANAGEMENT SPECIALIZATION

Advanced Aviation/Aerospace Science Core	**Credits**
MAS 602 The Air Transportation System	3
MAS 603 Aircraft and Spacecraft Development	3
MAS 604 Human Factors in the Aviation/Aerospace Industry	3
MAS 605 Research Methods and Statistics	3
	12

Management Specialization	**Credits**

The student must complete 12 credit hours from the following list of courses:

ABA 513 Human Resource Management	3
ABA 521 Management Information Systems	3
ABA 632 Aviation Labor Relations	3
ABA 645 Airport Management	3
MAS 609 Aircraft Maintenance Management	3
MAS 636 Aviation/Aerospace Planning Systems	3
MAS 640 Supply and Distribution in the Aviation/Aerospace Industry	3
MAS 641 Production and Procurement Management in the Aviation/Aerospace Industry	3
MAS 643 Management of Research and Development in the Aviation/Aerospace Industry	3
	12

Electives	**Credits**
Option I	
MAS/ABA (500-600 Level) Electives AND	6
MAS 700 Thesis OR	6
Option II	
MAS 690 Graduate Research Project AND	3
MAS/ABA (500-600 Level) Electives	9
	12
Total Required (At least 18 credits must be MAS courses)	36

MASTER OF BUSINESS ADMINISTRATION IN AVIATION (MBA/A)

The Master of Business Administration in Aviation is designed to emphasize the application of modern management concepts, methods, and tools to the challenges of aviation and general business. The special intricacies of aviation are woven into a strong, traditional business foundation and examined in greater detail through the wide variety of electives.

The demand for professional managers can only continue to grow in response to the increasing need to improve the efficient and effective use of scarce resources; to operate in an atmosphere of heightened national and international competition; to accommodate the expansion of the emerging nations; and to respond to the call to preserve the fragile environment. The MBA/A curriculum is oriented toward the needs of the strategic decision-maker in the management hierarchy.

Versatility and analytical resourcefulness are two of the key aims of the MBA/A. While the curriculum is highly structured, part of it can be individually molded to satisfy personal interests. The Master of Business Administration in Aviation graduate possesses a degree that signifies knowledge of the unique characteristics of the aviation industry and the management principles underlying all business.

Entry into the MBA/A program requires possession of an undergraduate business foundation in the areas of statistics, accounting, marketing, management, economics, finance and computers. Specific prerequisites for each graduate course in the curriculum are contained in the Course Description section of this catalog. The prerequisite for any graduate course must be satisfied before enrollment in the course is permitted. Students should assume responsibility to see that foundations and prerequisites are satisfied.

All students must complete 24 credit hours of graduate core courses. The remaining 12 credits consist of electives and either a thesis or a graduate research project. The thesis option is not available to CCE students.

MBA/A DEGREE REQUIREMENTS

Advanced Aviation Business Core	**Credits**
ABA 511 Operations Research	3
ABA 513 Human Resource Management*	3
ABA 514 Marketing Management	3
ABA 517 Managerial Accounting	3
ABA 518 Corporate Finance	3
ABA 520 Organizational Behavior*	3
ABA 521 Management Information Systems	3
ABA 602 Economics of Air Transportation	3
ABA 635 Business Policy Analysis	3
Core Total Required	24-27

* Students are required to have one course in Human Resource Management or one course in Organizational Behavior. Either or both may be taken at the undergraduate or graduate levels, i.e., as a Business Foundation course or as an Advanced Aviation Business core course. If the core requirement is satisfied at the undergraduate level, graduate electives must be added to satisfy the total number of graduate hours required for the degree.

Recommended Electives	**Credits**
ABA 590 Graduate Seminar	1-3
ABA 609 Airline Operations and Management	3
ABA 615 Current Problems in Aviation	3
ABA 625 Airline Marketing	3
ABA 638 Managerial Economics	3
ABA 645 Airport Management	3
ABA 655 Aviation Law and Insurance	3
ABA 696 Graduate Internship in Aviation Business Administration	1-3
ABA 699 Special Topics in Aviation Business Administration	1-3
MAS 605 Research Methods and Statistics	3
MAS 609 Aircraft Maintenance Management	3
MAS 640 Supply and Distribution in the Aviation/Aerospace Industry	3
MAS 641 Production and Procurement Management in the Aviation/Aerospace Industry	3
MAS 643 Management of Research and Development in the Aviation/Aerospace Industry	3
**ABA 502 Government Role in Aviation	3
**ABA 607 Human Resource Development	3
**ABA 632 Aviation Labor Relations	3
Elective Credit Required	6-9

** Available only to College of Continuing Education students.

Thesis/Project	**Credits**
ABA 690 Graduate Research Project OR	3
ABA 700 Thesis Research	6
Required Credits	3-6
Total Required	36

MASTER OF SCIENCE IN TECHNICAL MANAGEMENT (MSTM)

The Master of Science in Technical Management is a unique educational program developed in close consultation with aviation and aerospace industry representatives. The program aims at aspiring, entry or mid-level managers who are transitioning or wish to prepare to transition from technical jobs to managerial responsibilities.

The educational experience has been designed as a cohesive entity, from the introductory preparatory skills course to the capstone course of total quality management. The program consists of 39 credit hours with a strong emphasis on building communication (writing and speaking) skills and the management skills needed in a technically oriented enterprise. Students can expect projects, reports, and presentations requiring them to develop and exercise the knowledge and skills they have learned.

The MSTM degree program is delivered on-site at selected industry locations where a core of 24 students are committed to starting and completing the program, and where the corporation or institution is willing to provide facilities for teaching. It is a structured program designed to keep each class together until the degree is completed. Working professionals can complete the degree program within two years while continuing to work at their jobs. The terms are approximately thirteen weeks in length. Classes are held on Friday nights and all day Saturday. Students attend classes every other weekend. All classes are taught by faculty who are recognized as experts in the field.

