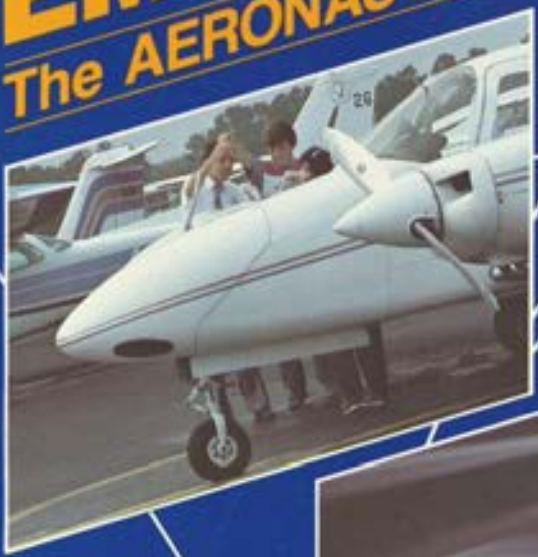
EMBRY-RIDDLE

The AERONAUTICAL UNIVERSITY



1987-88 Graduate Catalog

EMBRY-RIDDLE

The AERONAUTICAL UNIVERSITY

Serving the world of aviation through
higher education for more than sixty years

1987-88 GRADUATE CATALOG

INTERNATIONAL CAMPUS
950 Williamson Boulevard
Daytona Beach, FL 32014

DAYTONA BEACH CAMPUS
Regional Airport
Daytona Beach, FL 32014

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INTRODUCTION

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AN INVITATION FROM THE PRESIDENT

Embry-Riddle Aeronautical University is the world's only accredited aviation institution of higher learning and is a recognized leader in advanced education of aviation professionals.

Developments in aviation and later in aerospace have been steady and sometimes startling since Embry-Riddle was founded over 60 years ago. This significant progress did not just happen; it was made to happen by those, like you, who have chosen aviation as a lifelong career.

The world of aviation stands on the threshold of new advances in air and space transportation. Embry-Riddle is committed to excellence in aeronautical education, and our graduate degree programs are specifically designed to match your aspirations to the future needs of our industry. The courses we offer provide as much opportunity as possible to specialize in your particular area of interest. They are designed to give you maximum exposure to the real world of aviation through case studies, applications, exercises, simulations and interaction with industry.

We welcome you to Embry-Riddle and invite you to meet the challenges and seek the rewards of an advanced aviation education.

Sincerely,

Kenneth L. Tallman
Lt. General, USAF (Ret.)
President

EMBRY-RIDDLE
A University Like No Other

Since its beginning, Embry-Riddle Aeronautical University has played a unique and important role in aviation. A flying service established at Lunken Airport in Cincinnati on May 19, 1926, was the first aviation organization that operated under the Embry-Riddle banner. Everything from equipment, repair parts, and qualified pilots and mechanics was in short supply. Later, the lack of trained mechanics and pilots was to play a pivotal role in setting a new direction for Embry-Riddle. The original company remained intact until late 1928 when it was sold and became the first unit of what is now American Airlines. Four years later, J. Paul Riddle, one of the founding fathers, left American and, with aviation education on his mind, started a new company under the Embry-Riddle name. Home base, established in Miami, became the first Florida site of the company. By the late 1930'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 for the allied nations. Best estimates put the number of candidates trained at around 50,000. 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, president of the University from 1963 to 1984, reorganized Embry-Riddle as a non-profit institution, planned for expansion and further development, and found a new location — one that offered room for growth. On April 24, 1965, a convoy of trucks containing everything the institution owned rolled onto the airport at Daytona Beach, Florida, and began operating with some 260 students. Embry-Riddle acquired an 86-acre tract of land at the airport and, in 1970, officially became a University.

The multi-million dollar complex in Daytona Beach is now known as the Eastern campus. Approximately 5,000 students are enrolled in associate's, bachelor's and master's degree programs in aeronautical engineering, aeronautical science, aviation management, aviation maintenance, and computer science. Many students include flight and/or aircraft maintenance training as part of their degree programs.

Undergraduate programs were inaugurated at the Western campus in Prescott, Arizona in 1978. Approximately 1200 students study on this 510-acre campus nestled in one of the most picturesque sections of the Grand Canyon State, about 100 miles north of Phoenix.

Since the first resident center opened at Ft. Rucker, Alabama, in 1970, the International Campus 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 more than 80 locations worldwide, from Hawaii to western Europe. The students served by the International Campus 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 7,000 students participate in associate's, bachelor's, and master's degree programs at International Campus locations.

Graduate study was first offered by the University in 1973 in Miami, an international aviation hub and, at the time, headquarters for three major air carriers. Graduate programs are available at over forty International Campus locations in the United States and Europe, and at the Daytona Beach Campus.

UNIVERSITY STATEMENT OF PURPOSE

The purpose of Embry-Riddle Aeronautical University is to provide an aeronautically oriented educational program of such fundamental background, scope, and excellence that students may achieve competency and proficiency for productive careers, and in doing so, develop character, judgment, breadth of view, and understanding of our social and economic systems.

GRADUATE PROGRAMS

Embry-Riddle Aeronautical University graduate educational programs are designed to provide students with the knowledge, skills, and abilities to enable them to make a significant contribution to the aviation field. In order to do that and prepare the graduate to generate creative alternative solutions to the problems of aviation, the applications of current technology, methodology, and human resource management techniques are stressed. The acquisition of conceptual, analytical, and problem-solving skills is also emphasized. Wherever possible, case study and simulation learning techniques are employed. While the focus is on application, a clear balance is maintained between the practical and theoretical perspectives. Embry-Riddle is committed to providing graduate education to practicing aviation professionals, as well as those just beginning a career in aviation, so that both may continue their academic career and personal development.

ACCREDITATION AND AFFILIATION

Embry-Riddle Aeronautical University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools. All Embry-Riddle Aeronautical University degree programs offered at the International Campus 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 Veterans' Administration educational benefits under the various public laws.

STATEMENTS 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 staff, and the operation of any of its programs and activities, as specified by federal laws and regulations. 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 Vice Chancellor for Academic Affairs, International Campus.

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

CATALOG SCOPE AND APPLICABILITY

This catalog is designed for use from January 1, 1987, to August 20, 1988. 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 provision or any requirement stated in this catalog, and it further reserves at all times the right to require any student to withdraw for cause. Students who matriculate after January 1, 1987, are subject to all of the provisions of this catalog. As long as continuous enrollment is maintained, a student may remain under the provisions of this catalog.

Students following an earlier catalog but enrolled in courses after January 1, 1987, are subject to the policies, rules, and regulations set forth in the Procedures and Regulations Section of this catalog.

ALUMNI NETWORK

The Alumni Relations Office serves as the liaison between the alumni network and the University. An alumni newsletter is published and distributed quarterly to herald the latest developments at the University, to provide a forum for alumni opinion of University and industry matters, and facilitate contact among graduates.

Alumni chapters have been formed in many areas of the country and within individual organizations employing University graduates. Through the chapters, alumni can share experiences, discuss career strategies, and enjoy social activities.

Other alumni benefits include career assistance available through the Industry Liaison offices at the Daytona Beach and Prescott Campuses and International Campus resident centers.

The alumni of the University are an integral factor in the continued growth of Embry-Riddle. Many alumni contribute regularly to the various student assistance funds, such as the REAL (Repayable Educational Assistance Loan) program. Others donate equipment or their time to serve as counselors at college fairs and other special education events in their local areas.

Over 80,000 graduates have the distinction of calling Embry-Riddle Aeronautical University their alma mater. They can be found in every facet of aviation. Information about alumni activities can be obtained by contacting the Alumni Relations Office at the Executive Offices in Bunnell, Florida.

