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ABSTRACT

This program guide presents the avionics maintenance technology curriculum for technical institutes in Georgia. The general information section contains the following for both the diploma program and the associate degree program: purpose and objectives; program description, including admissions, typical job titles, and accreditation and certification; and curriculum model, including standard curriculum sequence and lists of courses. The next three sections contain the courses: general core courses for the diploma program (English, algebraic concepts, trigonometry, and interpersonal relations/professional development) and for the associate degree program (principles of economics, composition and rhetoric I, college algebra and trigonometry, and introductory physics and psychology); fundamental technical courses (aircraft maintenance regulations, aircraft applied sciences, sheet metal structures, assembly and rigging, aviation physics, basic and advanced electronics, and introduction to microcomputers); and specific technical courses (fluid power and landing gear systems, utility, aircraft electrical, and navigation systems, microprocessors, avionics maintenance practices, aircraft logic, aircraft communication, navigation, and flight director and autopilot systems). Each course consists of the following: a course overview (description, competency areas, prerequisites, credit hours, contact hours); course outline with student objectives and class and lab hours; and resource list. Two appendices are included: tools and equipment list and tool kit for avionics maintenance technicians. (NLA)

GEORGIA DEPARTMENT OF TECHNICAL AND ADULT EDUCATION

AVIONICS MAINTENANCE TECHNOLOGY PROGRAM GUIDE

AVIONICS MAINTENANCE TECHNOLOGY PROGRAM GUIDE

Developed and Produced
Under Contractual Agreement with

Office of Technical Education
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AVIONICS MAINTENANCE TECHNOLOGY PROGRAM GUIDE

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Without the close cooperation of members of the avionics maintenance technology profession in Georgia, this program guide would not have been possible. The Avionics Maintenance Technology State Technical Committee provided overall direction, identified areas of concern, provided occupational outlook and equipment recommendations, participated in task analysis review, and reviewed the curriculum in this guide. We would like to recognize each member of the Avionics Maintenance Technology State Technical Committee below.

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HOW TO USE THIS MANUAL

Summary

This manual is divided into:

Tabs - major divisions, physically separated by numbered tab dividers

Sections - divisions within a tab

Subjects - divisions within a section

Numbering System

Each document (Subject) has a unique 6-digit number. This number is divided into 3 sets of 2 digits which are separated by dashes.

Example:	04	-	02	-	03
	TAB		SECTION		SUBJECT

Locating a Document

Document numbers appear on the upper right hand corner of each page (see top of this page). To locate a subject:

1. Refer to the Table of Contents.
2. Note the document number for the subject.

   Example: 04-02-03

3. Turn to the tab divider marked 04 and within this tab find Section 02 and Subject 03.

Table of Contents

The table of contents (00-00-01) is intended to give a cover-to-cover overview of the manual contents and organization. It lists contents of a Tab to the Section and Subject level.

Amendments

Registered manual holders are instructed to keep their manuals up-to-date.

Manuals Document Transmittal	All new or revised documents are sent to the registered holder of the manual and are recorded on a Manuals Document Transmittal Form. Transmittals are numbered consecutively, and instructions for use are printed on the form.
Amendment Record	The registered holder of the manual records the receipt of all manual document transmittals on the Amendment Record. This record and instructions are found on the reverse side of the manual title page.

GENERAL INFORMATION

Diploma Program Introduction

Overview

The Avionics Maintenance Technology program is consistent with the philosophy and purpose of the institution. The program provides academic foundations in communications, mathematics, and human relations, as well as technical fundamentals. Program graduates are well trained in the underlying fundamentals of avionics maintenance technology and are well prepared for employment and subsequent upward mobility.

The Avionics Maintenance Technology program is a specialized training program that provides the student with the knowledge and skills to become a competent avionics technician in the modern avionics maintenance technology profession. Skills application plays a vital role in the comprehensive Avionics Maintenance Technology program. Important attributes of successful program graduates are critical thinking, problem solving, and the ability to apply knowledge and skills to the work requirement. This field has experienced rapid expansion and the trend is expected to continue for the foreseeable future.

The program structure acknowledges individual differences and provides opportunities for students to seek fulfillment of their respective educational goals. The program does not discriminate on the basis of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

To assist each student to attain his or her respective potential within the program, both the instructor and the student incur an obligation in the learning process. The instructor is a manager of instructional resources and organizes instruction in a manner which promotes learning. The student assumes responsibility for learning by actively participating in the learning process.

This is a dynamic field which requires extraordinary attention to current curriculum and up-to-date instructional equipment, materials, and processes. The Avionics Maintenance Technology program must promote the concept of change as the profession evolves. The need for nurturing the spirit of involvement and lifelong learning is paramount in the avionics maintenance technology profession.

GENERAL INFORMATION

Diploma Program Introduction

Standard Curriculum

The Avionics Maintenance Technology program guide presents the standard avionics maintenance technology curriculum for technical institutes in Georgia. This curriculum addresses the minimum competencies for the Avionics Maintenance Technology program. The competency areas included in a local Avionics Maintenance Technology program may exceed what is contained in this program guide, but it must encompass the minimum competencies contained herein.

As changes occur in the Avionics Maintenance Technology program, this guide will be revised to reflect those changes. Proposed changes are first evaluated and approved by the local program advisory committee and then forwarded to the State Technical Committee for approval and inclusion in the state standard program guide.

GENERAL INFORMATION

Diploma Program Introduction

Developmental Process

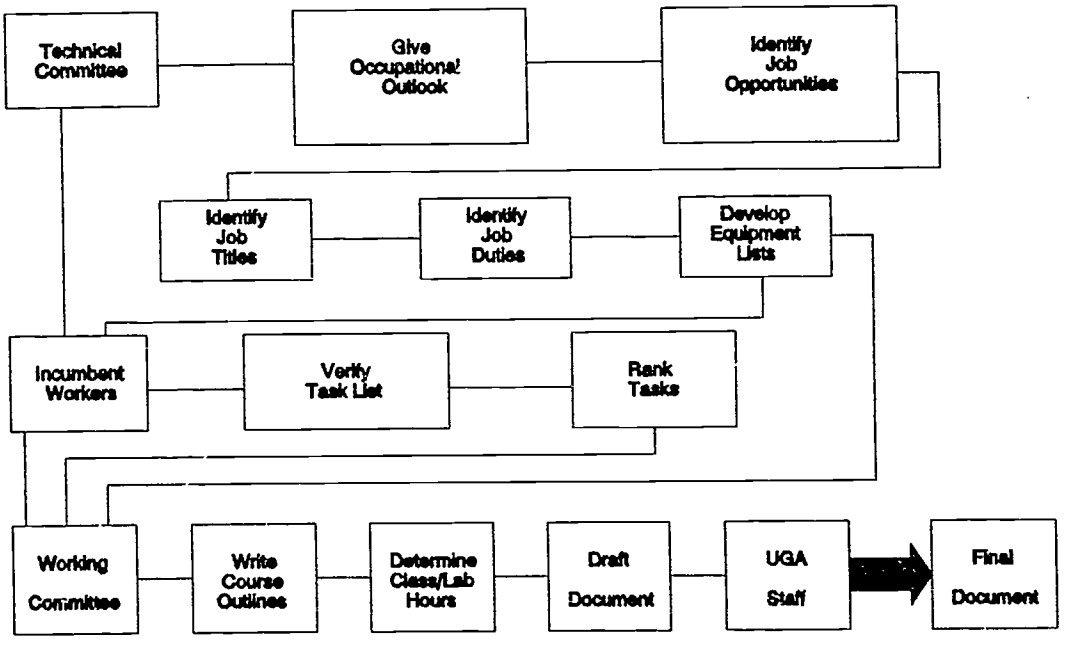
The development of the Avionics Maintenance Technology program guide was based on the premise that the people in the industry can best determine program needs. With this in mind, representatives from businesses which would employ program graduates were asked to serve on a State Technical Committee to help identify the technical content and to provide overall guidance to ensure that the resulting program would produce graduates qualified for entry-level technical positions in the industry.

The State Technical Committee verified an occupational task list that had been compiled through extensive research. These representatives included workers who had actually performed the duties and tasks being verified.

Technical institutes which would implement the curriculum were also included in the developmental effort. Representatives from the technical institutes provided the expertise in teaching methodology unique to each discipline and developed the courses contained in this program guide.

The University of Georgia coordinated and directed the development of the curriculum and produced the final program guide. The role of each group in the developmental process is shown in the diagram on the following page.

DATA/PROCESS FLOW DIAGRAM



GENERAL INFORMATION

Diploma Program Introduction

Purpose and Objectives

Purpose

The purpose of the Avionics Maintenance Technology program is to provide educational opportunities to individuals that will enable them to obtain the knowledge, skills, and attitudes necessary to succeed in the avionics maintenance technology profession.

The Avionics Maintenance Technology program provides educational opportunities regardless of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

The Avionics Maintenance Technology program is intended to produce graduates who are prepared for employment as avionics technicians. Program graduates are to be competent in the areas required for the Federal Aviation Administration airframe mechanics certification and in the general areas of written and oral communications; algebra, geometry, and trigonometry; and interpersonal relations. Program graduates are to be competent in the fundamentals of aircraft electrical, electronic, hydraulic, pneumatic, and mechanical systems maintenance; and avionics systems theory, application, and troubleshooting.

Objectives

1. Provide current curriculum, instructional materials, and equipment (in accordance with available funding) which teach knowledge, skills, and attitudes appropriate to industry needs.

2. Provide educational facilities which foster learning and provide safe, healthy environments available and accessible to all students who can benefit from the program.

3. Provide academic instruction which supports effective learning within the program and which enhances professional performance on the job.

4. Provide employability skills which foster work attitudes and work habits that will enable graduates of the program to perform as good employees.

5. Nurture the desire for learning so that graduates will pursue their own continuing education as a lifelong endeavor.

6. Provide an educational atmosphere which promotes a positive self-image and a sense of personal well-being.

7. Provide education that fosters development of good safety habits.

8. Provide admission, educational, and placement services without regard to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

9. Provide information to the public regarding the program that will facilitate recruitment and enrollment of students.

10. Promote good public relations via contacts and regular communications with business, industry, and the public sector.

11. Promote faculty and student rapport and communications to enhance student success in the program.

GENERAL INFORMATION

Diploma Program Description

Program Defined

The Avionics Maintenance Technology program is a sequence of courses designed to prepare students to work in the field of avionics maintenance technology. Learning opportunities develop academic, technical, and professional knowledge and skills required for job acquisition, retention, and advancement. The program emphasizes a combination of aircraft and avionics theory and practical application necessary for successful employment. Program graduates receive an Avionics Maintenance Technology diploma which qualifies them as avionics technicians.