Corporations or individuals interested in learning more about the Master of Science in Technical Management degree program are invited to write or call:

Embry-Riddle Aeronautical University
Director of Graduate Admissions
600 S. Clyde Morris Blvd.
Daytona Beach, Florida 32114-3900
(904) 226-6115

MSTM DEGREE REQUIREMENTS

COURSE	NUMBER/TITLE	Credits
TM 500	Communications and Computer Skills with Quantitative Methods	6
TM 505	Computer Applications Systems Management	3
TM 510	Project Development Techniques with Statistical Applications	3
TM 520	Financial and Managerial Accounting and Control in Technical Management	3
TM 605	Organizational Theory in a Technical Environment	3
TM 610	Managing Effective Technical Work Teams	3
TM 615	Planning for Systems Development and Operations	3
TM 620	Federal Regulations, Ethics and the Legal Environment	3
TM 625	Marketing in the Technical Environment	3
TM 640	Project Planning for Procurement and Contracting	3
TM 645	Advanced Operations Research and Management Science	3
TM 650	Total Quality Management and Quality Control	3
Total Required		39

THESIS/GRADUATE RESEARCH PROJECT REQUIREMENTS

Each candidate for the following three master's programs — Master of Science in Aerospace Engineering, Master of Aeronautical Science, and Master of Business Administration in Aviation — is required either to submit a thesis or a graduate research project in partial fulfillment of the requirements for the degree. This requirement does not apply to candidates in the Master of Science in Technical Management degree program. The research component of this advanced degree is satisfied with a student project which is initially developed in the Project Development Techniques with Statistical Applications course and completed and defended as a graduation requirement.

Thesis Option

This option includes six credit hours of thesis research (AE/ABA/MAS 700) to meet the thirty-six credit hours degree requirement. Students who do not finish the thesis within the six credit hours limit, must enroll for a minimum of one credit hour per semester, until completion of the thesis requirements. The thesis option is not available to CCE students.

The thesis project is to be carried out under the direction of the student's thesis committee chairman. Approval of the thesis is the responsibility of a committee composed of the thesis committee chairman and at least two other faculty members who are familiar with the student's program of study. The committee will conduct a final oral examination on the student's thesis when it has been completed to the chairman's satisfaction and in the format required by the University.

A document entitled "Guidelines and Requirements for Graduate Theses" is available at the School of Graduate Studies and Research to help students prepare the thesis manuscript for submission, in accordance with the standards of the particular discipline and of the University. Students must familiarize themselves with these guidelines before they proceed to prepare their final thesis in draft form. Students are also advised to check with the individual departments for any additional requirements.

After the thesis is accepted, two copies of the thesis manuscript are bound and permanently placed in the Library collection.

Graduate Research Project Option

This option requires a three-credit hour graduate research project course (AE/ABA/MAS 690) in the thirty-six credit hours degree requirement. This course requires submission of a scholarly report approved by a review committee composed of a Project Advisor and a Project Reader.

The graduate research project is more rigorous than a term paper, but less demanding than a thesis, and should normally be completed during the course of one semester/term. The graduate

research project should be undertaken during a semester/term at or near the completion of all other curriculum requirements. However, preparation of the research proposal should begin prior to the completion of the final 18 credit hours at the graduate level. The proposal should be fully refined by the time the actual work begins and the student enrolls in the graduate research project course.

Student guidelines for the graduate research project are available at the School of Graduate Studies and Research for Daytona Beach campus students and at the CCE Resident Centers for College of Continuing Education students.

Change from Thesis to Graduate Research Project

Under special circumstances a student may petition for permission to change from thesis to graduate research project. The students must obtain permission from the thesis committee chairman to make such a change. Upon recommendation from the program coordinator/department chair, the Dean of the School of Graduate Studies and Research will make the final determination of the action to be taken. If the petition is approved, the student must enroll and successfully complete the graduate research project course and an additional elective course to meet the graduation requirements. A maximum of three credits earned in thesis can be counted toward the degree requirements only if recommended by an appeals committee and approved by the Graduate Dean. The committee must document that the work was productive in and by itself and warrants credit as a special topics course.

COURSE DESCRIPTIONS

AEROSPACE ENGINEERING

AE 502 — Strength and Fatigue of Materials **3 Credits**
Analysis of stress and deformation in rods, beams, plates, shells and solids using the elementary theories of elasticity and plasticity. Theories of strength, impact, fatigue and creep. Computer methods and applications. Prerequisite: Two semesters of structural analysis or equivalent.

AE 504 — Advanced Compressible Flow **3 Credits**
Classification and solution of compressible flow problems. Basic conservation laws and fundamental theorems of compressible flows. Wave phenomena; normal and oblique shocks. Method of characteristics and wave interactions. Perturbation theories and similarity rules. Linearized supersonic flow, axisymmetric flows. Wing theory and wave drag. Nonlinear theories of transonic and supersonic flows. Prerequisite: Two semesters of aerodynamics or equivalent.

AE 506 — Airplane Dynamic Stability **3 Credits**
Small-disturbance theory and the linearized solutions of the general equations of unsteady motion. Aerodynamic derivatives, derivative analysis, aerodynamic transfer functions. Dynamic stability of uncontrolled longitudinal and lateral motion. Computer solution of dynamic stability problems. Inverse problems. Automatic stability and control. An introduction to automatic flight controls and feedback control system analysis. Prerequisite: One semester of airplane stability and control or equivalent.

AE 508 — Heat Transfer **3 Credits**
One and two-dimensional steady and unsteady-state conduction heat transfer including an introduction to finite difference and finite element methods of analysis. Free and forced convection heat transfer. Radiation heat transfer. Prerequisites: One semester each of fluid mechanics, thermodynamics and engineering analysis or equivalent.