ADMISSION

ADMISSION ELIGIBILITY
TRANSFER AND ADVANCED STANDING CREDIT
APPLICATION PROCEDURES
ADMISSION TIME LIMIT
PREREQUISITE KNOWLEDGE REQUIREMENTS

ADMISSION ELIGIBILITY

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 Aeronautical 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.
3. A minimum combined score of 1000 on the verbal and quantitative sections of the Graduate Record Examination (GRE) is required.

Master of Aviation Management (MAM), Master of Business Administration in Aviation (MBAA), and 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.
3. A minimum combined score of 1000 on the verbal and quantitative sections of the GRE is required.

CONDITIONAL ADMISSION

Students who are not eligible for direct admission may be granted conditional admission under certain circumstances. Students may be granted conditional admission to defer final admissions decisions 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 Graduate Record Examination 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 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. A grade of B or better must be earned in each course attempted. Failure to do so will result in elimination of the student from graduate status. Deficiencies in prerequisites must be made up in appropriate ERAU undergraduate courses or their equivalent. 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 advised in writing. 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 may be barred from further registration.

Note: International Campus students may enroll in up to twelve credit hours of graduate courses without formal admission to a graduate program. Students must earn a grade of B or better in each course attempted in order to qualify for admission into a graduate degree program. Students who fail to achieve at this level will be prohibited from further graduate study effective with the end of the term in which the twelfth credit hour was attempted.

FOREIGN STUDENTS

All foreign students seeking admission are required to submit satisfactory scores on the GRE Aptitude Test and achieve a score of 550 on the TOEFL (Test of English as a Foreign Language) with the following exceptions:

1. Foreign students whose native tongue is English or who have studied at a United States college or university for at least one year or who have achieved a grade of B or higher in the Level 9 Reading and Writing courses conducted by an English Language Services (ELS) Center need not submit TOEFL scores but must submit satisfactory scores on the Aptitude Test of the Graduate Record Examination before their application for admission can be considered.
2. Students educated in foreign countries that do not offer the GRE 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 but not the TOEFL. Permission to register for subsequent semesters will depend upon the submission of scores on the Graduate Record Examination.

Foreign 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 teaching assistantships.

Education received at foreign schools 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 at foreign schools may obtain the required evaluation by submitting official, certified documentation of their educational achievements to Educational Credentials Evaluators, Inc.

TRANSFER AND ADVANCED STANDING CREDIT

The combined total of transfer and advanced standing credit applied to an Embry-Riddle graduate degree, including the dual degree options, 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 institutions may be applied towards the MSAE.

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. Applicants should submit a copy of the appropriate school catalogs marked to show the descriptions of courses proposed for transfer to facilitate evaluation. 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 preceeding the date the application for admission is received at the International Campus Records and Registration Office or the Daytona Beach Campus Graduate Studies Office.

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 servicemember is on active duty when accepted for admission. The seven-year time limit commences on the date the servicemember 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.

Petitions for experiential credit beyond that described above are not encouraged and will be favorably considered only in exceptional circumstances.

Undergraduate Enrollment in Graduate Courses

Embry-Riddle undergraduate aeronautical engineering students who anticipate applying for the MSAE program can take approved 500-level

ERAU courses for graduate credit during their senior year in excess of the requirements for the BSAE degree. A average grade of B is required for all such courses. The 500-level courses used to fulfill the BSAE technical elective requirements cannot be used for graduate credit.

APPLICATION PROCEDURES

Applications for admission are to be submitted to the Daytona Beach Campus Graduate Studies Office or through the International Campus resident center which the applicant plans to attend. 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 at the Daytona Beach Campus Graduate Studies Office 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 and the full application fee ($15).
2. Official transcripts of all undergraduate coursework from institutions where the baccalaureate degree was earned or for courses which are prerequisites to graduate courses and all graduate course work attempted sent directly from each college or university attended. Applicants wishing to transfer graduate credit are reminded to submit catalogs from the institutions where the credit was earned, 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. Copies of Federal Aviation Administration flight certificates and/or official documentation of military pilot experience.

FOREIGN APPLICANTS (non-resident, non-immigrant applicants entering the United States on F-1 or J-1 student visas)

Embry-Riddle is authorized under federal laws to enroll non-immigrant alien students. Foreign applicants may enroll at the Daytona Beach Campus, in the South Florida Region and, with special approvals, at certain European Division locations. Foreign 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 resident center or 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 and the full application fee ($50).
2. Detailed evaluation of all foreign college/university educational credentials by:

   Educational Credentials 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, the resident center, or the Office of Records and Registration. 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 erom U.S. institutions where the baccalaureate degree was earned or for courses which are prerequisites for graduate courses and all graduate course work attempted 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 achievement of a grade of B or higher in the Level 9 Reading and Writing courses conducted by an English Language Services (ELS) Center or 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. An estimate of annual tuition, educational, and living expenses may be obtained from an Embry-Riddle center upon request. Foreign 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, foreign applicants must remit the required advance tuition deposit. The amount of the required deposit and associated procedures are described in the 1987-88 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 foreign 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 foreign 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.

PREREQUISITE KNOWLEDGE REQUIREMENTS

The prerequisite knowledge requirements listed after the descriptions of some graduate courses signify that comprehension of the major concepts in 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. Individual descriptions of these undergraduate courses are provided at the end of the course description section.
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, MS 590 and MS 591, 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. Students who believe they possess the required prerequisite knowledge by virtue of experience and training not covered in items 1 through 4 above may take specially developed tests to demonstrate their readiness for the graduate course.

PREREQUISITE KNOWLEDGE EQUIVALENCIES

Prerequisite Requirement	Embry-Riddle Undergraduate Courses
Basic aircraft performance	AS 310
Aircraft systems and components	AS 356 or AMT 360
Basic aerodynamics	AS 309
FAA Commercial Pilot certificate with Instrument Rating	AS 100 or AS 150, AS 201, AS 250, and AS 251
Flight rules and regulations	AS 100 or AS 150
Basic meteorology	AS 201
Basic navigation	AS 250
Basic calculus	MA 112
An introductory course in computers	CS 105 or CS 109
Financial accounting	MS 110 or MS 210 and MS 212
Microeconomics	EC 210
Macroeconomics	EC 211
Managerial accounting	MS 312
Principles of management	MS 201
Probability and statistics	MA 211 or MA 222

DEGREE PROGRAMS

INTRODUCTION
MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING
MASTER OF BUSINESS ADMINISTRATION IN AVIATION
MASTER OF AVIATION MANAGEMENT
MASTER OF AERONAUTICAL SCIENCE
DUAL DEGREE OPTIONS

INTRODUCTION

Status quo is virtually an unknown concept in the aviation industry. The technology with which aviation works and the national and international regulations with 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 fashioned to stress pragmatic solutions to the managerial, technical and organizational problems likely to arise in the aviation and business world of today. The actual problems presently confronting industry are brought into the classroom for analysis together with the newest tools and techniques available to the manager. Case studies, simulations and other experiential exercises are interspersed throughout the curriculum to achieve a balance between traditional management theory and the realities of organizational life in the 1980's.

The faculty is a mixture of traditionally prepared academicians and those who have compiled records of significant and substantial contributions to the industry. The faculty provide another very important link with aviation and industry. Many of the graduate students themselves have already established careers in aviation, management, and engineering and thus are also able to provide valuable insights from their professional training and experience.

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 MS 590 and MS 591) listed in this catalog.

MASTER OF SCIENCE IN AERONAUTICAL ENGINEERING (MSAE)

The Master of Science in Aeronautical Engineering provides formal post-baccalaureate study in areas of knowledge required by engineers engaged in aircraft-oriented research and development and design activities for public and private aerospace organizations and enterprises. Embry-Riddle's MSAE program is tailored for specialization in the fields of aerodynamics, structures, and design. Candidates for the MSAE degree can select courses with the goal of going either directly into the aerospace industry or on to doctoral studies elsewhere.