GENERAL INFORMATION

Diploma Program Description

Admissions

Admissions Requirements

Admission of new students to the Avionics Maintenance Technology program is contingent upon their meeting all of the following requirements:

a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum regular admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores*; and
d) completion of application and related procedures.

Admission of transfer students is contingent upon their meeting the following:

a) regular admission and good standing at a regionally accredited FAA approved diploma or degree granting institution; and
b) proper completion of application and related procedures.

Provisional Admission

A new student who does not meet the regular admission requirements of the program may be admitted on a provisional basis. The requirements for provisional admission are:

a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum provisional admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores*, or recommendation by program faculty and designated admissions personnel on the basis of interview and assessment of student potential; and
d) completion of application and related procedures.

GENERAL INFORMATION

Diploma Program Description

Typical Job Titles

The Avionics Maintenance Technology program is assigned a (PGM) CIP code of (PGM) 47.0692 and is consistent with all other programs throughout the state which have the same (PGM) CIP code. The related D.O.T. job title follows:

823.281-010	Avionics Technician

GENERAL INFORMATION

Diploma Program Description

Accreditation and Certification

This program must conform to the institutional accreditation requirements of the Southern Association of Colleges and Schools by meeting Commission on Colleges (COC) or Commission on Occupational Education Institutions (COEI) accreditation requirements and must not conflict with the accreditation criteria established by COC and COEI.

GENERAL INFORMATION

Diploma Program Curriculum Model

Standard Curriculum

The curriculum design components, general core courses, fundamental occupational/technical courses, specific occupational/technical courses, and elective courses, are listed below with quarter hour credits and suggested course prerequisites and/or corequisites.

Essential Courses		Credits	Sequence
Essential General Core Courses		18	
ENG 101	English	5	[P] ENG 097, or DTAE English admission score levels; and RDG 097, or DTAE reading admission score levels
MAT 103	Algebraic Concepts	5	[P] MAT 098, or DTAE arithmetic and algebra admission score levels
MAT 105	Trigonometry	5	[P] MAT 103
PSY 100	Interpersonal Relations and Professional Development	3	[P] Provisional admission
Essential Fundamental Technical Courses		47	
AMT 101	Aircraft Maintenance Regulations	3	[P] Provisional admission
AMT 102	Aircraft Applied Sciences	13	[P] Provisional admission
AMT 105	Sheet Metal Structures	7	[P] Provisional admission
AMT 107	Assembly and Rigging	6	[P] Program admission
AMT 121	Aviation Physics	3	[P/C] AMT 102
AVT 101	Basic Electronics	6	[P] MAT 103 [C] MAT 105
AVT 103	Advanced Electronics	6	[P] AVT 101
CMP 101	Introduction to Microcomputers	3	[P] Provisional admission

Essential Courses		Credits	Sequence
Essential Specific Technical Courses		66	
AMT 201	Fluid Power and Landing Gear Systems	9	[P] Program admission
AMT 202	Utility Systems	10	[P] Program admission
AMT 203	Aircraft Electrical and Navigation Systems	9	[P] AVT 103
AVT 104	Microprocessors	6	[P] AVT 101
AVT 105	Avionics Maintenance Practices	5	[P] AVT 101
AVT 106	Aircraft Logic Systems	6	[P/C] AVT 104
AVT 107	Aircraft Communication Systems	7	[P/C] AVT 104
AVT 108	Navigation Systems	7	[P/C] AVT 104
AVT 109	Flight Director and Autopilot Systems	7	[P/C] AVT 108
Essential Electives		6	

Program Final Exit Point

Avionics technician

Credits Required for Graduation

137 minimum quarter hour credits required for graduation

GENERAL INFORMATION

Diploma Program Curriculum Model

Standard Curriculum

The standard curriculum for the Avionics Maintenance Technology program is set up on the quarter system. Technical institutes may implement the Avionics Maintenance Technology program by using one of the sequences below or by using a locally developed sequence designed to reflect course prerequisites and/or corequisites.

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SUGGESTED SEQUENCE I				
FIRST QUARTER				
AMT 101 Aircraft Maintenance Regulations	2	2	4	3
AMT 105 Sheet Metal Structures	5	7	12	7
CMP 101 Introduction to Microcomputers	1	4	5	3
MAT 103 Algebraic Concepts	5	0	5	5
	13	13	26	18
SECOND QUARTER				
AMT 102 Aircraft Applied Sciences	10	10	20	13
AMT 121 Aviation Physics	3	0	3	3
MAT 105 Trigonometry	5	0	5	5
	18	10	28	21

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
THIRD QUARTER				
AMT 107 Assembly and Rigging	5	5	10	6
AVT 101 Basic Electronics	5	5	10	6
ENG 101 English	5	0	5	5
	15	10	25	17
FOURTH QUARTER				
AMT 201 Fluid Power and Landing Gear Systems	7	8	15	9
AVT 105 Avionics Maintenance Practices	3	7	10	5
	10	15	25	14
FIFTH QUARTER				
AMT 202 Utility Systems	8	7	15	10
AVT 103 Advanced Electronics	5	5	10	6
	13	12	25	16
SIXTH QUARTER				
AMT 203 Aircraft Electrical and Navigation Systems	7	8	15	9
AVT 104 Microprocessors	5	5	10	6
	12	13	25	15

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SEVENTH QUARTER				
AVT 106 Aircraft Logic Systems	5	5	10	6
AVT 107 Aircraft Communication Systems	6	4	10	7
PSY 100 Interpersonal Relations and Professional Development	3	0	3	3
	14	9	23	16
EIGHTH QUARTER				
AVT 108 Navigation Systems	6	4	10	7
AVT 109 Flight Director and Autopilot Systems	6	4	10	7
XXX xxx Electives	-	-	-	6
	12	8	20	20

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SUGGESTED SEQUENCE II				
FIRST QUARTER				
AMT 102 Aircraft Applied Sciences	10	10	20	13
AMT 121 Aviation Physics	3	0	3	3
MAT 103 Algebraic Concepts	5	0	5	5
	18	10	28	21
SECOND QUARTER				
AMT 101 Aircraft Maintenance Regulations	2	2	4	3
CMP 101 Introduction to Microcomputers	1	4	5	3
ENG 101 English	5	0	5	5
MAT 105 Trigonometry	5	0	5	5
	13	6	19	16
THIRD QUARTER				
AMT 107 Assembly and Rigging	5	5	10	6
AVT 101 Basic Electronics	5	5	10	6
XXX xxx Electives	-	-	-	6
	10	10	20	18
FOURTH QUARTER				
AMT 201 Fluid Power and Landing Gear Systems	7	8	15	9
AVT 103 Advanced Electronics	5	5	10	6
	12	13	25	15

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
FIFTH QUARTER				
AMT 105 Sheet Metal Structures	5	7	12	7
AMT 203 Aircraft Electrical and Navigation Systems	7	8	15	9
	12	15	27	16
SIXTH QUARTER				
AMT 202 Utility Systems	8	7	15	10
AVT 105 Avionics Maintenance Practices	3	7	10	5
	11	14	25	15
SEVENTH QUARTER				
AVT 104 Microprocessors	5	5	10	6
AVT 108 Navigation Systems	6	4	10	7
AVT 109 Flight Director and Autopilot Systems	6	4	10	7
	17	13	30	20
EIGHTH QUARTER				
AVT 106 Aircraft Logic Systems	5	5	10	6
AVT 107 Aircraft Communication Systems	6	4	10	7
PSY 100 Interpersonal Relations and Professional Development	3	0	3	3
	14	9	23	16

GENERAL INFORMATION

Diploma Program Curriculum Model

General Core Courses

The general core courses provide students with a foundation in the basic skills which enable them to express themselves more clearly, both orally and in writing, and to perform the mathematical functions required in this occupation. The general core courses for the Avionics Maintenance Technology program are listed below.

ENG	101	English	5 Credits
MAT	103	Algebraic Concepts	5 Credits
MAT	105	Trigonometry	5 Credits
PSY	100	Interpersonal Relations and Professional Development	3 Credits

GENERAL INFORMATION

Diploma Program Curriculum Model

Fundamental Technical Courses

The fundamental technical courses provide students with a foundation in the area of avionics maintenance technology which is needed to progress to the more highly specialized courses in avionics maintenance technology. The fundamental technical courses are listed below.

AMT 101	Aircraft Maintenance Regulations	3 Credits
AMT 102	Aircraft Applied Sciences	13 Credits
AMT 105	Sheet Metal Structures	7 Credits
AMT 107	Assembly and Rigging	6 Credits
AMT 121	Aviation Physics	3 Credits
AVT 101	Basic Electronics	6 Credits
AVT 103	Advanced Electronics	6 Credits
CMP 101	Introduction to Microcomputers	3 Credits

GENERAL INFORMATION

Diploma Program Curriculum Model

Specific Technical Courses

The specific technical courses build upon the fundamental technical courses to provide students with the basic knowledge and skill required to work as avionics maintenance technology trainees. The specific technical courses offered in the Avionics Maintenance Technology program are listed below.

AMT 201	Fluid Power and Landing Gear Systems	9 Credits
AMT 202	Utility Systems	10 Credits
AMT 203	Aircraft Electrical and Navigation Systems	9 Credits
AVT 104	Microprocessors	6 Credits
AVT 105	Avionics Maintenance Practices	5 Credits
AVT 106	Aircraft Logic Systems	6 Credits
AVT 107	Aircraft Communication Systems	7 Credits
AVT 108	Navigation Systems	7 Credits
AVT 109	Flight Director and Autopilot Systems	7 Credits

GENERAL INFORMATION

Diploma Program Curriculum Model

Electives

Elective courses are provided to allow for the different levels of prior knowledge and skills brought to the classroom by students with diverse backgrounds, educational attainment, and specialized interests.

Decisions regarding the selection and appropriateness of any elective are made by the student after consultation with the instructor. Provision must be made for electives chosen from disciplines outside the student's area of specialization.

XXX xxx Electives 6 Credits

GENERAL INFORMATION

Associate Degree Program Introduction

Overview

The Avionics Maintenance Technology associate degree program is consistent with the philosophy and purpose of the institution. The program provides academic foundations in college level communications, mathematics, and human relations, as well as technical fundamentals. Program graduates are well trained in the underlying fundamentals of avionics maintenance technology and are well prepared for employment and subsequent upward mobility.