AE 510 — Aircraft Structural Dynamics **3 Credits**
Emphasis is placed on vibrations of deformable elastic structures using the assumed modes method. Analysis as a continuous system for specialized cases. Undamped and damped free and forced vibration of single-degree-of-freedom and multiple-degree-of-freedom systems. Computer programming skills are necessary. Prerequisites: One semester each of aircraft structural analysis, dynamics, and ordinary differential equations or equivalent.

AE 512 — Combustion I **3 Credits**
Kinetics and equilibrium of combustion processes will be studied. Several important concepts such as the law of mass action, the Arrhenius reaction rate law, the heat of reaction and the adiabatic flame temperature will be introduced. The conservation equations that describe the behavior of reacting flows will be developed. Prerequisites: One semester each of thermodynamics and vector calculus or equivalent.

AE 590 — Graduate Seminar **1-3 Credits**
A study of the most current advancements in a particular field of study as determined by the instructor of the course. The course will have a different topic each term depending upon the varied interests of the students, the graduate faculty, or the research requirements of the Aerospace Engineering department. Prerequisites: As announced by the instructor conducting the seminar.

AE 601 — Combustion II **3 Credits**
Several simplified but important steady flow combustion problems will be studied. The concept of flame stabilization will be explored. The final part of the course will deal with combustion problems in unsteady flow systems. Prerequisite: AE 512.

AE 602 — Continuum Mechanics **3 Credits**
Kinematics and deformation of a continuum. Balance principles for mass, momentum and energy. Constitutive equations. Application of the theory to solid and fluid media. Prerequisites: Two semesters of both aerodynamics and aircraft structural analysis or equivalent, and MA 502.

AE 604 — Finite Element Fundamentals **3 Credits**
Basic equations of the theory of elasticity. Energy principles. Formulation and assembly of stiffness matrices and load vectors for elastic solids. Modeling considerations. Solution methods. Computer implementation of finite element and stress analysis procedures. Interpretation of computer solutions. Design applications. Prerequisites: One semester of matrix structural methods, and knowledge of FORTRAN or equivalent.

AE 606 — Finite Element Aerospace Applications **3 Credits**
Development of finite element representation of continua using Galerkin and variational techniques. Boundary Elements. Applications to the statics and dynamics of solids, structures, fluids and heat flow. Includes the use of production-level finite element codes. Prerequisite: AE 604 or equivalent.

AE 608 — Introduction to Computational Aerodynamics **3 Credits**
Potential flow theory. Panel Methods. Applications of numerical methods and the digital computer to inviscid flow analysis. Lifting

line, vortex lattice fundamentals. Use of production-level computer codes. Prerequisites: Knowledge of FORTRAN, two semesters of aerodynamics or equivalent.

AE 610 — Computational Aerodynamics **3 Credits**
Application of vortex lattice, panel element and boundary element methods to incompressible and three-dimensional aerodynamics flow problems. Wing and wing-body analysis. Incorporation of boundary integration for more complete modeling. Prerequisites: AE 608 and MA 502.

AE 612 — Analysis of Aircraft Plate and Shell Structures **3 Credits**
Bending and buckling of plates. Cylindrical bending. Boundary value problems. Axisymmetric problems. Deformation of shells. Energy principles. Stress and stability analysis. Approximate methods. Finite element methods. Computer applications. Prerequisites: AE 502 and MA 502.

AE 614 — Analysis of Aircraft Composites Structures **3 Credits**
Fiber materials, tapes, cloths, resin systems. Theory of elastic anisotropic materials. Elastic constants for multi-ply composites. Matrix formulation. Computer analysis. Strength and theory of failure. Sources and use of experimental data. Design considerations. Prerequisite: AE 502.

AE 616 — Advanced Aircraft Structural Dynamics **3 Credits**
Analysis of structures subjected to dynamic loads. Hamilton's Principle and Lagrange's Equations. Rayleigh's Principle. Numerical evaluation of natural frequencies and modes. Mode superposition and direct integration methods for dynamic response. Finite element modeling. Component mode synthesis. Computer applications. Prerequisite: One semester of structural dynamics or equivalent.

AE 620 — Boundary Layer Theory **3 Credits**
Navier-Stoke's equations for laminar and turbulent flows. Boundary layers. Jets, wakes, elementary turbulence modeling. Skin friction, separation, drag and aerodynamic heating. Approximate and exact finite-difference solutions including the effect of suction and blowing. Solutions of turbulent boundary layer equations. Prerequisites: AE 504, MA 502.

AE 640 — Turbine Engine Propulsion Systems **3 Credits**
Advanced theory of turbojet, multi-spool fan jet, variable cycle engines, and bypass air-breathing propulsion systems. Design and off design performance analysis. Theory and design of inlets, compressors, burners, and turbines. Component matching, cooling, regenerative systems, test methods and corrections. Engine post-

stall behavior. Prerequisite: One semester of turbine or engines theory or equivalent.

AE 642 — Rocket Engine Propulsion Systems **3 Credits**
Analysis of combustion and expansion processes. Thrust nozzle performance analysis and design techniques. Characteristics of liquid propellants and liquid propellant rocket motors. Characteristics of solid propellants and interior ballistics of solid propellant rocket motors. Cooling techniques. Thrust vector control methods. Prerequisite: One semester of turbine or rocket propulsion or equivalent.

AE 690 — Graduate Research Project **3 Credits**
Individual research and development project involving original laboratory, analytical or numerical investigations. Specific objectives and work requirements established by prior agreement of the instructor and student. The student will be required to submit a written report and give an oral presentation. This course is included in the AE curriculum to provide the student with the opportunity to pursue a project of special interest, but not to the level of a thesis. This is a required course for those students who choose not to write a thesis. Prerequisite: Graduate standing and permission of the instructor.