The MSAE degree requires a minimum of thirty-six credit hours of course work. This degree requirement consists of a twelve-credit hour core course requirement and an elective component composed of either eighteen additional credit hours plus a six-credit-hour thesis (the thesis option), or an additional twenty-four course credit hours and a scholarly paper (the non-thesis option).

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

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
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 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 618	Aeroelasticity	3
AE 620	Boundary Layer Theory	3
AE 622	Aeroacoustics	3
AE 624	Fracture Mechanics	3
AE 626	Aerospace Structural Loads	3
AE 628	Computer-Aided Design	3
AE 630	Aerospace Structural Design	3
AE 632	Aircraft Performance Optimization	3
AE 634	Automatic Flight Control Systems	3
AE 636	Propeller Theory	3
AE 638	Aerodynamic Systems Design and Integration	3
AE 640	Turbine Engine Propulsion Systems	3
AE 642	Rocket Engine Propulsion Systems	3
AE 644	Perturbation Methods in Astrodynamics	3
AE 699	Independent Study in Aeronautical Engineering	1-3
AE 700	M.S. Thesis	1-6

Thesis Option

This option includes six hours of thesis research credit in the thirty-six-hour degree requirement. The thesis project is to be carried out under the direction of the student's advisor. Approval of the thesis is the responsibility of an examining committee chaired by the student's advisor and composed of at least two other members of the graduate faculty who are familiar with the student's program of study. The examining committee will conduct a final oral examination on the student's thesis when it has been completed to the advisor's satisfaction and in the format required by the College of Engineering and Aviation Science.

Non-Thesis Option

This option requires an independent study course in the thirty-six-hour requirement, plus a comprehensive final examination by a committee of the graduate faculty over all coursework taken. The independent study course requires submission and approval of a scholarly technical paper.

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.

The MBA/A curriculum consists of a core requirement of twenty-four credit hours (eight courses) and an elective component totaling twelve credit hours. The degree requirements are summarized in the listing that follows:

MBA/A Core Courses

		Credit Hours
MS 607	Human Resource Development	3
MS 611	Quantitative Methods in Business	3
MS 614	Marketing Analysis	3
MS 617	Advanced Financial and Managerial Accounting	3
MS 618	Corporate Finance	3
MS 621	Introduction to Decision Support Systems	3
MS 635	Business Policy Analysis	3
MS 638	Managerial Economics	3
Electives		12
Total		36

The prerequisites for a graduate course must be satisfied before enrollment in the course is permitted. The prerequisites for the MBA/A core courses are listed below to help students plan their academic program. Prerequisite requirements may be satisfied in a number of ways.

Core Course	Prerequisite(s)
MS 607	Principles of management
MS 611	Probability and statistics
MS 617	Principles of financial and managerial accounting

MS 618	Principles of financial and managerial accounting
MS 621	An introductory course in computers
MS 635	MS 611, MS 614, & MS 618.
MS 638	Principles of microeconomics and macroeconomics.

MASTER OF AVIATION MANAGEMENT (MAM)

The Master of Aviation Management is designed primarily for those interested in managing the many smaller organizational entities that are such a vital part of the aviation industry or operational units of larger organizations. Examples include fixed base operations, corporate flight departments, commuter and air taxi flight operations, component and support equipment manufacturers and flight training establishments. In a typical morning, a manager of one of these operations may have to deal with situations in customer service, crew scheduling, wage and salary administration, packaging, inventory, and budgeting, to name just a few.

The curriculum is a survey of the tools and techniques available to manage problems that arise in all of the functional areas of management. The needs of the organizational decision-maker are the designed focus of the MAM curriculum. Four of the core courses stress the practical application of management theory to aviation while the two elective core courses allow the establishment of an individual program direction. Through judicious elective selection, the MAM student is able to put together a solid program that complements the framework formed by the core electives chosen. The MAM degree requires thirty-six credit hours consisting of a core totaling eighteen credit hours (six courses) and an elective component of eighteen credit hours. Students must select at least two management science courses as electives. The curriculum is summarized in the list that follows:

MAM Core Courses

	Credit Hours
MS 611 Quantitative Methods in Business	3
MS 613 Personnel Management	3
MS 615 Current Problems in Aviation	3
MS 621 Introduction to Decision Support Systems	3
In addition, two of the following courses must be selected to complete the core:	6
MS 602 Principles of Air Transportation	
MS 609 Airline Operations and Management	
MS 618 Corporate Finance	
MS 645 Airport Management	
MS 655 Aviation Law and Insurance	
AS 608 Aircraft Accident Investigation and Aviation Safety	
Electives (at least six credits must be management science)	18
Total	36

The prerequisites for a graduate course must be satisfied before enrollment in the course is permitted. The prerequisites for the MAM core courses are listed below to help students plan their academic program. Prerequisite requirements may be satisfied in a number of ways.

Core Course	Prerequisite(s)
MS 611	Probability and statistics
MS 613	Principles of management
MS 621	An introductory course in computers
MS 602	Principles of microeconomics, macroeconomics, & management
MS 609	Principles of management
MS 618	Principles of financial and managerial accounting
MS 645	Principles of management

MASTER OF AERONAUTICAL SCIENCE (MAS)

The Master of Aeronautical Science is designed for the aviation professional who seeks a career in the technical sphere of aviation. Opportunities include air traffic control, aviation maintenance, engineer liaison or technical representative with an aircraft or aircraft component manufacturer, flight operations manager, or federal air safety inspector. Functional responsibilities might include operations, safety, maintenance, logistics, or information systems. The core requirement of the MAS degree is structured to broaden the operational knowledge that students bring to the program from their professional experience. Electives can be chosen according to the specialty that most interests the individual student. The MAS degree requires thirty-six credit hours composed of a core totaling eighteen credit hours (six courses) and eighteen credit hours of electives. Students must select at least two aeronautical science courses as electives. The curriculum is summarized in the list that follows:

MAS Core Courses

		Credit Hours
AS 515	Simulation in Aviation	3
AS 608	Aircraft Accident Investigation and Aviation Safety	3
AS 609	Aircraft Maintenance Management	3
MS 615	Current Problems in Aviation	3
In addition, two of the following courses must be selected to complete the core:		6
AS 606	Aviation Control/Communication Systems	
AS 607	Advanced Aircraft Systems	
AS 640	Supply and Distribution in the Aviation Industry	
AS 641	Production and Procurement in the Aviation Industry	
Electives (at least six credits must be aeronautical science)		18
Total		36

The prerequisites for a graduate course must be satisfied before enrollment in the course is permitted. The prerequisites for the MAS core courses are listed below to help students plan their academic program. Prerequisite requirements may be satisfied in a number of ways.

Core Course	Prerequisite(s)
AS 606	Demonstrated knowledge of flight rules and regulations, and basic navigation

AS 607	Demonstrated knowledge of aircraft systems and components
AS 609	Principles of management
AS 640	Principles of management
AS 641	Principles of management, microeconomics, and macroeconomics

DUAL DEGREE OPTIONS

A student may pursue two Embry-Riddle Master's degrees — the Master of Aeronautical Science and either the Master of Business Administration in Aviation OR the Master of Aviation Management. The decision to pursue one of the dual degree options must be declared in writing before a student completes the first twelve credit hours of Embry-Riddle graduate study. A maximum of twelve credit hours from one degree may be applied to the requirements of the other. Thus, a minimum of sixty credit hours must be earned that includes all of the core courses of both degree programs. The transfer credit maximum of twelve credit hours is in effect for pursuit of a dual degree option meaning that a minimum of forty-eight credit hours of Embry-Riddle graduate courses must be completed. A single diploma is awarded showing the titles of both degrees. All requirements for both degrees must be completed before the diploma will be released. Following is a summary of the combined curricula for the two dual degree alternatives:

I. MAS and MBA/A
Core Courses

		Credit Hours
AS 515	Simulation in Aviation	3
AS 608	Aircraft Accident Investigation and Aviation Safety	3
AS 609	Aircraft Maintenance Management	3
MS 607	Human Resource Development	3
MS 611	Quantitative Methods in Business	3
MS 614	Marketing Analysis	3
MS 615	Current Problems in Aviation	3
MS 617	Advanced Financial and Managerial Accounting	3
MS 618	Corporate Finance	3
MS 621	Introduction to Decision Support Systems	3
MS 635	Business Policy Analysis	3
MS 638	Managerial Economics	3
and 2 courses from the following list:		
AS 606	Aviation Control/Communication Systems	6
AS 607	Advanced Aircraft Systems	
AS 640	Supply and Distribution in the Aviation Industry	
AS 641	Production and Procurement in the Aviation Industry	
Electives (at least six credits must be Aeronautical Science		18
Total		60

II. MAS and MAM
Core Courses

		Credit Hours
AS 515	Simulation in Aviation	3

AS 608	Aircraft Accident Investigation and Aviation Safety	3
AS 609	Aircraft Maintenance Management	3
MS 611	Quantitative Methods in Business	3
MS 613	Personnel Management	3
MS 615	Current Problems in Aviation	3
MS 621	Introduction to Decision Support Systems	3
and 2 courses from the following list:		6
	AS 606 Aviation Control/Communication Systems	
	AS 607 Advanced Aircraft Systems	
	AS 640 Supply and Distribution in the Aviation Industry	
	AS 641 Production and Procurement in the Aviation Industry	
and 2 courses from the following list:		6
	MS 602 Principles of Air Transportation	
	MS 609 Airline Operations and Management	
	MS 618 Corporate Finance	
	MS 645 Airport Management	
	MS 655 Aviation Law and Insurance	
Electives (at least six credits must be Aeronautical Science and six credits must be Management Science)		27
Total		60

COURSE DESCRIPTIONS

AERONAUTICAL ENGINEERING
AERONAUTICAL SCIENCE
MATHEMATICS
MANAGEMENT SCIENCE
UNDERGRADUATE PREREQUISITES

COURSE DESCRIPTIONS

Special courses offered on a limited time basis, such as courses taught by a distinguished visiting lecturer, will be identified in Schedules of Classes by numbers ending in "95".

Courses involving individual, independent study and a one to one relationship with a faculty member are identified with a course number having "99" as the last two digits.

AERONAUTICAL 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: AE 404 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 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: AE 401 or equivalent.

AE 506 **Airplane Dynamic Stability** **3 Credits**
Small-disturbance theory and the linearized solutions of the general equations of unsteady motions. Aerodynamic derivatives, derivative analysis, aerodynamic transfer functions. Dynamic stability of uncontrolled longitudinal and lateral motions. Computer solution of dynamic stability problems. Inverse problems. Automatic stability and control. An introduction to automatic flight controls and feedback control system analysis. Prerequisite: AE 413 or equivalent.

AE 508 **Heat Transfer** **3 Credits**
One and two-dimensional steady and unsteady-state condition heat transfer including an introduction to finite difference and finite element methods of analysis. Free and forced convection heat transfer. Radiation heat transfer. Prerequisites: AE 301, ES 305 and MA 441 or their equivalent.

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: AE 302 and AE 404, or their 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: AE 407 and CS 210, or their 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.

AE608 **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: CS 210 and AE 401, or their 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: ES 412 or equivalent.

AE 618 **Aeroelasticity** **3 Credits**
Introduction to self-excited vibrations. Wing flutter, Panel flutter. Unsteady aerodynamics. Prerequisites: MA 502, AE 616.

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 622 **Aeroacoustics** **3 Credits**
General theory of aerodynamic sound. Aerodynamic acoustical noise sources and control. Noise radiation from jets, boundary layers, rotors, propellers and fans. Structural response. Interior aircraft noise. Mechanisms of noise measurements. Acoustical treatment. Prerequisites: MA 502, AE 616.

AE 624 **Fracture Mechanics** **3 Credits**
Basic concepts of solid mechanics applied to the problem of fracture. Effect of microstructure on crack initiation and propagation. Stress intensity factor determination. Analysis of fracture strength. Experimental methods. Prerequisites: AE 502, MA 508.

AE 626 **Aerospace Structural Loads** **3 Credits**
Steady state spanwise and chordwise loads. Windshears, gusts, landing gear and maneuvering loads. Special commercial and military load requirements. Prerequisites: AE 302 and AE 404, or their equivalent.

AE 628 **Computer-Aided Design** **3 Credits**
Introduction to structural and aerodynamic design concepts and analysis techniques. Use of existing computer software for structural and aerodynamic analysis. Verification of closed-form solutions. Computer-aided parametric studies. Prerequisites: AE 420 and AE 421 or their equivalent.

AE 630 **Aerospace Structural Design** **3 Credits**
Design and internal construction of major structural components: wing, fuselage, empennage, landing gear, engine pylons. Layout of major structures and system interfaces. Design load conditions for both static and dynamic environments. Internal geometry, material alternatives, manufacturing alternatives and design constraints. Certification and proof of design requirements. Prerequisites: AE 421 or equivalent, AE 628.

AE 632 **Aircraft Performance Optimization** **3 Credits**
Use of optimization techniques to analyze and design aircraft mission profiles. Performance of aircraft with parabolic drag polars and arbitrary drag polars. Aircraft performance at low subsonic, transonic and supersonic speeds and introduction to performance of hypersonic flight vehicles. Prerequisites: AE 302 or equivalent, MA 510.

AE 634 **Automatic Flight Control Systems** **3 Credits**
Introduction to the analysis and design of digital flight control systems. Mathematical models of open and closed loop systems containing a digital computer. Z and W plane analysis of system stability and performance. Compensation techniques and digital filter designs. Applications to actively controlled aircraft. Effects on design variables. Prerequisite: AE 506.

AE 636 **Propeller Theory** **3 Credits**
The analysis and design of propellers. Analysis of the contribution of innovative propeller design to improving the efficiency of high performance turbine powered aircraft. Noise considerations. Prerequisite: AE 401 or equivalent.

AE 638 **Aerodynamic Systems Design and Integration** **3 Credits**
Design of external aircraft surfaces, intersections, inlets, nozzles, nacelles, and stores and their integration into the overall configuration. Effects of geometric details on the external aerodynamics and performance of the aircraft. Airframe/ propulsion system interactions. Prerequisites: AE 420 or equivalent, MA 510.

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: AE 408 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: AE 408 or equivalent.

AE 644 **Perturbation Methods in Astrodynamics** **3 Credits**
The three-body problem of celestial mechanics. Determination and construction of orbital and mission parameters by approximation methods. Perturbation techniques. Prerequisites: ES 409 or equivalent, MA 502.

AE 699 **Independent Study in Aeronautical Engineering** **1-3 Credits**

AE 700 **M.S. Thesis** **1-6 Credits**

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

AERONAUTICAL SCIENCE

AS 509 **Advanced Aerodynamics** **3 Credits**
A study of current flight applications and problems that includes transonic and supersonic aerodynamics, principles of aircraft stability and control, and operational strength considerations. Prerequisite: Demonstrated knowledge of basic aerodynamics.

AS 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. Prerequisite: Demonstrated knowledge of basic aircraft performance.

AS 512 **Air Carrier Operations** **3 Credits**
A study of air carrier flight operations from the viewpoints of the ground-based flight dispatcher and the cockpit flight crew.

Topics include flight planning, aircraft performance and loading considerations, impact of weather conditions, routing priorities, etc. The course is adequate preparation for the FAA Aircraft Dispatcher written test. Prerequisites: Demonstrated knowledge of flight rules and regulations, basic meteorology, basic navigation, and basic aircraft performance.

AS 515 **Simulation in Aviation** **3 Credits**
A comprehensive examination of simulation in modern aviation that includes the history, "state of the art", and current research and development. Discussion focuses on the extent and impact of simulator application and the effects on training costs and safety.