The Avionics Maintenance Technology associate degree program is a specialized training program that provides the student with the knowledge and skills to become a competent avionics technician in the modern avionics maintenance technology profession. Skills application plays a vital role in the comprehensive Avionics Maintenance Technology associate degree program. Important attributes of successful program graduates are critical thinking, problem solving, and the ability to apply knowledge and skills to the work requirement. This field has experienced rapid expansion and the trend is expected to continue for the foreseeable future.

The program structure acknowledges individual differences and provides opportunities for students to seek fulfillment of their respective educational goals. The program does not discriminate on the basis of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

To assist each student to attain his or her respective potential within the program, both the instructor and the student incur an obligation in the learning process. The instructor is a manager of instructional resources and organizes instruction in a manner which promotes learning. The student assumes responsibility for learning by actively participating in the learning process.

This is a dynamic field which requires extraordinary attention to current curriculum and up-to-date instructional equipment, materials, and processes. The Avionics Maintenance Technology associate degree program must promote the concept of change as the profession evolves. The need for nurturing the spirit of involvement and lifelong learning is paramount in the avionics maintenance technology profession.

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Associate Degree Program Introduction

Standard Curriculum

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As changes occur in the Avionics Maintenance Technology associate degree program, this guide will be revised to reflect those changes. Proposed changes are first evaluated and approved by the local program advisory committee and then forwarded to the State Technical Committee for approval and inclusion in the state standard program guide.

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Associate Degree Program Introduction

Developmental Process

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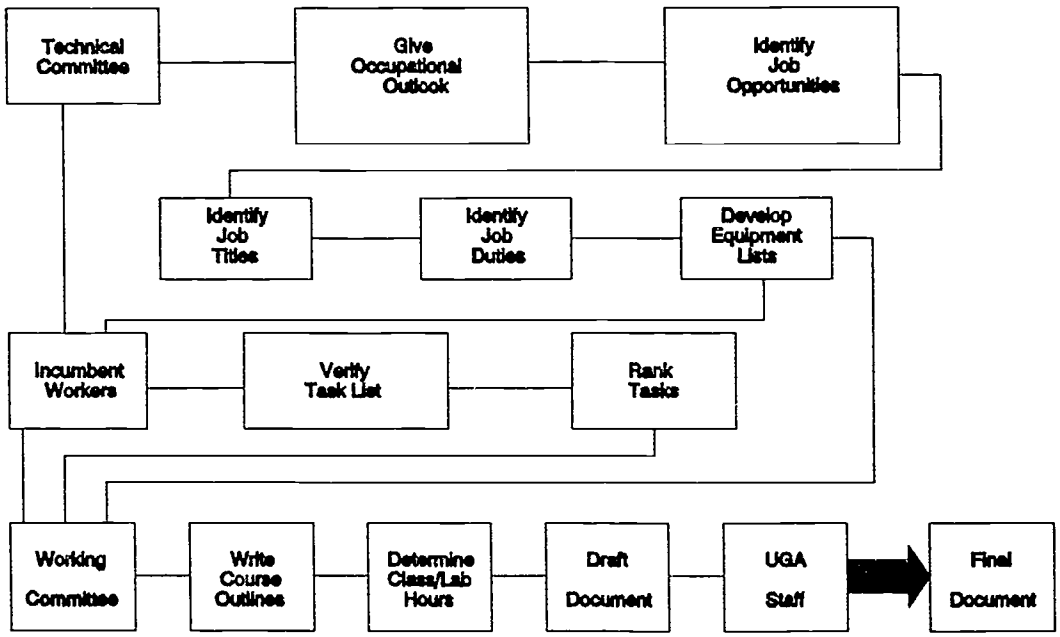
DATA/PROCESS FLOW DIAGRAM



GENERAL INFORMATION

Associate Degree Program Introduction

Purpose and Objectives

Purpose

The purpose of the Avionics Maintenance Technology associate degree program is to provide educational opportunities to individuals that will enable them to obtain the knowledge, skills, and attitudes necessary to succeed in the avionics maintenance technology profession.

The Avionics Maintenance Technology associate degree program provides educational opportunities regardless of race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

The Avionics Maintenance Technology associate degree program is intended to produce graduates who are prepared for employment as avionics technicians. Program graduates are to be competent in the areas required for the Federal Aviation Administration Airframe Mechanics certification. Program graduates are to be competent in the general areas of written and oral communications; algebra, geometry, and trigonometry; and interpersonal relations. Program graduates are to be competent in the fundamentals of aircraft electrical, electronic, hydraulic, pneumatic, and mechanical systems maintenance; and avionics systems theory, application, and troubleshooting.

Objectives

1. Provide current curriculum, instructional materials, and equipment (in accordance with available funding) which teach knowledge, skills, and attitudes appropriate to industry needs.

2. Provide educational facilities which foster learning and provide safe, healthy environments available and accessible to all students who can benefit from the program.

3. Provide academic instruction which supports effective learning within the program and which enhances professional performance on the job.

4. Provide employability skills which foster work attitudes and work habits that will enable graduates of the program to perform as good employees.

5. Nurture the desire for learning so that graduates will pursue their own continuing education as a lifelong endeavor.

6. Provide an educational atmosphere which promotes a positive self-image and a sense of personal well-being.

7. Provide education that fosters development of good safety habits.

8. Provide admission, educational, and placement services without regard to race, color, national origin, religion, sex, age, handicapping condition, academic disadvantage, or economic disadvantage.

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10. Promote good public relations via contacts and regular communications with business, industry, and the public sector.

11. Promote faculty and student rapport and communications to enhance student success in the program.

GENERAL INFORMATION

Associate Degree Program Description

Program Defined

The Avionics Maintenance Technology associate degree program is a sequence of courses designed to prepare students to work in the field of avionics maintenance technology. Learning opportunities develop academic, technical, and professional knowledge and skills required for job acquisition, retention, and advancement. The program emphasizes a combination of aircraft and avionics theory and practical application necessary for successful employment. Program graduates receive an Avionics Maintenance Technology associate degree which qualifies them as avionics technicians.

GENERAL INFORMATION

Associate Degree Program Description

Admissions

Admissions Requirements

Admission of new students to the Avionics Maintenance Technology associate degree program is contingent upon their meeting all of the following requirements:

a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum regular admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores;* and
d) completion of application and related procedures.

Admission of transfer students is contingent upon their meeting the following:

a) regular admission and good standing at a regionally accredited FAA approved diploma or degree granting institution; and
b) proper completion of application and related procedures.

Provisional Admission

A new student who does not meet the regular admission requirements of the program may be admitted on a provisional basis. The requirements for provisional admission are:

a) attainment of 16 or more years of age;
b) documentation of high school graduation or satisfaction of High School Equivalency Certificate requirements;
c) achievement of minimum provisional admission scores on tests of reading, language, and math as specified in GDTAE document *Minimum Program Entrance Scores*, or recommendation by program faculty and designated admissions personnel on the basis of interview and assessment of student potential; and
c) completion of application and related procedures.

GENERAL INFORMATION

Associate Degree Program Description

Typical Job Titles

The Avionics Maintenance Technology associate degree program is assigned a (PGM) CIP code of (PGM) 47.069203 and is consistent with all other programs throughout the state which have the same (PGM) CIP code. The related D.O.T. job title follows:

823.281-010	Avionics Technician

GENERAL INFORMATION

Associate Degree Program Description

Accreditation and Certification

This program must conform to the institutional accreditation requirements of the Southern Association of Colleges and Schools by meeting Commission on Colleges (COC) or Commission on Occupational Education Institutions (COEI) accreditation requirements and must not conflict with the accreditation criteria established by COC and COEI.

GENERAL INFORMATION

Associate Degree Program Curriculum Model

Standard Curriculum

The curriculum design components, general core courses, fundamental occupational/ technical courses, specific occupational/technical courses, and elective courses, are listed below with quarter hour credits and suggested course prerequisites and/or corequisites.

Essential Courses		Credits	Sequence
Essential General Core Courses		25	
Area I			
ENG 191	Composition and Rhetoric I	5	[P] Program admission level language competency or ENG 098
Area II			
PSY 191	Introductory Psychology		[P] Program admission
OR			
ECO 191	Principles of Economics	5	[P] Program admission
Area III			
MAT 191	College Algebra	5	[P] Program admission level math achievement
MAT 193	College Trigonometry	5	[P] MAT 191
PHY 190	Introductory Physics	5	[P] MAT 191 or MAT 196
Essential Fundamental Technical Courses		47	
AMT 101	Aircraft Maintenance Regulations	3	[P] Provisional admission
AMT 102	Aircraft Applied Sciences	13	[P] Provisional admission
AMT 105	Sheet Metal Structures	7	[P] Provisional admission
AMT 107	Assembly and Rigging	6	[P] Program admission
AMT 121	Aviation Physics	3	[P/C] AMT 102

Essential Courses	Credits	Sequence
AVT 101 Basic Electronics	6	[P] MAT 191 [C] MAT 193
AVT 103 Advanced Electronics	6	[P] AVT 101
CMP 101 Introduction to Microcomputers	3	[P] Provisional admission
Essential Specific Technical Courses	66	
AMT 201 Fluid Power and Landing Gear Systems	9	[P] Program admission
AMT 202 Utility Systems	10	[P] Program admission
AMT 203 Aircraft Electrical and Navigation Systems	9	[P] AVT 103
AVT 104 Microprocessors	6	[P] AVT 101
AVT 105 Avionics Maintenance Practices	5	[P] AVT 101
AVT 106 Aircraft Logic Systems	6	[P/C] AVT 104
AVT 107 Aircraft Communication Systems	7	[P/C] AVT 104
AVT 108 Navigation Systems	7	[P/C] AVT 104
AVT 109 Flight Director and Autopilot Systems	7	[P/C] AVT 108
Essential Electives	6	

Program Final Exit Point

Avionics technician, associate degree level

Credits Required for Graduation

144 minimum quarter hour credits required for graduation

GENERAL INFORMATION

Associate Degree Program Curriculum Model

Standard Curriculum

The standard curriculum for the Avionics Maintenance Technology associate degree program is set up on the quarter system. Technical institutes may implement the Avionics Maintenance Technology associate degree program by using one of the sequences below or by using a locally developed sequence designed to reflect course prerequisites and/or corequisites.