AE 696 — Graduate Internship in Aerospace Engineering **1-3 Credits**
Temporary professional or industrial work appointments made available to students enrolled in graduate programs at the University. An internship provides graduate students with an opportunity to extend their academic endeavors through the application of the theories and philosophies studied in the classroom to specific professional activities common to the work place. They are academic/professional activities coordinated by the University between offering organizations and a graduate student.

AE 699 — Special Topics in Aerospace Engineering **1-3 Credits**
Guided independent study of selected topics not offered in regularly scheduled classes. Arrangements and work requirements established by prior agreement of instructor and students. Students should expect to spend at least sixty hours of reading and study for each credit hour. May be repeated. Prerequisites: Graduate standing and permission of instructor.

AE 700 — M.S. Thesis **6 Credits**

Note: A maximum of six thesis or special topics credits is permitted in any one semester.

AERONAUTICAL SCIENCE

MAS 509 — Advanced Aerodynamics **3 Credits**
A study of current flight applications and problems that includes transonic, supersonic, and hypersonic aerodynamics, principles of aircraft stability and control, and operational strength considerations. Emphasis is placed on the applications of the rapidly changing technological innovations in aerodynamics and the solutions to the problems created by these advances. Prerequisite: Demonstrated knowledge of basic aerodynamics.

MAS 510 — Advanced Aircraft Performance **3 Credits**
An analysis of performance characteristics for transonic, supersonic, and near space air vehicles powered by jet or rocket engines. Problems related to high speed and high altitude flight such as aeroelastic effects, compressibility drag, Reynold's Number effects, ram pressure rise, and aerodynamic heating are explored. Discussions center on current developments and the problems associated with these advancements. Prerequisite: Demonstrated knowledge of basic aircraft performance.

MAS 515 — Aviation/Aerospace Simulation Systems **3 Credits**
A comprehensive examination of simulation in modern aviation/aerospace that includes history, state-of-the-art, and current research and development. Discussion focuses on the extent and impact of simulator applications throughout the industry and the effects on training costs and safety. Topics, from the flight crew being checked-out, updated, evaluated, or retrained in aircraft and systems simulators to the simulation models used in management, flight operations, scheduling, or air traffic control, are examined in detail.

MAS 516 — Applications in Cockpit Resource Management **3 Credits**
This course will examine the common concepts of Cockpit Resource Management (CRM) as developed by major air carriers and explore the theoretical basis of such training. Topics such as supervision of crewmembers, counseling, manner and style, accountability, and role management will be studied. Each student will have the opportunity to become knowledgeable in a specific area of CRM by assisting in the development of a CRM research document as part of the seminar. Additionally, each student will use simulators and computer-based instruction to supplement their academic instruction.

MAS 517 — Advanced Meteorology **3 Credits**
Course topics include the derivation and application of the hydrostatic equation, atmospheric kinematics, derivation of the equation of continuity, development of thermal wind, fundamental weather analysis, high altitude and radar meteorology, air pollution, and solar impact on weather. The student practices current weather analysis and short range weather forecasting using much of the latest equipment available in aviation. Prerequisites: Demonstrated knowledge of mathematics and basic meteorology.

MAS 550 — Aviation Education Foundations **3 Credits**
This course assists in developing contexts and concepts in which educational problems and issues may be understood, particularly the role of aviation in education. Emphasis is placed on aviation education, its historical and philosophical foundations.

MAS 560 — Rotorcraft Operations **3 Credits**
The course introduces the complexities of rotary wing flight systems and the advancements made to overcome them. The unique problems facing an organization involved in rotorcraft operations are studied from the initial inception of a program to the government rules and regulations, environmental and noise considerations, special landing and take-off facilities, flight and maintenance ratings, and techniques of control. Special consideration is given to the unique problems and issues facing such rotorcraft operations as police, medical evacuation, forestry service and corporate aviation.

MAS 570 — Advanced Avionics **3 Credits**
An advanced study of electronic communication, navigation, and landing equipment used in aircraft and spacecraft is the basis for this course. Discussions will include electronic pulse type equipment, surveillance systems, low frequency and area navigation systems, flight control systems, and systems integration. Prerequisite: Demonstrated knowledge of avionics systems.

MAS 590 — Graduate Seminar **1-3 Credits**
A study of the most current advancements in a particular field of study as determined by the instructor of the course. The course will have a different topic each term depending upon the varied interests of the students, the graduate faculty, or the research requirements of the Aeronautical Science department. Prerequisites: As announced by the instructor conducting the seminar.

MAS 602 — The Air Transportation System **3 Credits**
A study of air transportation as part of a global, multi-modal transportation system. The course reviews the evolution of the technological, social, environmental, and political aspects of this system since its inception at the beginning of this century. The long-term and short-term effects of deregulation, energy shortages, governmental restraints, and national and international issues are

examined. Passenger and cargo transportation, as well as military and private aircraft modes are studied in relation to the ever changing transportation requirements. Prerequisites: Demonstrated knowledge of aviation rules and regulations, and economics.

MAS 603 — Aircraft and Spacecraft Development 3 Credits
This course is an overview of aircraft and spacecraft development. Included are vehicle mission, the requirements directed by economics, the military and defense considerations, and the research and developmental processes needed to meet the vehicle requirements. Aviation and aerospace manufacturing organizations and techniques are addressed to include planning, scheduling, production, procurement, supply, and distribution systems. The course studies the aviation and aerospace maintenance systems from the built-in test equipment to the latest product support activities. Prerequisites: Demonstrated knowledge of college-level mathematics and economics.