AS 530 **Corporate Aviation Operations** **3 Credits**
The establishment and operation of a corporate flight department is examined. The procedures and techniques generally accepted as standards by professional corporate flight operations are treated relative to individual corporate experiences. Included is a practical view of the corporate aviation mission of management mobility and use of the resources available to accomplish it.

AS 601 **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. Prerequisites: Basic calculus and demonstrated knowledge of basic meteorology.

AS 606 **Aviation Control/Communication 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 and plans and their objectives. The recent and 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.

AS 607 **Advanced Aircraft Systems** **3 Credits**
State-of-the-art aircraft systems and projections of research trends for future air vehicle requirements and applications are studied. Topics include the capabilities and limitations of current aircraft propulsion, electrical, environmental, control and hydraulic systems and sub-systems. The total aircraft design and the interdependence of aircraft system design constraints are emphasized. Prerequisite: Demonstrated knowledge of aircraft systems and components.

AS 608 **Aircraft Accident Investigation and Aviation Safety** **3 Credits**
A critical analysis of selected aircraft accidents and evaluation of causal factors. Particular emphasis is placed on study of the 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.

AS 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. Prerequisite: Principles of management.

AS 634 **Aviation 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 environment and attempts to design an occupant "friendly" flight deck environment. Prerequisite: FAA Commercial/Military Pilot certification with Instrument rating.

AS 636 **Advanced Aviation Planning Concepts** **3 Credits**
Planning and decision-making techniques and strategies used by the aviation manager. The types and sources of data needed for decisions about route development and expansion, fleet modernization and new markets are examined. The methods of analyzing this data through computer applications, modeling, simulation, heuristics, value theory and payoff tables are studied. The application and limitations of these tools are discussed. Prerequisites: Principles of management, microeconomics, and macroeconomics.

AS 640 **Supply and Distribution in the Aviation 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 analyze supply management in terms of customer satisfaction relative to the costs incurred. Prerequisite: Principles of management.

AS 641 **Production and Procurement in the Aviation 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, operator, and certificator/regulator. Study of the process begins with demand analysis and continues through purchase contracting, manufacturing, marketing, certification, pre-delivery activities, and introduction into service. Prerequisites: Principles of management, microeconomics, and macroeconomics.

AS 642 **Research and Development for the Aviation Industry** **3 Credits**

The types and sources of aviation 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 and other factors affecting progress from initial development to production of aircraft and components. Prerequisites: Principles of management, microeconomics, and macroeconomics.

AS 699 **Special Project** **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 review and recommendation at least three weeks prior to the end of registration for a term. Prerequisite: Consent of the faculty member and approval of the Vice Chancellor for Academic Affairs or his designee.

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.

MANAGEMENT SCIENCE

MS 500 **Government 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.

MS 570 **International Developments in Aviation** **3 Credits**
A comprehensive analysis of current international aviation issues. Particular attention is paid to U.S. international air services, and the cooperative efforts of nations toward providing safe and standardized airways and airports throughout the world. The effects of national, social, economic, and political goals on aviation and the methods for resolving international disagreements are also examined.

MS 590 **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 may be taken on a pass/fail basis. **Credit for this course is not applicable to the requirements of any Embry-Riddle degree.**

MS 591 **Economics Review** **4 Credits**
An introduction to economic 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 may be taken on a pass/fail basis. **Credit for this course is not applicable to the requirements of any Embry-Riddle degree.**

MS 602 **Principles of Air Transportation** **3 Credits**
A study of air transportation as part of a foreign and domestic, multi-modal transportation system. The evolution of the technological, economic, social, and political aspects of the system in this century is reviewed. Long and short-term effects of deregulation and scarce energy are examined. Passenger and

freight transportation, and common and private carriage in each mode are studied relative to the changing system as a whole and air transportation in particular. Prerequisites: Principles of management, microeconomics, and macroeconomics.

MS 603 **Analysis of Data Base Management Systems** **3 Credits**
A study of software systems designed for managing the storage, access, update, and maintenance of a data base. Emphasis is placed on identifying and understanding the capabilities and cost-effectiveness of current Data Base Management Systems (DBMS) and the advantages and disadvantages of using DBMS in modern business applications. Basic concepts of data structures are reviewed. Prerequisite: MS 621.

MS 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.

MS 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.

MS 611 **Quantitative Methods in Business** **3 Credits**
A comprehensive survey of the quantitative analysis techniques and concepts available for use in management. Course topics include an introduction to a variety of quantitative methods, analysis of their strengths and limitations, and illustrations of their application to the solution of actual problems. Prerequisites: Probability and statistics.

MS 613 **Personnel Management** **3 Credits**
The theories, structures, and techniques relative to the utilization of human resources in any organization. Personnel management systems and processes are studied in an environment of rapid social, economic, and technological change. Other topics include job motivation and satisfaction relative to productivity; interrelationship of human and organizational goals and the achievement of both; decision-making processes within union and non-union organizations. Prerequisite: Principles of management.

MS 614 **Marketing Analysis** **3 Credits**
The role of the marketing manager and marketing in the 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.

MS 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.

MS 617 **Advanced Financial and Managerial Accounting** **3 Credits**
The application of financial accounting standards, concepts, and principles using problem-solving and case study approaches. Selected cases will also address managerial planning, control, and decision-making. Prerequisites: Principles of financial and managerial accounting.

MS 618 **Corporate Finance** **3 Credits**
A crucial and timely study of current financial concepts, techniques, and issues emphasizing administrative and managerial applications. Topics include financial policy, planning and control of assets, liabilities and owner's equity, and incorporation into financial accounts and statements. Prerequisites: Principles of financial and managerial accounting.

MS 620 **Managerial Psychology** **3 Credits**
An examination of the causes and implications of human behavior in the organizational environment. Course topics include evaluation of the comparative theories that explain and describe human behavior, behavior causation and modification, perception, personality, learning theory, motivation and work, systems psychology, influencing behavior.

MS 621 **Introduction to Decision Support Systems** **3 Credits**
A study of general systems concepts, purposeful systems within organizations, decision and information systems, planning and control systems, and project management and evaluation systems. Prerequisite: An introductory course in computers.

MS 622 **Decision Support Systems Analysis and Design** **3 Credits**
Course topics include review and analysis of old decision support systems, determining new system requirements, data collection techniques, feasibility assessment, design procedures, flow charting and documentation, system simulation, cost/benefit analysis, system implementation, user concerns, management involvement. Prerequisite: MS 621.

MS 623 **Decision Support Systems Applications: Student Projects** **3 Credits**
Case studies and student projects involving actual organizational systems in areas such as office automation, inventory, airline reservations, aircraft maintenance control and analysis. This course is the pragmatic capstone to the Decision Support Systems series. Prerequisites: MS 603, MS 621, and MS 622.

MS 625 **Airline Marketing Management** **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. Prod-

uct 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: Principles of microeconomics, macroeconomics and management.

MS 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.

MS 635 **Business Policy Analysis** **3 Credits**
Policy and strategy formulation in all of the functional areas of management within a constrained environment are examined via case studies. This "capstone" course includes a competitive management simulation game in which students must make decisions on personnel, production, marketing, pricing, and finance issues. Prerequisites: MS 611, MS 614, and MS 618.

MS 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.

MS 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.

MS 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 the 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.

MS 699 **Special Project** **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 review and recommendation at least three weeks prior to the end of the registration for a term. Prerequisite: Consent of the faculty member and approval of the Vice Chancellor for Academic Affairs or his designee.

Prerequisite Course Descriptions — Embry-Riddle Undergraduate Courses

AMT 360 **Airframe Systems and Applications** **3 Credits**
A study of airframe hydraulic, pneumatic, environmental, fuel, landing gear, and auxiliary systems. (Type 65)

AS 100 **Foundations of Aeronautics** **4 Credits**
Aerodynamics, engines, systems, Federal Aviation Regulations, navigation, meteorology, communication, Airman Information Manual, and flight physiology. Student is eligible to take the Private Pilot written examination upon satisfactory completion. (This course is offered only by the International Campus.)