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SUGGESTED SEQUENCE I				
FIRST QUARTER				
AMT 101 Aircraft Maintenance Regulations	2	2	4	3
AMT 105 Sheet Metal Structures	5	7	12	7
CMP 101 Introduction to Microcomputers	1	4	5	3
MAT 191 College Algebra	5	0	5	5
	13	13	26	18
SECOND QUARTER				
AMT 102 Aircraft Applied Sciences	10	10	20	13
AMT 121 Aviation Physics	3	0	3	3
PHY 190 Introductory Physics	4	3	7	5
	17	13	30	21

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
THIRD QUARTER				
AMT 107 Assembly and Rigging	5	5	10	6
AVT 101 Basic Electronics	5	5	10	6
ENG 191 Composition and Rhetoric I	5	0	5	5
MAT 193 College Trigonometry	5	0	5	5
	20	10	30	22
FOURTH QUARTER				
AMT 201 Fluid Power and Landing Gear Systems	7	8	15	9
AVT 105 Avionics Maintenance Practices	3	7	10	5
	10	15	25	14
FIFTH QUARTER				
AMT 202 Utility Systems	8	7	15	10
AVT 103 Advanced Electronics	5	5	10	6
	13	12	25	16
SIXTH QUARTER				
AMT 203 Aircraft Electrical and Navigation Systems	7	8	15	9
AVT 104 Microprocessors	5	5	10	6
	12	13	25	15

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SEVENTH QUARTER				
AVT 106 Aircraft Logic Systems	5	5	10	6
AVT 107 Aircraft Communication Systems	6	4	10	7
PSY 191 Introductory Psychology				
OR				
ECO 191 Principles of Economics	5	0	5	5
	16	9	25	18
EIGHTH QUARTER				
AVT 108 Navigation Systems	6	4	10	7
AVT 109 Flight Director and Autopilot Systems	6	4	10	7
XXX xxx Electives	-	-	-	6
	12	8	20	20

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
SUGGESTED SEQUENCE II				
FIRST QUARTER				
AMT 102 Aircraft Applied Sciences	10	10	20	13
AMT 121 Aviation Physics	3	0	3	3
MAT 191 College Algebra	5	0	5	5
	18	10	28	21
SECOND QUARTER				
AMT 101 Aircraft Maintenance Regulations	2	2	4	3
CMP 101 Introduction to Microcomputers	1	4	5	3
ENG 191 Composition and Rhetoric I	5	0	5	5
PHY 190 Introductory Physics	4	3	7	5
XXX xxx Electives	-	-	-	3
	12	9	21	19
THIRD QUARTER				
AMT 107 Assembly and Rigging	5	5	10	6
AVT 101 Basic Electronics	5	5	10	6
MAT 193 College Trigonometry	5	0	5	5
XXX xxx Electives	-	-	-	3
	15	10	25	20

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
FOURTH QUARTER				
AMT 201 Fluid Power and Landing Gear Systems	7	8	15	9
AVT 103 Advanced Electronics	5	5	10	6
	12	13	25	15
FIFTH QUARTER				
AMT 105 Sheet Metal Structures	5	7	12	7
AMT 203 Aircraft Electrical and Navigation Systems	7	8	15	9
	12	15	27	16
SIXTH QUARTER				
AMT 202 Utility Systems	8	7	15	10
AVT 105 Avionics Maintenance Practices	3	7	10	5
	11	14	25	15
SEVENTH QUARTER				
AVT 104 Microprocessors	5	5	10	6
AVT 108 Navigation Systems	6	4	10	7
AVT 109 Flight Director and Autopilot Systems	6	4	10	7
	17	13	30	20

Course	Class Hours	Lab Hours	Weekly Contact Hours	Credits
EIGHTH QUARTER				
AVT 106 Aircraft Logic Systems	5	5	10	6
AVT 107 Aircraft Communication Systems	6	4	10	7
PSY 191 Introductory Psychology				
OR				
ECO 191 Principles of Economics	5	0	5	5
	16	9	25	18

GENERAL INFORMATION

Associate Degree Program Curriculum Model

General Core Courses

The general core courses provide students with a foundation in the basic skills which enable them to express themselves more clearly, both orally and in writing, and to perform the mathematical functions required in this occupation. The general core courses for the Avionics Maintenance Technology associate degree program are listed below.

ENG 191	Composition and Rhetoric I	5 Credits
MAT 191	College Algebra	5 Credits
MAT 193	College Trigonometry	5 Credits
PHY 190	Introductory Physics	5 Credits
PSY 191	Introductory Psychology	5 Credits
OR		
ECO 191	Principles of Economics	5 Credits

GENERAL INFORMATION

Associate Degree Program Curriculum Model

Fundamental Technical Courses

The fundamental technical courses provide students with a foundation in the area of avionics maintenance technology which is needed to progress to the more highly specialized courses in avionics maintenance technology. The fundamental technical courses are listed below.

AMT 101	Aircraft Maintenance Regulations	3 Credits
AMT 102	Aircraft Applied Sciences	13 Credits
AMT 105	Sheet Metal Structures	7 Credits
AMT 107	Assembly and Rigging	6 Credits
AMT 121	Aviation Physics	3 Credits
AVT 101	Basic Electronics	6 Credits
AVT 103	Advanced Electronics	6 Credits
CMP 101	Introduction to Microcomputers	3 Credits

GENERAL INFORMATION

Associate Degree Program Curriculum Model

Specific Technical Courses

The specific technical courses build upon the fundamental technical courses to provide students with the basic knowledge and skill required to work as avionics maintenance technology trainees. The specific technical courses offered in the Avionics Maintenance Technology associate degree program are listed below.

AMT 201	Fluid Power and Landing Gear Systems	9 Credits
AMT 202	Utility Systems	10 Credits
AMT 203	Aircraft Electrical and Navigation Systems	9 Credits
AVT 104	Microprocessors	6 Credits
AVT 105	Avionics Maintenance Practices	5 Credits
AVT 106	Aircraft Logic Systems	6 Credits
AVT 107	Aircraft Communication Systems	7 Credits
AVT 108	Navigation Systems	7 Credits
AVT 109	Flight Director and Autopilot Systems	7 Credits

GENERAL INFORMATION

Associate Degree Program Curriculum Model

Electives

Elective courses are provided to allow for the different levels of prior knowledge and skills brought to the classroom by students with diverse backgrounds, educational attainment, and specialized interests.

Decisions regarding the selection and appropriateness of any elective are made by the student after consultation with the instructor. Provision must be made for electives chosen from disciplines outside the student's area of specialization.

XXX xxx Electives 6 Credits

GENERAL CORE

ENG 101 - English

Course Overview

Course Description

Emphasizes the development and improvement of written and oral communication abilities. Topics include: analysis of writing techniques used in selected readings, writing practice, editing and proofreading, research skills, and oral presentation skills. Homework assignments reinforce classroom learning.

Competency Areas

Analysis of Writing Techniques
Used in Selected Readings
Writing Practice
Editing and Proofreading
Research Skills
Oral Presentation Skills

Prerequisites

ENG 097, or entrance English score in accordance with approved DTAE admission score levels; and RDG 097, or entrance reading score in accordance with approved DTAE admission score levels

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

ENG 101 - English

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
ANALYSIS OF WRITING TECHNIQUES USED IN SELECTED READINGS		**10**	**0**
Review and analysis of various writing techniques	Read and analyze writing to identify subject and focus. Read and analyze writing to identify supporting information. Read and analyze writing to identify patterns of development, such as time, space, climax, examples, process, instructions, definition, comparison/contrast, cause and effect, classification, and problem solving.		
WRITING PRACTICE		**20**	**0**
Review of grammar fundamentals	Produce logically organized, grammatically acceptable writing.		
Review of composition fundamentals	Compose a variety of paragraphs, reports, memoranda, and business letters. Demonstrate listening skills by following directions for writing assignments.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
EDITING AND PROOFREADING		**10**	**0**
Review of editing fundamentals	Revise to improve ideas, style, organization, and format, preferably with word processing. Edit to improve grammar, mechanics, and spelling.		
RESEARCH SKILLS		**5**	**0**
Reference materials location and utilization	Use library resources to enhance writing.		
ORAL PRESENTATION SKILLS		**5**	**0**
Types of oral presentation participation	Participate in class discussion, small group discussion, and/or individual presentations.		
Role of the listener	Participate as an active listener.		

GENERAL CORE

ENG 101 - English

Resources

Graham, S. Y., & Barth, M. E. (1986). *The Harbrace college workbook, Form 10C: Writing for the world of work.* San Diego: Harcourt Brace Jovanovich.

Kraska, M. (1985). *Communication skills for trade and industry.* Cincinnati: South-Western.

Langan, J. (1989). *English skills* (4th ed.). New York: McGraw-Hill.

Lewis, S. D., Smith, H., Baker, F., Ellegood, G., Kopay, C., & Tanzer, W. (1988). *Writing skills for technical students* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Van Alstyne, J. S. (1985). *Professional and technical writing strategies.* Englewood Cliffs, NJ: Prentice Hall.

GENERAL CORE

MAT 103 - Algebraic Concepts

Course Overview

Course Description

Introduces concepts and operations which can be applied to the study of algebra. Course content emphasizes: use of variables, manipulation of algebraic expressions, solution of linear and quadratic equations, evaluation and graphing of linear and quadratic functions, and solution of systems of linear equations. Class includes lecture, applications, and homework to reinforce learning.

Competency Areas

Basic Mathematical Concepts
Basic Algebraic Concepts
Intermediate Algebraic Concepts

Prerequisite

MAT 098, or entrance arithmetic and algebra scores in accordance with approved DTAE admission score levels

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

MAT 103 - Algebraic Concepts

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
BASIC MATHEMATICAL CONCEPTS		**5**	**0**
Arithmetic review	Solve problems using exponents, roots, and scientific notation.		
	Simplify radicals and use them in arithmetic operations.		
	Use a scientific calculator to perform basic arithmetic operations.		
Signed numbers	Perform operations using signed numbers.		
	Define absolute value and use in calculations.		
	Use signed numbers in application problems.		
Order of operation	Apply hierarchy of operations to solve mathematical problems requiring multiple operations.		
BASIC ALGEBRAIC CONCEPTS		**30**	**0**
Unknowns and variables	Define concept and notation used for variable quantities.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Algebraic expressions	Combine like terms.		
	Perform operations on algebraic expressions.		
	Expand expressions with exponents.		
	Factor polynomials.		
Algebraic fractions	Perform operations on algebraic fractions.		
Equations and formulas	Solve linear equations.		
	Solve quadratic equations by factoring or by use of the quadratic formula.		
	Solve equations involving algebraic fractions.		
	Solve formulas for a designated unknown.		
	Solve applied problems involving linear or quadratic equations.		
INTERMEDIATE ALGEBRAIC CONCEPTS		**15**	**0**
Functions	Define the concept of one variable being a function of another.		
	Evaluate linear and quadratic functions.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Graph linear and quadratic functions on the rectangular coordinate system.		
	Solve applied problems using linear and quadratic functions.		
Linear systems	Solve systems of linear equations with 2 or 3 variables using elimination, substitution, graphing, and determinants.		