MAS 604 — Human Factors in Aviation/Aerospace Industry 3 Credits
This course presents an overview of the importance of the human role in all aspects of the aviation and aerospace industries. It will emphasize the issues, problems, and solutions of unsafe acts, attitudes, errors, and deliberate actions attributed to human behavior and the roles supervisors and management personnel play in these actions. The course will study the human limitations in the light of human engineering, human reliability, stress, medical standards, drug abuse, and human physiology. The course will discuss human behavior as it relates to the aviator's adaptation to the flight environment as well as the entire aviation/aerospace industry's role in meeting the aviator's unique needs. Prerequisite: Demonstrated knowledge of behavioral science.

MAS 605 — Research Methods and Statistics 3 Credits
A study of current aviation research methods that includes techniques of problem identification, hypothesis formulation, design and use of data gathering instruments, and data analysis. The interpretation of research reports that appear in professional publications are examined through the use of statistical terminology and computations. A formal research proposal will be developed and presented by each student as a basic course requirement. Prerequisites: Demonstrated knowledge of college-level mathematics, including introdutory statistics, and basic computer operations.

MAS 606 — Aviation/Aerospace Communications/ Control Systems 3 Credits
A detailed analysis of current and future developments and trends in the control of air traffic that includes the evolution of current national policies, plans and their objectives. The most recent

planned improvements for each major component of the ATC system are examined individually and as part of the system as a whole. Prerequisites: Demonstrated knowledge of flight rules and regulations and basic navigation.

MAS 607 — Advanced Aircraft/Spacecraft Systems 3 Credits
State-of-the-art aircraft/spacecraft systems and projections of research trends for future air vehicle requirements and applications are studied. Topics include the developments, capabilities and limitations of current aircraft/spacecraft propulsion, electrical, environmental, control and hydraulic systems and sub-systems. The total aircraft design and the interdependence of aircraft system design constraints are emphasized as well as current problems and solutions. Prerequisites: Demonstrated knowledge of college-level mathematics and aircraft systems and components.

MAS 608 — Aviation/Aerospace Accident Investigation and Safety Systems 3 Credits
A critical analysis of selected aircraft accidents and an evaluation of causal factors. Particular emphasis is placed on the study of human factors connected with flight and support crew activities in aviation operations. Identification and implementation of accident prevention measures are stressed as integral parts of the development of a complete safety program.

MAS 609 — Aircraft Maintenance Management 3 Credits
A detailed analysis of commercial air carrier and general aviation aircraft maintenance that includes regulation, organization and structure, capabilities and limitations, maintenance levels, inspection and reporting requirements, and prevention and correction inspections. Case studies of typical and unique maintenance scenarios are utilized. A major course objective is to heighten awareness of the critical interface of maintenance with flight, supply, and training activities. Prerequisites: Demonstrated knowledge of management principles.

MAS 620 — Air Carrier Operations 3 Credits
A study of air carrier flight operations systems from the viewpoints of the groundbased dispatcher, operations specialists, managers, and the cockpit flight crew. Topics include advanced flight planning, aircraft performance and loading considerations, impact of weather conditions, and routing priorities. Prerequisites: Demonstrated knowledge of flight rules and regulations, basic meteorology, basic navigation, and basic aircraft performance.

MAS 622 — Corporate Aviation Operations 3 Credits
The establishment and operation of a corporate flight department is examined along with the procedures and techniques generally accepted as standards by professional corporate flight operations. Included is a practical view of the corporate aviation mission of

management mobility and use of the resources available to accomplish it.

MAS 634 — Aviation/Aerospace Psychology **3 Credits**
A study of the complexities of human factors research in aviation. Drawing extensively on such diverse areas as human physiology, basic learning theory, aviation safety, and pilot training, the course surveys the study of human behavior as it relates to the aviator's adaptation to the flight environment and attempts to design an occupant "friendly" flight deck module.

MAS 636 — Advanced Aviation/Aerospace Planning Systems **3 Credits**
Planning and decision-making techniques and strategies used in the aviation industry are emphasized. The types and sources of data needed for decisions about route development and expansion, fleet modernization and new markets are examined. The methods of collecting, analyzing, and applying the data through computer applications, modeling, heuristics, value theory, and payoff tables are studied. The limitations and problems associated with strategic planning are discussed. Prerequisites: Demonstrated knowledge of management principles and economics.

MAS 640 — Supply and Distribution in the Aviation/Aerospace Industry **3 Credits**
A study of the elements of physical distribution that includes the structure of supply organizations, priority systems, cost categories, inventory control, and the applications of electronic data processing. Case studies are employed to present issues, problems, and analyses of supply systems in terms of customer satisfaction relative to costs incurred. Prerequisites: Demonstrated knowledge of management principles.

MAS 641 — Production and Procurement Management in the Aviation/Aerospace Industry **3 Credits**
The evolution of an air carrier aircraft from design concept to delivery is examined from the perspectives of the purchaser, manufacturer, component manufacturers, operators, and certificator/regulator. The study of the process begins with demand analysis and continues through purchase contracting, manufacturing, marketing, certification, pre-delivery activities, and introduction into service. Prerequisites: Demonstrated knowledge of management and economic principles.

MAS 643 — Management of Research and Development for the Aviation/Aerospace Industry **3 Credits**
The types and sources of aviation/aerospace research and development are analyzed through study of the structure and interrelationship of the industry, educational institutions, and other organizations. Sources and methods of funding, specification determination,

the relationship of research and development to procurement and production, and the regulatory factors affecting progress from the initial development to production of the aircraft and components are examined. Concepts of motivation and management as applied to research scientists and engineers will be studied as well as procedures for promoting optimum creativity concurrently with efficient operations. Prerequisites: Demonstrated knowledge of management and economic principles.

MAS 652 — Continuing Education's Role in Aviation 3 Credits
Emphasis on assessing community needs relative to developing programs in continuing education for the adult learner, evaluation of existing programs, and the processes utilized in developing curricula for an adult continuing education program related to aviation.