AS 150 **Aeronautics I** **5 Credits**
A study of the basic aeronautical subject areas necessary for the student to satisfactorily operate an aircraft as a Private Pilot. Subjects include: basic aerodynamics, aircraft performance, weights and balance, Federal Aviation Regulations, aircraft systems and operating procedures, VFR flight planning and the physiological aspects of flight. At the completion of this course, the student will be prepared to take the FAA Private Pilot Written Examination.

AS 201 **Meteorology I** **3 Credits**
A survey of the basic concepts and processes of atmospheric phenomena and their relationship to aeronautical conditions. Included is a systematic development of the following: thermal patterns, atmospheric moisture, horizontal and vertical pressure patterns, clouds, atmospheric circulation, local winds, tropical weather, stability, air masses, fronts, fog, icing, thunderstorms, jet streams and turbulence. Weather data studied includes: surface weather observations, surface maps, and constant pressure maps.

AS 250 **Aeronautics II** **3 Credits**
A study of the techniques, procedures, and regulations pertaining to instrument flight in the National Airspace System. Topics include: attitude instrument flying, navigational equipment and facilities, and the airway system, and air traffic control procedures. At the completion of this course, the student will be prepared to take the FAA Instrument Airplane Written Examination. Prerequisite: AS 150.

AS 251 **Aeronautics III** **3 Credits**
A study and review of the operations, regulations, and procedures necessary to perform competently as a Commercial Pilot. Subjects include: complex and multiengine aircraft operations, advanced weight and balance computations and cross-country planning, meteorology, FAR, AIM, and other flight publications. Study includes a discussion of precision flight maneuvers required for Commercial Pilot Certification. At the completion of the course, the student will be prepared to take the FAA Commercial Pilot Written Examination. Prerequisite: AS 150.

AS 309 **Basic Aerodynamics** **3 Credits**
Incompressible flow, airfoil theory, wing theory. Calculation of stall speed, drag, and basic performance criteria. Special flight conditions. Introduction to compressible flow. Prerequisite: PS 104.

AS 310 **Aircraft Performance** **3 Credits**
Aerodynamic performance of aircraft powered by reciprocating, turboprop, or jet turbine engines. Stability and control, weight and balance, and operating data. Prerequisite: AS 309.

AS 356 **Aircraft Systems and Components** **3 Credits**
Electrical, environmental, hydraulic, fuel, ignition, and lubrication systems including theory of operation and calculations. Prerequisite: PS 104.

CS 105 **Introduction to Computers in Aviation** **3 Credits**
Diverse exposure to the digital computer and its uses and capabilities as a management tool in the aviation field. Topics include basic introduction to systems analysis and management information systems. Contrasts hardware capabilities, programming requirements, and systems analysis and planning.

CS 109 **Introduction to Computer Programming with BASIC** **3 Credits**
Concepts of algorithms, computers, and programming. Experience with software packages and programming in BASIC. Student develops an appreciation for the kinds of tasks that can (or cannot) be performed by the computer, and the types of analysis and programming necessary to achieve desired results.

EC 210 **Microeconomics** **3 Credits**
An introduction to economic principles, problems, and policies with emphasis on microeconomic theory and current domestic problems.

EC 211 **Macroeconomics** **3 Credits**
An introduction to economic principles, problems, and policies with emphasis on macroeconomic theory, business fluctuation, fiscal and monetary policy, and economic growth.

MA 112 **College Mathematics for Aviation II** **3 Credits**
Basic calculus designed for the student of aviation. Differentiation and integration of algebraic functions; applications to velocity, acceleration, area, curve sketching, and computation of extreme values. Prerequisite: MA 111.

MA 211 **Statistics with Aviation Applications** **3 Credits**
Descriptive statistics; populations and samples; measures of central tendency and dispersion; elementary probability; binomial and normal distributions and their interrelationships; random variables; one and two sample hypothesis testing involving proportions and means for large and small samples; estimation and confidence intervals; Chi square distribution; correlation coefficient; least squares line. Prerequisite: MA 111.

MA 222 **Business Statistics** **3 Credits**
Measures of central tendency and dispersion; histograms; algebra of probability; sample spaces; dependent events; Bayes' Theorem with applications; binomial, Poisson, and normal distribution and their interrelationships; sampling distributions; hypothesis testing; confidence intervals. Prerequisite: MA 220 or MA 112 or MA 140.

MS 110 **Accounting I** **3 Credits**
An introduction to accounting; double entry, income statement, balance sheet, interpretation of accounts, partnerships, and corporations. This course is offered only at International Campus locations.

MS 201 **Principles of Management** **3 Credits**
Provides an overview of relevant management principles and practices as applied in contemporary organizations. Focuses on management theories, philosophies, and functions.

MS 210 **Financial Accounting I** **3 Credits**
Fundamental principles applicable to the accounting cycle, asset valuation, income determination, financial reporting, the owner's equity. Prerequisite: CS 109 or permission of the instructor.

MS 212 **Financial Accounting II** **3 Credits**
Fundamental principles applicable to financial statement analysis, funds and cash flow reporting, price level changes and income tax interperiod allocation. Prerequisite: MS 210.

MS 312 **Managerial Accounting** **3 Credits**
Emphasizes the conceptual, measurement, and communication aspects essential for the interpretation and use of accounting information for management purposes. These aspects will be stressed by treating three areas of cost within the field of management accounting: full cost accounting; differential accounting; and responsibility accounting. Prerequisite: MS 110 or MS 210.

PROCEDURES AND REGULATIONS

STUDENT RESPONSIBILITIES
STANDARDS OF CONDUCT
PRIVACY OF STUDENT RECORDS
ATTENDANCE
GRADUATE CLASS SCHEDULES
COURSE LOAD
AUDITING AND WITHDRAWING FROM A COURSE
WITHDRAWAL FROM THE UNIVERSITY
GRADING POLICY
STANDARDS OF ACADEMIC PROGRESS
DEGREE COMPLETION TIME LIMIT
CONTINUOUS ENROLLMENT
READMISSION TO THE GRADUATE PROGRM
RESIDENT CREDIT
GRADUATION REQUIREMENTS
TRANSCRIPT REQUESTS

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, 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 him 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 ERAU 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 ERAU 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.

PRIVACY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974, Public Law 93-380, provides students with the right of access to their educational records and precludes the University from releasing educational records to individuals outside the University without the consent of the student. Blanket authorizations are not permitted. Consent of the student must be supplied with every request to release education records. Certain "directory" information may be published at the discretion of the University without consent. This information includes a student's name, address, telephone number, date and place of birth, degree program, class schedule, dates of attendance, degrees and awards received, and the most recent public or private school attended.

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 International Campus 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 Program Coordinator (Daytona Beach Campus) or International Campus 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 college dean or the Vice Chancellor for Academic Affairs.

Full-time enrollment status is achieved when a student enrolls in six or more credit hours per term. For the purposes of determining eligibility for financial aid or veterans' educational benefits, full-time enrollment status may be defined differently depending upon the number of weeks in a term or the number of terms per year.

AUDITING AND WITHDRAWING FROM 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 term. At the Daytona Beach Campus, the "Add" period is shown on the calendar in the rear of this catalog. For International Campus 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.