GENERAL CORE

MAT 103 - Algebraic Concepts

Resources

Calter, P. (1990). *Technical mathematics* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Cleaves, C., Hobbs, M., & Dudenhefer, P. (1988). *Introduction to technical mathematics.* Englewood Cliffs, NJ: Prentice Hall.

Groza, S. (1986). *Elementary algebra* (4th ed.). Philadelphia: Saunders College.

Person, R. V., & Person, V. J. (1989). *Essentials of mathematics* (5th ed.). New York: John Wiley & Sons.

Washington, A. J. (1990). *Basic technical mathematics* (5th ed.). Redwood City, CA: Benjamin-Cummings.

Washington, A. J., & Triola, M. F. (1988). *Introduction to technical mathematics* (4th ed.). Redwood City, CA: Benjamin-Cummings.

Wise, A. (1989). *Beginning algebra and problem solving* (2nd ed.). San Diego: Harcourt Brace Jovanovich.

Yamato, Y., & Cordon, M. J. (1987). *Mastering elementary algebra.* San Diego: Harcourt Brace Jovanovich.

GENERAL CORE

MAT 105 - Trigonometry

Course Overview

Course Description

Emphasizes trigonometric concepts. Introduces logarithms and exponential functions. Topics include: geometric formulas, right triangle and unit circle trigonometric values, evaluation and graphing of trigonometric functions, laws of sines and cosines, vectors, complex numbers, logarithms, and logarithmic and exponential functions.

Competency Areas

Geometric Formulas
Trigonometric Concepts
Logarithms and Exponentials

Prerequisite

MAT 103

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

MAT 105 - Trigonometry

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
GEOMETRIC FORMULAS		**5**	**0**
Two-dimensional geometry	Find the area and perimeter (circumference) of rectangles, squares, triangles, circles, and any regular polygon.		
Three-dimensional geometry	Find volume and surface area of rectangular solids, right circular cylinders, cones, and spheres.		
TRIGONOMETRIC CONCEPTS		**30**	**0**
Right triangle trigonometry	Define the trigonometric functions of the angles in a right triangle in terms of the sides.		
	Evaluate trigonometric functions using calculators or tables.		
	Solve for unknown sides of a right triangle using the trigonometric functions.		
	Solve for unknown angles in a right triangle using inverse trigonometric functions.		
	Solve applied right triangle problems using trigonometric functions.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Unit circle trigonometry	Define the trigonometric functions in terms of coordinates of points on the unit circle.		
	Define angle measure in terms of degrees and radians.		
	Convert from one type angular measurement to the other.		
	Compute arc lengths using radian measure.		
Trigonometric functions	Define the periodic condition of trigonometric functions.		
	Determine amplitude, period, frequency, and phase angle.		
	Graph the trigonometric functions.		
	Graph functions of the form: a sin (bx + c) and a cos (bx + c).		
Oblique triangles	Solve for the sides or angles of oblique triangles using the laws of sines and cosines.		
Vectors	Define vector notation and represent vectors graphically.		
	Add and subtract vectors.		
	Solve applied problems involving vectors.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Complex numbers	Define complex numbers.		
	Write complex numbers in trigonometric form.		
	Multiply and divide complex numbers in trigonometric form.		
LOGARITHMS AND EXPONENTIALS		**15**	**0**
Logarithms	Define logarithmic notation and evaluate logarithmic expressions.		
Equations	Solve logarithmic and exponential equations.		
Functions	Evaluate and graph logarithmic and exponential functions.		

GENERAL CORE

MAT 105 - Trigonometry

Resources

Calter, P. (1990). *Technical mathematics* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Cleaves, C., Hobbs, M., & Dudenhefer, P. (1988). *Introduction to technical mathematics.* Englewood Cliffs, NJ: Prentice Hall.

Person, R. V., & Person, V. J. (1989). *Essentials of mathematics* (5th ed.). New York: John Wiley & Sons.

Smith, R. D. (1983). *Vocational-technical mathematics.* Albany, NY: Delmar.

Washington, A. J. (1990). *Basic technical mathematics* (5th ed.). Redwood City, CA: Benjamin-Cummings.

Washington, A. J., & Triola, M. F. (1988). *Introduction to technical mathematics* (4th ed.). Redwood City, CA: Benjamin-Cummings.

GENERAL CORE

PSY 100 - Interpersonal Relations and Professional Development

Course Overview

Course Description

Provides a study of human relations and professional development in today's rapidly changing world that prepares students for living and working in a complex society. Topics include: personal skills required for understanding the self and others; projecting a professional image; job acquisition skills such as conducting a job search, interviewing techniques, job applications, and resume preparation; desirable job performance skills; and desirable attitudes necessary for job retention and advancement.

Competency Areas

Human Relations Skills
Job Acquisition Skills
Job Retention Skills
Job Advancement Skills
Professional Image Skills

Prerequisite

Provisional admission

Credit Hours

3

Contact Hours Per Week

Class - 3

Lab - 0

GENERAL CORE

PSY 100 - Interpersonal Relations and Professional Development

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
HUMAN RELATIONS SKILLS		**6**	**0**
Goal setting	Develop and set personal goals.		
Stress management	Diagnose and respond to own stress level.		
Behavior problems	Identify strategies to handle difficult behaviors effectively.		
Personal introductions	Make proper introductions.		
Problem solving/decision making	Identify strategies to solve problems/make decisions.		
JOB ACQUISITION SKILLS		**15**	**0**
Job search	Identify strategies to conduct a job search.		
Career goals	Develop and set career goals.		
Employment documents	Prepare letter of application.		
	Prepare resume/applications.		
	Prepare follow-up letters.		
Interviewing	Demonstrate interviewing techniques.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
JOB RETENTION SKILLS		**3**	**0**
Office relationships	Identify techniques used to work effectively with co-workers.		
Time management	Develop time management strategies.		
JOB ADVANCEMENT SKILLS		**3**	**0**
Performance appraisal	Demonstrate ability to accept counseling positively.		
	Demonstrate ability to negotiate promotion/salary increase.		
Supervisory chain	Explain chain of responsibility.		
PROFESSIONAL IMAGE SKILLS		**3**	**0**
Image	Project professional image.		
Attitude	Project professional attitude.		

GENERAL CORE

PSY 100 - Interpersonal Relations and Professional Development

Resources

Dahlstrom, H. S. (1989). *Job hunting handbook* (3rd ed.). Franklin, MA: Author.

DuBrin, A. G. (1988). *Human relations--A job oriented approach* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.

Gable, B. (1985). *How to get a job and keep it* (3rd ed.). Austin, TX: Steck-Vaughn.

Reynolds, C. (1988). *Dimensions in professional development* (3rd ed.). Cincinnati: South-Western.

Wilkes, M., & Crosswait, C. B. (1987). *Professional development--The dynamics of success* (3rd ed.). San Diego: Harcourt Brace Jovanovich.

GENERAL CORE

ECO 191 - Principles of Economics

Course Overview

Course Description

Provides a description and analysis of economic operations in contemporary society. Emphasis is placed on developing an understanding of economic concepts and policies as they apply to everyday life. Topics include: basic economic principles; economic forces and indicators; capital and labor; price, competition, and monopoly; money and banking; government expenditures, federal and local; fluctuations in production, employment, and income; and the United States economy in perspective.

Competency Areas

Basic Economic Principles
Economic Forces and Indicators
Capital and Labor
Price, Competition, and Monopoly
Money and Banking
Government Expenditures, Federal and Local
Fluctuations in Production, Employment, and Income
United States Economy in Perspective

Prerequisite

Program admission

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

ECO 191 - Principles of Economics

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
BASIC ECONOMIC PRINCIPLES		**7**	**0**
Economics defined	Define economics.		
Modern specialization	List economic impacts of modern specialization.		
Increasing production and consumption	Differentiate between and define gross national product, national income, and disposable personal income.		
ECONOMIC FORCES AND INDICATORS		**7**	**0**
Economic forces and indicators	List economic forces.		
	List ten economic indicators.		
Economic effects	List the economic functions of government.		
Functions of government	List the criteria of sound taxation.		
Analysis of government spending	Discuss tax revenues in the United States.		
Financing government spending	Outline the history and use of federal and state personal income taxes.		
	Discuss corporate income tax.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	Discuss property tax.		
	Discuss commodity tax.		
CAPITAL AND LABOR		**7**	**0**
Capital tools	State the importance of saving and investment.		
Large scale enterprise	Describe the necessity for markets.		
Labor	List labor population characteristics.		
	Define vocational choice.		
Unemployment	Identify the four types of unemployment.		
	List the causes of each of the four types of unemployment.		
The function of money	List bank sources of deposits.		
The nation's money supply	Define the reserve ratio.		
Bank organization and operation	Discuss expansion of bank reserves.		
The Federal Reserve System	Identify sources of bank reserves.		
The Federal Deposit Insurance Corporation	Describe the service functions of the Federal Reserve System.		
	Discuss the impact of Federal control of the money supply.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Discuss the strengths and weaknesses of the F.D.I.C.		
	Research and identify predicted and current effects of automation on production, employment, and income.		
PRICE, COMPETITION, AND MONOPOLY		**8**	**0**
Function of prices	Describe price as an indicator of supply.		
Price determination	Describe the role of competitive cost of product in determination of price.		
Benefits and consequences of competition	Evaluate the interactions between supply and demand in determining product price.		
The extent of competition in the United States and global economies	Define and differentiate between the terms monopoly and oligopoly.		
	Identify the forces that modify and reduce competition.		
	Outline the history of government regulation of competition.		
Increasing real income	Differentiate between and define wages, interest, rents, and profits.		
Income distribution today	Explain supply/demand, income/production, and distribution relationships.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
MONEY AND BANKING		**5**	**0**
Functions of money	Explain the meaning of money in economic terms.		
Nation's money supply	Discuss the establishment and control of the nation's money supply.		
Organization and operation of a bank	Describe sources of deposits and reserves, including reserve ratio and expansion of bank deposits.		
The Federal Reserve System	Discuss the service functions and method of control of money supply by the Federal Reserve System.		
Federal Deposit Insurance Corp (F.D.I.C.)	Explain the function and purpose of the F.D.I.C.		
GOVERNMENT EXPENDITURES, FEDERAL AND LOCAL		**5**	**0**
Economic effect	Discuss effects of federal and local government expenditures on the economy.		
Functions of government	List the major functions of government.		
Analysis of government spending	Analyze and discuss pros and cons of government spending.		
Future outlook	Discuss possibilities for future changes in government spending.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Financing government spending	Explain criteria for sound taxation and describe the various taxes now used to finance government.		
FLUCTUATIONS IN PRODUCTION, EMPLOYMENT, AND INCOME		**5**	**0**
Changes in aggregate spending	Discuss how changes in aggregate spending affect production, employment, and income.		
Output and employment	Explain the relationship between output and employment.		
Other factors affecting economic fluctuations	Describe effect of factors such as: supply and demand; war; technology and automation; and cost-price relationship as they affect the economy.		
Government debt	Describe how the national debt affects the economy.		
UNITED STATES ECONOMY IN PERSPECTIVE		**6**	**0**
Recent economic changes	Explain effects of inflation and recession.		
Present economic problems of U.S. economy	Discuss effects of trade imbalances.		
Communism	Explain the nature of the Soviet State and contrast it to the U.S. economy.		
Common problems	List economic problems common to all forms of government.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Special economic problems of the U.S.	List and describe major problems which affect the American economy today.		