MAS 654 — Adult Teaching and Learning Techniques 3 Credits
The major instructional strategies used in education with particular emphasis on higher education and adult learning are the core of this course. An examination of multiple approaches as they relate to academic disciplines and grade levels are studied. The unique "cockpit classroom" environment will be discussed and evaluated.

MAS 690 — Graduate Research Project 3 Credits
A written document on an aviation/aerospace topic which exposes the student to the technical aspects of writing. This course is included in the MAS curriculum to provide the student with the opportunity to pursue a project of special interest, but not to the level of a thesis. This is a required course for those students who choose not to write a thesis. Prerequisite: MAS 605.

MAS 696 — Graduate Internship in Aeronautical Science 1-3 Credits
Temporary professional or industrial work appointments made available to students enrolled in graduate programs at the University. An internship provides graduate students with an opportunity to extend their academic endeavors through the application of the theories and philosophies studied in the classroom to specific professional activities common to the work place. They are academic/professional activities coordinated by the University between offering organizations and a graduate student.

MAS 699 — Special Topics in Aeronautical Science 1-3 Credits
Students may elect to perform a special, directed analysis and/or independent study in an area of particular interest. A detailed proposal of the desired project must be developed and presented to the center director or department chair for faculty review and recommendation at least three weeks prior to the end of registration for a term.

MAS 700 — Thesis **6 Credits**

A written document on an aviation/aerospace topic supervised throughout its preparation by the student's Guidance Committee, which demonstrates the student's mastery of the topic and is of satisfactory quality for publication. Prerequisite: MAS 605.

AVIATION BUSINESS ADMINISTRATION

ABA 500 — Accounting Review **4 Credits**
An introduction to financial and managerial accounting; includes double entry accounting income statement, balance sheet, interpretation of accounts, partnerships and corporations, and the cost, differential, and responsibility accounting aspects of managerial accounting. In order to satisfy the accounting prerequisite requirements, a student must pass a comprehensive examination in accounting. This course is graded on a pass/fail basis. **Credit for this course is not applicable to the requirements of any Embry-Riddle degree.**

ABA 501 — Economics Review **4 Credits**
An introduction to economics principles, problems, and policies with an emphasis on macro and microeconomic theories, business fluctuations, fiscal and monetary policy, economic growth, and current domestic economic problems. In order to satisfy the economics prerequisite requirements, a student must pass a comprehensive examination in economics. This course is graded on pass/fail basis. **Credit for this course is not applicable to the requirements of any Embry-Riddle degree.**

ABA 502 — Government's Role in Aviation **3 Credits**
A study of the evolution of governmental involvement in the promotion and regulation of aviation and the changes resulting from deregulation. The interaction between governmental agencies and the aviation industry is examined with particular emphasis on the role of government in the resolution and achievement of both social and aviation goals.

ABA 511 — Operations Research **3 Credits**
A survey of the use of quantitative methods for management decision-making and their applications to aviation business decision-making and operational problems. Emphasis will be on linear programming, queuing theory, simulation, decision tree theory, transportation models, and probabilities. The strengths and weaknesses of these methods will be reviewed. Prerequisite: Business Statistics.

ABA 513 — Human Resource Management **3 Credits**
A detailed examination of current concepts and practices in aviation personnel administration. The emphasis is on Human Resource Management as a staff function in support of the acquisition, training, evaluation, compensation, and retention of an effective work force. Topics include: Labor Relations, Job Analysis and Design,

Selection, Legal Constraints, Unions, and Health and Safety. Prerequisite: Principles of Management.

ABA 514 — Marketing Management **3 Credits**
The role of the marketing manager and marketing in the aviation firm and society is examined. Emphasis is on the development of the marketing mix (product, price, place, and promotion) and its relevance to the other functional areas of the firm. Prerequisites: Principles of Management, Microeconomics, Basic Marketing.

ABA 517 — Managerial Accounting **3 Credits**
An inquiry into managerial accounting, including concepts for planning, control and decision-making, using problem solving and case study approaches. Topics include: cost accounting; cost-volume-profit relationships; budgeting; standard costs; segment analysis; and financial ratios. Prerequisites: Principles of Financial Accounting.

ABA 518 — Corporate Finance **3 Credits**
A crucial and timely study of current aviation financial concepts, techniques, and issues emphasizing administration and managerial applications. Topics include financial accounts and statements. Prerequisite: Finance.

ABA 520 — Organizational Behavior **3 Credits**
This course emphasizes the development of an understanding of human behavior in the aviation organizational setting. Basic organizational concepts are explored in depth with a focus on practical applications. Topics include: Organizational Structure, Motivation, Group Dynamics, Perceptions, Leadership, Conflict Resolution, Ethics, and Social Responsibility. Prerequisite: Principles of Management.

ABA 521 — Management Information Systems **3 Credits**
A study of general systems concepts, purposeful systems within aviation organizations, decision and information systems, planning and control systems, and project management and evaluation systems. Prerequisites: Principles of Management, An Introductory Course in Computers.

ABA 590 — Graduate Seminar **1-3 Credits**
A study of the most current advancements in a particular field of study as determined by the instructor of the course. The course will have a different topic each term depending upon the varied interests of the students, the graduate faculty, or the research requirements of the Aviation Business Administration department. Prerequisites: As announced by the instructor conducting the seminar.

ABA 602 — Economics of Air Transportation **3 Credits**
The regulatory framework for domestic and international airline operations precedes an analysis of airline cost functions, including fleet planning for long-term operations. The cost factors are brought together with demand forecasts and the nature of airline demand to allow analysis of the pricing structures and policies of air carriers. A thorough understanding of demand forecast analysis is included in the course structure. Prerequisite: Macroeconomics, Microeconomics, ABA 511.

ABA 607 — Human Resource Development **3 Credits**
This course emphasizes the integration of the individual into the organization by studying the current and fundamental issues in organization theory and organizational behavior as they relate to the individual. The effectiveness of the individual in the organization is examined in terms of personal traits such as communicative abilities, leadership style and potential, and beliefs about organizational ethics and social responsibility. Prerequisite: Principles of Management.