A Daytona Beach Campus student may withdraw from a course at any time during the first nine weeks of a semester and during the first four and one-half weeks of a summer term. An International Campus student may withdraw from a course until the end of the middle week of a term or as stated in the contracts or memoranda of understanding/agreement in effect at certain graduate locations. 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 after the scheduled withdrawal period and before the scheduled administration of any final examinations constitutes withdrawal from the University. When students formally withdraw from the University, a grade of WP (Withdrawal-Passing) or WF (Withdrawal-Failing) will be assigned for each course in which they are enrolled based on their performance in the course up to the time of official withdrawal. 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/Officee 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 Vice Chancellor for Academic Affairs 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
S	Satisfactory (non-credit)	0
X	Credit by examination or advanced standing	0
T	Accepted by transfer	0
N	No grade submitted by instructor	0
I	Incomplete	0
P	Passing	0
	(Applicable to MS 590 and MS 591 only)	0
W	Withdrawal from a course	0
WP	Withdrawal from the University passing	0
WF	Withdrawal from the University failing	0
AU	Audit	0

Incomplete

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. For Daytona Beach Campus students, an I grade must be redeemed no later than six weeks following the term for which the I grade was assigned (third week for summer terms.) For International Campus students, an I grade must be redeemed by the end of the second term following the term for which the I grade was assigned. Incompletes which are not redeemed are automatically converted to course grades of F upon expiration of the redemption period. The center director/Office of Records and Registration may restrict the enrollment of students who have outstanding incompletes or a history of repeated incompletes.

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. When a P, S, X, T, N, I, WP, WF, or AU grade is recorded for a course, the hour value does not count as hours attempted. 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.

Grade Reports

Grade reports are issued at the end of each term. All reports of grades are mailed directly to students at the addresses provided by them 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.

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 after a student has been unconditionally admitted to the graduate program. Conditional admission itself constitutes a warning notice and, therefore, students on conditional status will not be issued an Academic Warning.

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 are subject to course/load limitations. 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. Students receiving Veterans' Administration (VA) Educational Benefits who are placed on Academic Warning will experience an interruption in VA Educational Benefits if they remain on Academic Warning for more than two terms.

Dismissal

Students are subject to dismissal 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. Students are permitted to enroll in a maximum of twelve credits of graduate courses while on conditional admission status and are subject to immediate dismissal if a final course grade of less than B is earned in any of the courses.
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.

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.

The International Campus Vice Chancellor for Academic Affairs (Dean of the Graduate School at the Daytona Beach Campus) reviews the cases of all students subject to dismissal from the graduate program and makes the final determination of the action to be taken.

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 Dean of the Graduate School if on the Daytona Beach Campus or the appropriate International Campus center director. Documentation supporting the readmission must accompany the application. The Vice Chancellor for Academic Affairs reviews all applications for readmission and 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 the first enrollment subsequent to the readmission. At the time of readmission, the criteria for transfer credit and advanced standing is applied to all previous graduate study, including previously completed Embry-Riddle graduate courses, and any relevant experience.

RESIDENT CREDIT

A minimum of twenty-four hours of graduate work including the last nine credit hours must be completed at Embry-Riddle to qualify for a master's degree. Students pursuing either of the dual degree options must complete a minimum of forty-eight credit hours of graduate work 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 or sixty graduate credit hours for either dual degree option.
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 (forty-eight for either dual degree option).
4. Earn a cumulative GPA of at least 3.00 for all Embry-Riddle graduate work.
5. Satisfy all debts and obligations to the University.
6. Be recommended by the graduate faculty, appropriate International Campus center director, and the campus Vice Chancellor for Academic Affairs.

Application for Graduation

Daytona Beach Campus students may graduate only on the dates for commencement specified in the calendar in the front of this catalog. International Campus students may graduate at the end of any term. An application for graduation must be initiated by the student and received by the Records Office within the time limit specified by the campus. 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.

TRANSCRIPT REQUESTS

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 without charge. For additional transcripts, **a signed request** for the academic transcript, accompanied by a fee of $2.00, must be made by the student to the campus Student Records Office. Transcripts, letters of recommendation or certifications of attendance will not be released for students who have failed to meet their financial obligations to the University.

FINANCIAL INFORMATION

CHARGES, PAYMENT AND REFUNDS
FINANCIAL AID
VETERANS' EDUCATIONAL BENEFITS
MILITARY TUITION ASSISTANCE
GRADUATE ASSISTANTSHIPS

CHARGES, PAYMENT AND REFUNDS

For information concerning charges, payment regulations and refunds, consult the ERAU 1987-88 Financial Information Brochure or contact the resident center director.

FINANCIAL AID

Embry-Riddle makes every effort, within the limitations of its available financial resources, to assure that no qualified student is denied the opportunity to obtain an education because of inadequate financial resources. However, the primary reponsibility for financing an education must be assumed by the student. Graduate students in need of financial assistance to enable them to pursue their educational goals should contact the campus financial aid office or resident center they plan to attend. A brochure describing financial assistance available to graduate students may be obtained by contacting the Daytona Beach or International Campus Financial Aid Office or resident centers.

Financial aid applicants must meet University academic requirements and maintain the standards of satisfactory 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. For Embry-Riddle graduate programs, they are as follows:

1. Maintain good academic standing
2. Maintain a CGPA of at least 3.00
3. Successfully complete at least 66 percent of the cumulative credit hours attempted
4. Complete degree requirements within the maximum number of allowable credit hours as defined in accordance with federal financial aid guidelines.

Complete, detailed information can be found in "Standards of Satisfactory Progress for Financial Aid Recipients," a publication available at both the Daytona Beach and International Campus Financial Aid Offices or resident centers.

The Financial Aid programs available to graduate students are as indicated below.

- Guaranteed Student Loans
- Supplemental Loans for Parents
- Supplemental Loans for Independent Students
- Embry-Riddle Student Employment Program
- Florida Graduate Scholar's Fund
- Graduate Engineering Teaching Assistantships
- Short-term Loans

Participation in somg of the programs listed above may be limited because of students' degree programs and/or the ERAU location where they attend.

VETERANS' EDUCATIONAL BENEFITS

All Embry-Riddle graduate programs have been approved for Veterans Administration Educational Benefits. Students planning to use VA benefits should contact the appropriate center director as soon as possible prior to the start of the first term in which they plan to enroll. In order for the University to certify the enrollment of students wishing to receive veterans' benefits, the students must **have applied and been accepted** for enrollment as Embry-Riddle graduate students.

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 graduate students at the Daytona Beach Campus. A teaching assistant helps in teaching undergraduate students in specified courses or laboratories under the general supervision of a faculty member. Disciplines for such teaching appointments include engineering, engineering technology, mathematics, and physical sciences. A research assistant is involved in research activities under the direction of a faculty member in connection with ongoing departmental contracted research.

To be eligible for a teaching assistantship, a student must be admitted to the graduate school and be in good academic standing with a minimum CGPA of 3.00 on a 4.00 basis in all graduate level courses. Assistantship applications may be made directly to the offering department during the first semester of graduate registration. Currently, assistantships are available in the Aeronautical Engineering and Mathematics and Physical Sciences Departments for MSAE students.

All teaching or graduate assistants must be registered for courses at ERAU for any semester of their appointment. Any outside employment accepted by a graduate student on assistantship must be made with the permission of the Graduate Program Coordinator.

FACULTY AND ADMINISTRATION

OFFICERS OF THE UNIVERSITY

DAYTONA BEACH CAMPUS
ACADEMIC ADMINISTRATION

FACULTY

INTERNATIONAL CAMPUS
ACADEMIC ADMINISTRATION

FACULTY

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John W. Williams, Jr.
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William J. Harmon
Vice President, University Relations. B.A., University of Pennsylvania.

L. William Motzel
Vice President/Assistant Secretary. B.A., University of Notre Dame; M.S.E.S., Saint Louis University; Ph.D., Catholic University of America; P-ASEL.

Paul S. Daly
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Eric S. Doten
Vice President and Chancellor, Daytona Beach Campus. B.S., Princeton University; M.S., Troy State University; C-ASMEL-I; CFI-ASEL.

Charles S. Williams
Vice President and Chancellor, International Campus. B.S., U.S. Naval Academy; M.A., Stanford University; C.

Dianne R. Thompson
Secretary/Treasurer. A.A., Daytona Beach Community College; B.S., Embry-Riddle Aeronautical University.