GENERAL CORE

ECO 191 - Principles of Economics

Resources

Amacher, R., & Ulbrich, H. (1989). *Principles of economics* (4th ed.). Cincinnati: South-Western.

Bowden, E. V. (1989). *Economics: The science of common sense* (6th ed.) Cincinnati: South-Western.

Heilbroner, R. L., & Thurow, L. C. (1984). *The economic problem* (7th ed.). Englewood Cliffs, NJ: Prentice Hall.

Hoag, A. J., & Hoag, J. H. (1986). *Introductory economics.* Englewood Cliffs, NJ: Prentice Hall.

Olsen, H., & Kennedy, J. (Latest edition). *Economics: Principles and applications.* Cincinnati: South-Western.

GENERAL CORE

ENG 191 - Composition and Rhetoric I

Course Overview

Course Description

Emphasizes the analysis of literature and articles about issues in the humanities and in society. Students practice various modes of writing, ranging from description to exposition to argumentation and persuasion. The course includes a review of standard grammatical and stylistic usage in proofreading and editing. An introduction to library resources lays the foundation for research. Topics include: modes of writing, revision, and research.

Competency Areas

Modes of Writing
Revision
Research

Prerequisite

Program admission level language competency or ENG 098

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

ENG 191 - Composition and Rhetoric I

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
MODES OF WRITING		**35**	**0**
Description	Write descriptions drawing details from observation.		
Exposition	Read literature and articles and analyze the methods of development.		
	Write essays based on personal experiences or assigned readings.		
	Demonstrate through writing the ability to employ the various methods of development.		
REVISION		**10**	**0**
Editing	Demonstrate the ability to edit own writing to eliminate jargon, choppiness, dullness, and incoherence to produce a smooth, vivid style appropriate to the subject and the audience.		
Proofreading	Demonstrate the ability to proofread own writing to eliminate sentence structure errors, verb and pronoun errors, punctuation errors, and spelling errors.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
RESEARCH		**5**	**0**
Steps	Identify the major steps in conducting research.		
References	Locate and use appropriate reference materials for written and oral reports.		

GENERAL CORE

ENG 191 - Composition and Rhetoric I

Resources

Casty, A., & Tighe, D. J. (1979). *Staircase to writing and reading* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Hodges, J. C., & Whitten, M. E. (1989). *Harbrace college handbook* (11th ed.). San Diego: Harcourt Brace Jovanovich.

Kirszner, L. G., & Mandell, S. R. (1986). *Patterns for college writing: A rhetorical reader and guide* (3rd ed.). New York: St. Martin's Press.

Lunsford, A., & Connors, R. (1989). *The St. Martin's handbook* (5th ed.). New York: St. Martin's Press.

McCuen, J. R., & Winkler, A. C. (1986). *Readings for writers* (5th ed.). San Diego: Harcourt Brace Jovanovich.

Stubbs, M., & Barnet, S. (1989). *Little, Brown reader* (5th ed.). Glenview, IL: Scott, Foresman.

Winkler, A. C., & McCuen, J. R. (1988). *Rhetoric made plain* (5th ed.). San Diego: Harcourt Brace Jovanovich.

GENERAL CORE

MAT 191 - College Algebra

Course Overview

Course Description

Emphasizes techniques of problem solving using algebraic concepts. Topics include: algebraic concepts and operations, linear and quadratic equations and functions, simultaneous equations, inequalities, exponents and powers, graphing techniques, and analytic geometry.

Competency Areas

Algebraic Concepts and Operations
Linear and Quadratic Equations and Functions
Simultaneous Equations
Inequalities
Exponents and Powers
Graphing Techniques
Analytic Geometry

Prerequisite

Program admission level math achievement

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

MAT 191 - College Algebra

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
ALGEBRAIC CONCEPTS AND OPERATIONS		**10**	**0**
Fundamental laws of algebra	Identify fundamental laws of algebra.		
Algebraic expressions	Utilize fundamental laws of algebra to simplify algebraic expressions.		
Equations and formulas	Solve algebraic equations and formulas.		
LINEAR AND QUADRATIC EQUATIONS AND FUNCTIONS		**15**	**0**
Linear equations	Solve linear equations.		
Factoring	Identify all factors of algebraic expressions.		
Fractions	Convert complex algebraic fractions to equivalent forms.		
Quadratic equations	Calculate sum, difference, product, and quotient of algebraic expressions.		
	Solve quadratic equations.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
SIMULTANEOUS EQUATIONS		**9**	**0**
Graphical solutions	Solve systems of linear equations graphically.		
Algebraic solutions	Solve systems of equations algebraically.		
Solutions by determinants	Solve systems of linear equations by using determinants.		
INEQUALITIES		**2**	**0**
Graphical solution	Solve inequalities graphically.		
Algebraic solutions	Solve inequalities algebraically.		
EXPONENTS AND POWERS		**3**	**0**
Laws of exponents	Compute the value of expressions involving exponents.		
Scientific notation	Convert numbers to scientific notation.		
GRAPHING TECHNIQUES		**6**	**0**
Cartesian coordinates	Identify points on a Cartesian plane by given coordinates.		
Graphing functions	Prepare graphs of algebraic equations.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
ANALYTIC GEOMETRY		**5**	**0**
Straight line	Mathematically define a straight line and its properties.		
Conics	Mathematically define and identify the circle, parabola, hyperbola, and ellipse.		

GENERAL CORE

MAT 191 - College Algebra

Resources

Bernice, D. D. (Latest edition). *Arithmetic and algebra* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Bertrand, B. S. (Latest edition). *Basic mathematics for electricity and electronics* (4th ed.). New York: McGraw-Hill.

Christopher, J. (1982). *Introductory technical mathematics.* Englewood Cliffs, NJ: Prentice Hall.

Clar, L. J., & Hart, J. A. (Latest edition). *Mathematics for the technologies.* Englewood Cliffs, NJ: Prentice Hall.

Cooke, N. M., & Adams, H. F. R. (1982). *Basic mathematics for electronics* (5th ed.). New York: McGraw-Hill.

Davis, L. (1990). *Technical mathematics with calculus* (1st ed.). Columbus, OH: Merrill.

Fleming, W., & Varberg, D. (1988). *Algebra and trigonometry* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Gilbert, J. (1981). *College algebra and trigonometry.* Englewood Cliffs, NJ: Prentice Hall.

Paul, R. S., & Shaevel, M. L. (Latest edition). *Essentials of technical mathematics with calculus.* Englewood Cliffs, NJ: Prentice Hall.

Radford, L. (1986). *Introduction to technical mathematics with calculus.* Boston: Brenton.

Smith, K. J. (1985). *Precalculus mathematics: A functional approach.* Pacific Grove, CA: Brooks-Cole.

Swokowski, E. W. (1981). *Fundamentals of algebra and trigonometry* (5th ed.). Boston: Prindle, Weber & Schmidt.

Washington, A. J. (1990). *Basic technical mathematics with calculus* (5th ed.). Redwood City, CA: Benjamin-Cummings.

GENERAL CORE

MAT 193 - College Trigonometry

Course Overview

Course Description

Emphasizes techniques of problem solving using trigonometric concepts. Topics include: trigonometric functions, properties of trigonometric functions, vectors and triangles, inverse of trigonometric functions/graphing, logarithmic and exponential functions, and complex numbers.

Competency Areas

Trigonometric Functions
Properties of Trigonometric Functions
Vectors and Triangles
Inverse of Trigonometric Functions/Graphing
Logarithmic and Exponential Functions
Complex Numbers

Prerequisite

MAT 191

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

MAT 193 - College Trigonometry

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
TRIGONOMETRIC FUNCTIONS		**7**	**0**
Signs of the trigonometric functions	Define the six trigonometric functions.		
	Determine the trigonometric function of any angle.		
Radians	Perform trigonometric computations with angles measured in radians.		
PROPERTIES OF TRIGONOMETRIC FUNCTIONS		**10**	**0**
Fundamental trigonometric identities	Recognize and verify the trigonometric identities.		
Trigonometric equations	Prove the validity of trigonometric equations by means of the trigonometric identities.		
VECTORS AND TRIANGLES		**9**	**0**
Vectors	Define vector quantities and give examples.		
Oblique triangles	Solve oblique triangles using the laws of sines and cosines.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
INVERSE OF TRIGONOMETRIC FUNCTIONS/GRAPHING		**9**	**0**
Trigonometric graphs	Represent trigonometric functions graphically.		
Inverse trigonometric functions	Solve for an unknown angle using inverse trigonometric functions.		
LOGARITHMIC AND EXPONENTIAL FUNCTIONS		**8**	**0**
Properties of logarithms	Review properties of logarithms.		
Logarithmic and exponential functions	Represent exponential and logarithmic functions graphically.		
Solutions of exponential and logarithmic equations with applications	Solve applicable equations.		
COMPLEX NUMBERS		**7**	**0**
Vectors	Represent vectors as complex numbers.		
Complex numbers	Transform complex numbers from J-format to polar coordinates and exponential format.		
	Perform mathematical operations using complex numbers.		

GENERAL CORE

MAT 193 - College Trigonometry

Resources

Bernice, D. D. (Latest edition). *Arithmetic and algebra* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Bertrand, B. S. (Latest edition). *Basic mathematics for electricity and electronics* (4th ed.). New York: McGraw-Hill.