ABA 609 — Airline Operations and Management **3 Credits**
An integrated study of the components and characteristics of airline operations and the functions of management. The characteristics and categories of air carriers and their role in serving national and international air transportation needs are examined. Airline organizational elements and functions such as structure, planning, and line and staff responsibilities are also explored. Prerequisite: Principles of Management.

ABA 615 — Current Problems in Aviation **3 Credits**
An analysis of the significant current issues in various areas of civil aviation with particular attention paid to the economic problems and competitive strategies of airlines, regulatory evolution, airport and airspace congestion, and the conflicting interests of the many parties involved. Prerequisite: ABA 602.

ABA 625 — Airline Marketing **3 Credits**
A study of the functions and basic concepts of marketing air transportation services. Discussion includes passenger and cargo markets, determinants of travel demand, growth factors, seasonality, and cargo traffic categories and characteristics. Product and service elements, roles of advertising and travel agents, marketing unit structure, pricing and cost environment, and schedule planning are also among the topics examined. Prerequisites: Microeconomics, Macroeconomics and Principles of Management.

ABA 632 — Aviation Labor Relations **3 Credits**
An introduction to labor law as applied to the aviation industry. Topics include labor union organization and constituency representation, the collective bargaining process, typical labor contract terms

and provisions, grievance, mediation, and arbitration procedures, contract administration, labor actions, restrictive employment practices, Title VII of the Civil Service Reform Act of 1978. Prerequisite: Principles of Management.

ABA 635 — Business Policy Analysis **3 Credits**
The core of this capstone course is a management simulation which requires strategy and policy formulation in a competitive interactive environment. Operations analysis reports on annual performance in all functional areas of business require the use of word processing and spread sheet software packages for forecasting and financial analysis. Prerequisite: Principles of Management, ABA 511.

ABA 638 — Managerial Economics **3 Credits**
This course covers the underlying principles, laws, structure, and theories of microeconomics as applied to managerial decision-making in profit and non-profit organizations. Demand theory and analysis, the role of cost, profit maximization, market structure identification, and public-sector economics are explored. Prerequisites: Principles of Microeconomics and Macroeconomics.

ABA 645 — Airport Management **3 Credits**
A study of the major airport management functions, especially planning, development, and operations. The management of on-site activities by airport tenants and their relationship with the airport operator are analyzed. The current problems confronting airports in areas such as regulation, financing, revenue generation, cost control, establishment of rent and user charges, safety, security, and the socioeconomic relationship of the airport to the community it serves are explored. Prerequisite: Principles of Management.

ABA 655 — Aviation Law and Insurance **3 Credits**
Examination of the governmental regulatory functions affecting statutory and administrative law pertaining to aviation. The national and international impact of these laws on aviation policies and operations are studied. The legal aspects of business contracts, negotiable instruments, and commercial code as they relate to aviation are analyzed. The course concludes with an overview of the principles of insurance and risk as they apply to aviation.

ABA 690 — Graduate Research Project **3 Credits**
A written document on an aviation/aerospace topic which exposes the student to the technical aspects of writing. This course is included in the ABA curriculum to provide the student with the opportunity to pursue a project of special interest, but not to the level of a thesis. This is a required course for those students who choose not to write a thesis. Prerequisite: ABA 511 or MAS 605.

ABA 696 — Graduate Internship in Aviation Business Administration **1-3 Credits**

Temporary professional or industrial work appointments made available to students enrolled in graduate programs at the University. An internship provides graduate students with an opportunity to extend their academic endeavors through the application of the theories and philosophies studied in the classroom to specific professional activities common to the work place. They are academic/professional activities coordinated by the University between offering organizations and a graduate student.

ABA 699 — Special Topics in Aviation Business Administration **1-3 Credits**

Students may elect to perform a special, directed analysis and/or independent study in an aviation area of particular interest. A detailed proposal of the desired project must be developed and presented to the center director or department chairperson for faculty review and recommendation three weeks prior to the end of registration for the term.

ABA 700 — Thesis Research **6 Credits**

A written document on an aviation/aerospace topic supervised throughout its preparation by the student's Thesis Committee, which demonstrates the student's mastery of the topic and is of satisfactory quality for publication. Prerequisite: ABA 511 or MAS 605.

MATHEMATICS

MA 502 — Boundary Value Problems **3 Credits**
Basic techniques of solving boundary-value problems of partial differential equations by employing the methods of Fourier series, orthogonal functions, operational calculus including Laplace transforms, other integral transforms and Cauchy's residue calculus. Applications to heat transfer, fluid mechanics, elasticity and mechanical vibrations. Computer applications. Prerequisite: MA 441 or equivalent.

MA 504 — Theory of the Potential **3 Credits**
Potential theory and Green's function. Method of characteristics and solution in the large of Cauchy's initial value problem for first and second order equations. Numerical methods. Application to fluid mechanics, electromagnetic fields, heat conduction and other areas. Computer applications. Prerequisite: MA 502.

MA 506 — Probability for Engineers **3 Credits**
Foundations, combinations, conditional probability, expectations, and applications to discrete sample spaces. Random variable in one or more dimensions. Various continuum distributions. Characteristic functions. Applications to engineering problems. Computer applications. Prerequisite: MA 441 or equivalent.

MA 508 — Applied Stochastic Processes **3 Credits**
An introductory course in the concept of a discrete and continuous stochastic process based upon physical phenomena that originally gave rise to the specific stochastic models that are studied. Random walk, recurrent events, queuing theory, Markov chains, birth and death processes, diffusion, simple representations of noise, spectra, response of time invariant systems to noise inputs. Power spectral density. Stationary random processes. Computer applications. Prerequisite: MA 506.