DAYTONA BEACH CAMPUS

ACADEMIC ADMINISTRATION

Reisbig, R. Luther
Vice Chancellor for Academic Affairs. B.S., Michigan State University; M.S., University of Washington; Ph.D., Michigan State University.

Brown, Robert S., Jr.
Dean, College of Engineering and Aviation Science. B.S. and M.S., Lowell Technological University; Ph.D., University of Connecticut.

Martin, William A.
Dean, College of Aviation Technology. B.S. and M.A.S., Embry-Riddle Aeronautical University; ATP-MEL; CE-500; C-SEL; H-I; CFI-ASMEL&IA; AGI; IGI.

FACULTY

Aggarwal, Shiv Kumar
Professor, Mathematics. Ph.D., Ohio University.

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Professor, Computer Science. Ph.D., Purdue University.

Baty, Margaret
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Blackwell, Bishop
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Chadbourne, Bruce D.
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Chamberlin, William A., Jr.
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Professor, Mathematics. Ph.D., Florida State University.

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Martin, William A.
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Sivjee, Gulamabas G.
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(502) 942-0625

Fort Rucker Center
ERAU
P.O. Box 700
Fort Rucker, Alabama
36362-5000
(205) 598-6232 or 598-6252

Grand Forks AFB Center
ERAU
Education Center
321 CSG/DPE
Grand Forks AFB,
North Dakota 58205-5000
(701) 594-5324

Griffiss AFB Center

Hawaii Centers

ERAU
416 CSG/DPE
Griffiss AFB, New York
13441-5000
(315) 339-5458 or 330-3746

Keesler AFB Center
ERAU
P.O. Box 5092
c/o Base Education Office
Keesler AFB, Mississippi
39534-5092
(601) 377-2323

Langley AFB Center
ERAU
P.O. Box 816
Langley AFB, Virginia 23665
(804) 764-2662

Loring AFB Center
ERAU
HQ 42nd CSG/DPE
Loring AFB, Maine 04751
(207) 999-2608 or 328-7933

March AFB Center
ERAU
Base Education Office
22 CSG/DPE
Building 449
March AFB, California 92518
(714) 653-4074

Norton AFB Center
ERAU
Base Education Center
63 ABG/DPE
Norton AFB, California 92409
(714) 888-2918 or 382-4372

South Florida Region
ERAU Graduate Program
Executive Airport
5601 N.W. 15th Avenue
Fort Lauderdale, Florida 33309
(305) 493-8788

ERAU
P.O. Box 1029
Pearl City, Hawaii 96782-1029
(808) 845-2500

Kirtland AFB Center
ERAU
1606 ABW/DPE
Base Education C
Kirtland AFB, New Mexico
87117
(505) 844-0051 or 255-9409

Luke AFB Center
ERAU
832 CSG/DPE
Building 241
Luke AFB, Arizona 85309-5715
(602) 935-4000

McClellan AFB Center
ERAU
2852 ABG/DPE
McClellan AFB, California
95652-5000
(916) 920-9620

McDill AFB Center
ERAU
P.O. Box 6821
McDill AFB, Florida 33608-0821
(813) 830-3772

Offutt AFB Center
ERAU
3902 ABW/DPE
Offutt AFB, Nebraska 68113
(402) 292-6655
Ontario, Canada POH/1PO

Williams AFB Center
ERAU
82 ABG/DPE
Williams AFB, AZ
85240-5615
(602) 988-1071 or
988-2611 Ext. 5657

EUROPE

Headquarters
ERAU Graduate Programs
HQ USAFE/DPPEF
APO New York 09633-7451
Wiesbaden Civilian: 06121-81-0608
Wiesbaden Military: 3723

England

RAF Alconbury
10 CSG/DPE
Attn: ERAU
APO New York 09238

Fairford
7020 ABG/DPE
Attn: ERAU
APO New York 09125

RAF Mildenhall
513 CSG/DPE
Attn: ERAU
APO New York 09127

RAF Woodbridge
81 CSG/DPE
Attn: ERAU
APO New York 09405

RAF Bentwaters
81 CSG/DPE
Attn: ERAU
APO New York 09755

RAF Lakenheath
48 CSG/DPE
Attn: ERAU
APO New York 09179

RAF Upper Heyford
20 CSG/DPE
Attn: ERAU
APO New York 09194

Germany

Bitburg Air Base
36 CSG/DPE
Attn: ERAU
APO New York 09132

Hahn
50 CSG/DPE
Attn: ERAU
APO New York 09109

Ramstein Air Base
377 CSW/DPE
Attn: ERAU
APO New York 09012

Sembach Air Base
601 CSG/DPE
Attn: ERAU
APO New York 09123

Zweibrucken Air Base
26 CSG/DPE
Attn: ERAU
APO New York 09860

Finthen Army Airfield
Finthen Education Center
Attn: ERAU
APO New York 09185

Hanau
Hanau Education Center
Fliegerhorst Kaserne
Attn: ERAU
APO New York 09165

Rhein-Main Air Base
435 CSG/DPE
Attn: ERAU
APO New York 09057

Spangdahlem Air Base
52 CSG/DPE
Attn: ERAU
APO New York 09123

Holland

Camp New Amsterdam
32 TFS/DPE
Attn: ERAU
APO New York 09292

Spain

Torrejon Air Base
401 CSG/DPE
Attn: ERAU
APO New York 09283

*ERAU CALENDAR 1987-88

SPRING SEMESTER 1987

January 6-7 ..... Registration
January 8 ..... Classes begin
January 12 ..... Last day for late registration
February 16 ..... HOLIDAY — President's Day
April 16 ..... Last day of classes
April 17 ..... HOLIDAY — Good Friday
April 18, 20-23 ..... Final Examinations
April 25 ..... Commencement

SUMMER SEMESTER (TERM A) 1987

May 4-5 ..... Registration for Terms A, B
May 6 ..... Classes begin
May 8 ..... Last day for late registration
May 25 ..... HOLIDAY — Memorial Day
June 19 ..... Last day of classes
June 22-23 ..... Final Examinations

SUMMER SEMESTER (TERM B) 1987

June 25 ..... Registration for Term B
June 26 ..... Classes begin
June 30 ..... Last day for late registration
July 3 ..... HOLIDAY — Independence Day
August 10 ..... Last day of classes
August 12-13 ..... Final Examinations
August 15 ..... Commencement

FALL SEMESTER 1987

August 26-28 ..... Registration
August 31 ..... Classes begin
September 2 ..... Last day for late registration
September 7 ..... HOLIDAY — Labor Day
November 26-27 ..... HOLIDAY — Thanksgiving
December 10 ..... Last day of classes
December 12, 14-17 ..... Final Examinations
December 19 ..... Commencement

SPRING SEMESTER 1988

January 7-8 ..... Registration
January 11 ..... Classes begin
January 13 ..... Last day for late registration
February 15 ..... HOLIDAY — President's Day
April 1 ..... HOLIDAY — Good Friday
April 15 ..... Last day of classes
April 16, 18-21 ..... Final Examinations
April 23 ..... Commencement

SUMMER SEMESTER (TERM A) 1988

May 5-6 ..... Registration for Terms A, B
May 9 ..... Classes begin
May 11 ..... Last day for late registration
May 30 ..... HOLIDAY — Memorial Day

June 24 ..... Last day of classes
June 25-27 ..... Final Examinations

SUMMER SEMESTER (TERM B) 1988

June 29 ..... Registration for Term B
June 30 ..... Classes begin
July 4 ..... HOLIDAY — Independence Day
July 5 ..... Last day for late registration
August 16 ..... Last day of classes
August 17-18 ..... Final Examinations
August 20 ..... Commencement

* Daytona Beach Campus only. International Campus students should contact the local ERAU Resident Center Director for the Academic Calendar applicable to their specific location.

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EMBRY-RIDDLE
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Embry-Riddle Aeronautical University
Department of Admissions
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Star Route Box 540
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