Christopher, J. (1982). *Introductory technical mathematics.* Englewood Cliffs, NJ: Prentice Hall.

Clar, L. J., & Hart, J. A. (Latest edition). *Mathematics for the technologies.* Englewood Cliffs, NJ: Prentice Hall.

Cooke, N. M., & Adams, H. F. R. (1982). *Basic mathematics for electronics* (5th ed.). New York: McGraw-Hill.

Davis, L. (1990). *Technical mathematics with calculus* (1st ed.). Columbus, OH: Merrill.

Fleming, W., & Varberg, D. (1988). *Algebra and trigonometry* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Gilbert, J. (1981). *College algebra and trigonometry.* Englewood Cliffs, NJ: Prentice Hall.

Paul, R. S., & Shaevel, M. L. (Latest edition). *Essentials of technical mathematics with calculus.* Englewood Cliffs, NJ: Prentice Hall.

Radford, L. (1986). *Introduction to technical mathematics with calculus.* Boston: Brenton.

Smith, K. J. (1985). *Precalculus mathematics: A functional approach.* Pacific Grove, CA: Brooks-Cole.

Swokowski, E. W. (1981). *Fundamentals of algebra and trigonometry* (5th ed.). Boston: Prindle, Weber & Schmidt.

Washington, A. J. (1990). *Basic technical mathematics with calculus* (5th ed.). Redwood City, CA: Benjamin-Cummings.

GENERAL CORE

PHY 190 - Introductory Physics

Course Overview

Course Description

Introduces the student to the basic laws of physics. Topics include: Newtonian mechanics, fluids, heat, light and optics, sound, electricity and magnetism, and modern physics.

Competency Areas

Newtonian Mechanics
Fluids
Heat
Light and Optics
Sound
Electricity and Magnetism
Modern Physics

Prerequisite

MAT 191 or MAT 196

Credit Hours

5

Contact Hours Per Week

Class - 4

D.Lab - 3

GENERAL CORE

PHY 190 - Introductory Physics

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
NEWTONIAN MECHANICS		**10**	**5**
Equilibrium	State conditions for equilibrium.		
	Draw free body diagrams.		
Kinematics	Define position, velocity, and acceleration.		
Dynamics	Define Newton's laws of motion.		
	State units of motion.		
Work and energy	Define work.		
	Define kinetic energy.		
	Define potential energy.		
	Apply conservation of energy to simple machines.		
	Define simple machines.		
	Calculate efficiency of a simple machine.		
FLUIDS		**5**	**4**
Terminology	Define terms of fluid mechanics.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Define fluidic work and energy.		
Energy conservation	Apply conservation of energy to fluidic system.		
HEAT		**5**	**4**
Terminology	Define terms of thermodynamics.		
	Define thermodynamic work and energy.		
Energy conservation	Apply conservation of energy to thermodynamics.		
LIGHT AND OPTICS		**5**	**4**
Properties	Describe the basic properties of light and wave motion.		
	Apply the laws of reflection and refraction of light.		
	Describe alteration of light through opaque medium.		
Lenses and mirrors	Define types of lenses and mirrors.		
	Combine lens and mirrors to construct optic instruments.		
SOUND		**5**	**4**
Properties	Describe the basic properties of sound waves.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Measurement	Calculate intensity of sound.		
	Calculate frequency of sound.		
ELECTRICITY AND MAGNETISM		**5**	**5**
Measurement units	Define the units of electrical measurement.		
Ohm's law	Solve problems using Ohm's law.		
Reactance	Describe the effects of capacitors, inductors, and resistors in electrical circuits.		
Magnetism	Define units of measuring magnetism.		
	Describe natural magnetism.		
Application	Give examples of electromagnetic devices.		
MODERN PHYSICS		**5**	**4**
Energy levels	Explain energy levels.		
Quantum theory	Explain quantum nature of light absorption/emission.		
Atomic mass unit	Calculate binding energy.		
Atomic particles	Balance nuclear equations.		
	Discuss subatomic particles.		
Nuclear decay	Discuss modes of decay.		

GENERAL CORE

PHY 190 - Introductory Physics

Resources

Green, C. R. (1984). *Technical physics*. Englewood Cliffs, NJ: Prentice Hall.

Hewitt, P. G. (1989). *Conceptual physics* (6th ed.). Glenview, IL: Scott, Foresman.

Krauskopf, K. B., & Beiser, A. (1986). *The physical universe* (5th ed.). New York: McGraw-Hill.

Tippens, P. E. (1989). *Basic technical physics* (2nd ed.). New York: McGraw-Hill.

Zebrowski, E. Jr. (1980). *Practical physics*. New York: McGraw-Hill.

GENERAL CORE

PSY 191 - Introductory Psychology

Course Overview

Course Description

Emphasizes the basics of psychology. Topics include: science of psychology; social environments; life stages; physiology and behavior; personality; emotions and motives; conflicts, stress, anxiety, and abnormal behavior; and perception, learning, and intelligence.

Competency Areas

Science of Psychology
Social Environments
Life Stages
Physiology and Behavior
Personality
Emotions and Motives
Conflicts, Stress, Anxiety, and Abnormal Behavior
Perception, Learning, and Intelligence

Prerequisite

Program admission

Credit Hours

5

Contact Hours Per Week

Class - 5

Lab - 0

GENERAL CORE

PSY 191 - Introductory Psychology

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
SCIENCE OF PSYCHOLOGY		**3**	**0**
Definitions	Define psychology.		
History and methods	Identify the founders of the major schools of psychology.		
Careers in psychology	Describe methods used in psychological research.		
	Identify career options in psychology.		
SOCIAL ENVIRONMENTS		**14**	**0**
Definitions	Define social psychology and attitude.		
Attitudes	Differentiate between types of conformity to social norms.		
Attribution theory	Relate attitudes, reputations, and stereotypes to person perceptions.		
Attraction	Describe factors that link attraction and liking.		
Conformity, compliance, obedience, altruism, and deindividuation	Describe how the attribution theory explains behavior and some of its errors.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Communications	Identify the four main factors in the communication process.		
Group processes	Differentiate between verbal and nonverbal communication.		
	Provide examples of the use of effective and ineffective communications.		
	Practice active listening and nonjudgmental paraphrasing of statements.		
	Define personal space and tell how it affects behavior.		
	List factors in group effectiveness.		
	List stages of group performance.		
LIFE STAGES		**5**	**0**
Physical development	Identify stages of growth and development throughout life span.		
Moral development	Identify theories of moral development.		
Cognitive development	Identify theories of cognitive development.		
PHYSIOLOGY AND BEHAVIOR		**2**	**0**
Nervous and endocrine systems	Describe roles of the nervous and endocrine systems on behavior.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
Altered states of consciousness	Identify altered states of consciousness.		
PERSONALITY		**7**	**0**
Definition	Define personality.		
Theories	Match major theorists with their approaches to personality.		
Assessment	List three methods of assessing personality.		
	Differentiate between objective and projective personality tests.		
	Name and describe personality disorders and types of therapy for each.		
EMOTIONS AND MOTIVES		**4**	**0**
Definitions	Define motive and emotion.		
Needs theory	Relate needs and motives.		
Theories of emotion	List Maslow's hierarchy of needs.		
Expression of emotion	Relate motivation to study habits and career choices.		
	Give examples of verbal and nonverbal means of communicating emotions.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
CONFLICTS, STRESS, ANXIETY, AND ABNORMAL BEHAVIOR		**7**	**0**
Definitions	Define stress, anxiety, and adjustment.		
Locus of control	Define locus of control and recognize own characteristics as internal or external locus of control.		
Types of conflict	Identify the major types of conflict.		
Effects of stress	Relate conflict to pressure and frustration.		
Coping mechanisms	Identify three stages of stress and physiological changes in each.		
Abnormal behavior	Identify direct and defensive coping mechanisms.		
	Name four criteria for labeling behaviors abnormal.		
	Name disorders that result from stress or anxiety and treatments for them.		
PERCEPTION, LEARNING, AND INTELLIGENCE		**8**	**0**
Definitions	Differentiate between sensation and perception.		
Classical conditioning	Identify perceptual constancies.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Operant conditioning	Identify observer characteristics in perception.		
Memory	List examples of distance, depth, and movement perceptions and of visual illusions.		
Cognition	Define learning.		
Theories of learning	Identify theories of learning.		
	Define latent learning, block, and insight.		
	Define memory.		
	Differentiate between short-term and long-term memory.		
	Define cognition, image, and concept.		

GENERAL CORE

PSY 191 - Introductory Psychology

Resources

Benjamin, L. T., et al. (1987). *Psychology.* New York: Macmillan.

Calhoun, J. F., & Acocella, J. R. (1989). *Psychology of adjustment and human relationships* (3rd ed.). New York: Random House.

Carver, C., & Scheier, M. (1988). *Perspectives on personality.* Needham Heights, MA: Allyn & Bacon.

Dworetzky, J. P. (1988). *Psychology* (3rd ed.). St. Paul: West.

Morris, C. (1990). *Psychology: An introduction* (7th ed.). Englewood Cliffs, NJ: Prentice Hall.

Scarr, S., & Zanden, J. V. (1987). *Understanding psychology* (5th ed.). New York: Random House.

Shaffer, D. R. (1988). *Social and personality development* (2nd ed.). Pacific Grove, CA: Brooks-Cole.

Spear, P. D., et al. (1988). *Psychology: Perspectives on behavior.* New York: John Wiley & Sons.

Stanovich, K. E. (1989). *How to think straight about psychology* (2nd ed.). Glenview, IL: Scott, Foresman.

Verderber, K. S., & Verderber, R. F. (1989). *Interact: Using interpersonal communication skills* (5th ed.). Belmont, CA: Wadsworth.

FUNDAMENTAL TECHNICAL

AMT 101 - Aircraft Maintenance Regulations

Course Overview

Course Description

Provides students with the knowledge and skills necessary to select and use FAA and manufacturers' specifications, data sheets, manuals, related regulations, and technical data; write descriptions of aircraft conditions, record work performed, and complete maintenance forms and inspection reports; and learn to interpret federal regulations regarding mechanic privileges and limitations. Topics include: maintenance publications, forms and records, and mechanic privileges and limitations.