MA 510 — Optimization Techniques **3 Credits**
Development of the elements of the theory of the minima of functions. The calculus of variations, Pontryagin's maximum principle, steepest descent techniques, and dynamic programming. Computational solution of engineering problems. Computer applications. Prerequisite: MA 441 or equivalent.

TECHNICAL MANAGEMENT

TM 500 — Communications and Computer Skills with Quantitative Methods **6 Credits**

A series of interconnected management science problems will be used to cover introductory graduate level skills in computer use, quantitative management methods, and communications abilities. Integration of the three areas will be stressed through the use of computer techniques to solve quantitative management problems and to communicate the results in a clear and understandable fashion. Computer techniques will be covered only as an efficient method to achieve higher level analytical and communicative skills. Stress will be placed on understanding analytical methodologies, interpreting quantitative results, and communicating those results in concise and persuasive writing and speaking.

This is a required course for all students in the M.S. in Technical Management degree program and is a prerequisite for all other courses in the program.

TM 505 — Computer Applications in Systems Management **3 Credits**

The use of computers to enhance systems management. Electronic data management systems; electronic spreadsheets; decision support systems; electronic mail, bulletin boards and communications; wordprocessing and desktop publishing for developing graphics and aids for presentations; and some new concepts and sample applications of computer-integrations of computer-aided-design (CAD) with relational databases, using Query Languages (SQL), colorgraphics, and local area networks (LANS) of interactive personal computers as intelligent terminals to mainframes.

TM 510 — Project Development Techniques with Statistical Applications **3 Credits**

Use of available resources to develop credible research applications and strategies to support systems development. How to conduct searches; synthesis of data for reports/presentations; conducting literature searches, index/catalog and/or full text search; statistical methods for analyzing project assumptions; forecasting; regression analysis; probability distributions; parametric and non-parametric statistical methods; sampling theory; time series analysis. Comprehensive coverage of the art and science of problem solving in applied and pure business research, and the uses and abuses of statistics in applied research. Introduction to a style manual for the preparation of the research proposal.

TM 520 — Financial and Managerial Accounting and Control in Technical Management **3 Credits**

Understanding financial control procedures for a systems approach to program management. Cost elements in manufacturing, research and development, logistic and support services. It will include the introduction of fixed and variable costs; computing and using overhead; process and job order costing methods; preparation of income statements in the contribution format; ratio analysis; profit planning and its relationship to cost; using spreadsheets for budget and overhead analysis; pricing, capital budgeting and investment decisions.

TM 605 — Organization Theory in a Technical Environment **3 Credits**

Effectively using the organization to build a technical management team. Leadership versus management; conflict between functional and project management; matrix versus hierarchial organizations; organizational alternatives; human response in the organization; persuasion, influence and authority in the technical setting; participation and power; sensitivity to cultural and minority differences; managing technical change and innovation in a large organization; communication in a technical organization; organization culture and tradition; government perspective; industry perspective.

TM 610 — Managing Effective Technical Work Teams **3 Credits**

Team building for a technical project. Two-way communications and feedback; participative management techniques concerning motivation, small-group processes, and group decision support systems; attraction and retention of quality personnel; skills in writing employee evaluations; responsibility, authority, accountability; conflict resolution; initiative; creativity; communicating upward and downward; being caught in the middle; personality/temperament; logic versus heuristic/detail versus holistic; people management strategies; motivation, recognition, reward.

TM 615 — Planning for Systems Development and Operations **3 Credits**

Detailed systems planning for implementation of a program up to and including production and support. Systems life cycle concepts; feasibility analysis and design techniques; economic trade-offs and budgeting requirements; cost benefit analysis; legal, environmental, and international considerations; organizing for project management, production and quality control; training, maintenance and logistic requirements.

TM 620 — Federal Regulations, Ethics, and the Legal Environment **3 Credits**

Understanding the complex regulatory and legal setting surrounding management. The Federal Acquisition regulations and how they affect all projects; legal responsibility and accountability; ethical

considerations within and external to the organization; the international environment and how it may affect projects.

TM 625 — Marketing in the Technical Environment **3 Credits**

Effective use of communications to explain and/or sell your projects, programs, or products to a hostile or friendly audience. Understanding products and people; collecting data to accurately reflect the situation; clear and meaningful presentations; highlighting the positive; reporting the negative; internal versus external presentations; dealing with the media; video and computer techniques; analyzing your audience; communications level; public relations.

TM 640 — Project Planning for Procurement and Contracting **3 Credits**

Using strategic and tactical planning for program and project management in a technical environment. Organizing for acquisition using strategic and tactical plans; specifications, regulations, legal liabilities, proposal preparation and submittal; selections process, criteria, pricing, and negotiation; contracting, warranties, quality assurance, subcontracting, administration, audits, appeals, coordination, modification, budgetary process and profits; types of contracts — fixed price, CPFF, CPIF; incentive contracting; advantages/disadvantages of contract types.

TM 645 — Advanced Operations Research and Management Science **3 Credits**

Quantitative methods for program management. Forecasting and probability distributions; decisions theory and decision-making under conditions of risk and uncertainty; marginal analysis; linear programming applications including problems of minimization and maximization, transportation and warehousing, assignment and scheduling, and ingredient blending; queuing theory and waiting lines; network models such as PERT, CPM, maximal flow and shortest route techniques; and simulation and modeling; regression analysis; time series analysis.

TM 650 — Total Quality Management and Quality Control **3 Credits**

Instilling quality concepts in a project. Continuous improvement; total quality; designing for and cost of quality; organizing for TQM; alternative approaches to quality; understanding the corporate culture; developing the quality plan; implementing TQM; introducing the concept; work meetings and project teams; informing, motivating, recording; using technology; key approaches and when to use them; reward and recognition; follow-up, evaluation, and feedback.

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