Competency Areas

Maintenance Publications
Forms and Records
Mechanic Privileges and Limitations

Prerequisite

Provisional admission

Credit Hours

3

Contact Hours Per Week

Class - 2

D.Lab - 2

FUNDAMENTAL TECHNICAL

AMT 101 - Aircraft Maintenance Regulations

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
MAINTENANCE PUBLICATIONS		**9**	**10**	
FAA specifications and type certificate data sheets	Locate FAA type data sheet for specifically identified aircraft.			3
	Select FAA data sheet for specifically identified aircraft.			3
Control surface travel verification	Use information from the manufacturers' manuals to verify control surface travel.			3
	Check control surface movement against limits in specifications.			3
Applicability of Federal Air Regulations to aircraft airworthiness certificates	Identify and relate regulations governing airworthiness certificates.			3
Technical standard orders	Select and use technical standard orders.			3
Manufacturers' publications	Read and interpret manufacturers' publications to obtain pertinent information.			3
Supplementary type certificates and airworthiness directives	Select and use supplementary type certificates and airworthiness directives.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
Technical data	Read and interpret technical information.			3
FORMS AND RECORDS		**7**	**8**	
Condition of acceptance report	Inspect an aircraft and prepare a condition report.			3
	Write a description of major/minor repairs and routine maintenance.			3
Maintenance forms	Record entries on a form for a major repair or alteration.			3
FAR 43	Make maintenance record entries describing major and minor repairs, alterations, and modifications.			3
Inspection report	Record requirements for returning an aircraft to service after a 100 hour inspection.			3
	Record requirements to indicate compliance with airworthiness directives.			3
Compliance with Federal Air Regulations	Evaluate aircraft records for compliance with Federal Air Regulations.			3
MECHANIC PRIVILEGES AND LIMITATIONS		**4**	**2**	
FAR 65	Exercise mechanic privileges within the limitations prescribed by FAR 65.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
FAR 1	Define aviation terms and abbreviations.			1
Repairs and alterations	Interpret regulations governing repairs and alterations.			3

FUNDAMENTAL TECHNICAL

AMT 101 - Aircraft Maintenance Regulations

Resources

Aviation Book Company. (1988). *Federal aviation regulations for mechanics.* Glendale, CA: Author.

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *CARACOMP the electronic tutor: Aviation technician airframe program computer software.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Aircraft Maintenance Record (actual or simulated)

Aircraft Type Certificate Data Sheets

Manufacturers' Service Manuals

FUNDAMENTAL TECHNICAL

AMT 102 - Aircraft Applied Sciences

Course Overview

Course Description

Provides students with the fundamentals of aircraft servicing methods and ground operations. Topics include: cleaning and corrosion control, fluid line fabrication and installation, aircraft hardware and materials, aircraft drawing, and weight and balance.

Competency Areas

Sketching and Use of Aircraft Drawings
Aircraft Weighing and Balancing
Fluid Lines and Fittings Fabrication and Installation
Materials and Processes Selection
Ground Operations and Servicing
Cleaning and Corrosion Control

Prerequisite

Provisional admission

Credit Hours

13

Contact Hours Per Week

Class - 10

P.Lab - 10

FUNDAMENTAL TECHNICAL

AMT 102 - Aircraft Applied Sciences

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
SKETCHING AND USE OF AIRCRAFT DRAWINGS		**12**	**13**	
Drawings, symbols, and schematic diagrams	Identify basic lines and symbols used in aircraft drawings and schematic diagrams.			2
	Interpret dimensions on aircraft drawings.			2
	Read, interpret, describe, and locate components on aircraft drawings.			2
Repairs and alterations	Make sketches and drawings of repairs and alterations.			3
Blueprint information	Read and interpret drawings to include scale, title block, and changes.			3
	Interpret installation diagrams, service bulletins, and engineering changes.			3
Graphs and charts	Read and interpret manufacturers' charts and graphs.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
AIRCRAFT WEIGHING AND BALANCING		**18**	**12**	
Theory of weight and balance	Identify types and sources of information required to perform weight and balance procedures.			2
Aircraft weighing procedure	Prepare an aircraft for weighing, weigh aircraft, and compute empty weight C.G. and useful load.			2
Aircraft specifications	Use FAA specifications and type data sheets to identify leveling and weighing information, identify useful load and empty center of gravity, and determine location of pilot and passenger seats.			2
Weight and balance under extreme conditions	Compute the effects of equipment changes on the empty weight, center of gravity, and useful load of an aircraft.			3
	Perform complete weight and balance check and record data.			3
Weight and balance computations	Solve a typical helicopter weight, load, and balance problem.			3
Weight and balance records	Review and analyze weight and balance records.			3
FLUID LINES AND FITTINGS FABRICATION AND INSTALLATION		**14**	**16**	
Aluminum and stainless steel tubing	Bend aluminum and stainless steel tubing using hand and tool methods.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
Flares on tubing	Form single and double flares on aluminum tubing.			3
	Cut and deburr tubing.			3
	File or sand tubing.			3
Beads on tubing	Form a bead on different sizes and types of tubing.			3
Defects	Recognize defects in metal tubing.			3
	Repair a damaged aluminum line assembly using a union.			3
	Rework tubing.			3
Fabrication and installation of flexible hoses	Identify and select hose and fittings.			3
	Fabricate and install flexible hose.			3
Installation of a section of tubing	Install sections of tubing and inspect installation.			3
	Perform operation check of system.			3
MATERIALS AND PROCESSES SELECTION		**30**	**30**	
Handtools	Identify and select proper handtools.			3
Aircraft hardware and materials	Identify and select aircraft hardware and materials.			3
	Install or remove different types of nuts, bolts, and fasteners.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Identify substitution fasteners.			3
Nonferrous aircraft metals	Identify types of nonferrous aircraft metals and describe applications for each one.			3
Ferrous metals	Identify steel alloys and their applications.			3
Safety methods	Demonstrate how to safety a series of nuts, bolts, cannon plugs, and turnbuckles.			3
Precision measurements	Measure inside and outside diameters with micrometers.			3
	Measure the thickness of a thin sheet of steel or aluminum.			3
Effects of heat treatment	Describe the relationship between hardness and tensile strength.			2
Heat treating processes	Select proper heat treating process for a specific application.			2
	Describe the different types of heat treating processes.			2
	Perform basic heat treatment.			2
Chemical etching	Perform local chemical etching.			2
Magnetic particle inspection	Explain the process of magnetic particle inspection.			2
	Perform a magnetic particle inspection.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
Dye penetrant inspection	Explain the principles of dye penetrant inspection.			2
	Perform a dye penetrant inspection and interpret the results.			2
Inspection of welds	List the desirable characteristics of a completed weld.			3
	Inspect welded assemblies for defects.			3
Metal fatigue	Check for metal fatigue.			3
Nondestructive testing methods	Identify and select appropriate nondestructive testing methods.			1
GROUND OPERATIONS AND SERVICING		**14**	**16**	
Classification of fuels	Identify various grades of aviation gasoline and jet fuels.			2
Properties of aviation fuel	Describe the properties of aviation fuel.			2
Aircraft fueling	Demonstrate safety precautions around aircraft and engines.			2
	Select correct fuel for a specific aircraft.			2
	Stand fire guard.			2
	Measure fuel in tanks and add fuel to aircraft.			2
Fire extinguishing agents	Identify types of aircraft fires.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
	Select the appropriate fire extinguishing agent for a specific fire.			2
Starting and operating procedures	Start aircraft engines.			2
	Operate engine through power range and shut down engine.			2
	Perform a functional check on all systems.			2
Ground support equipment	Identify the different types of ground support equipment.			2
Ground handling	Demonstrate starting taxi, towing, parking, and directing traffic with hand signals.			2
Outside storage	Prepare an aircraft for outside storage.			2
	Secure aircraft for outside storage using appropriate tiedowns.			2
CLEANING AND CORROSION CONTROL		**12**	**13**	
Aircraft cleaning	Identify and select cleaning materials.			3
	Identify hazards of using caustic cleaning agents.			3
	Clean aircraft.			3
	Clean an aircraft tire.			3
	Clean typical engine parts.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
Classification of corrosion Forms of corrosion	Identify different types of corrosion. Describe the forms of corrosion found on aircraft.		3	
Corrosion prone areas	List the corrosion prone areas on an aircraft.		3	
Corrosion control and surface treatment	Select materials, remove corrosion, and supply protective coating.		3	
	Remove rust from ferrous parts and apply protective finish.		3	

FUNDAMENTAL TECHNICAL

AMT 102 - Aircraft Applied Sciences

Resources

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Krees, M. J., Rardon, J. R., Bent, R. D., & McKinley, J. L. (1988). *Aircraft basic science* (6th ed.). New York: McGraw-Hill.

FUNDAMENTAL TECHNICAL

AMT 105 - Sheet Metal Structures

Course Overview

Course Description

This course provides a study of metal structures of welded tube and riveted sheet monocoque or semi-monocoque. Topics include: identification, selection, and installation of rivets and other mechanical fasteners in stressed skin construction; inspection and repair of sheet metal and bonded structures; sheet metal formation; and inspection and repair of plastics, honeycomb, and laminated structures as well as windows, doors, and interior furnishings.

Competency Areas

Sheet Metal Structures Introduction
Conventional Rivets Installation
Special Rivets and Fasteners Installation
Sheet Metal Hand Forming, Lay Out, and Bending
Sheet Metal Structures Inspection and Repair
Bonded Structures Inspection
Plastics, Honeycomb, and Laminated Structures Inspection and Repair
Windows, Doors, and Interior Furnishings Inspection, Checking, Service, and Repair

Prerequisite

Provisional admission

Credit Hours

7

Contact Hours Per Week

Class - 5

P.Lab - 7

FUNDAMENTAL TECHNICAL

AMT 105 - Sheet Metal Structures

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
SHEET METAL STRUCTURES INTRODUCTION		**2**	**3**	
Safety	Interpret shop safety guidelines.			2
Airframe materials	Review the properties of metals used for the airframe.			2
Heat treating	Review the cycle of events in heat treating.			2
Tools and machines for metal work	Demonstrate the use of all hand tools and power tools.			2
Rivets	Identify rivets as to type, head style, and composition.			2
CONVENTIONAL RIVETS INSTALLATION		**7**	**15**	
Riveting principles	Lay out a pattern for riveting.			3
Conventional riveting	Select rivets of flush and protruded head styles and specified diameters for a given application.			3
	Install protruding head rivets for a given application.			3
	Install flush rivets for a given application.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
	Drill out and replace rivets.			3
	Drill rivet holes.			3
	Inspect installed rivets for structural deformities.			2
SPECIAL RIVETS AND FASTENERS INSTALLATION		**2**	**3**	
Types of special rivets and fasteners	Identify special rivets and fasteners.			2
	Select special rivet or fastener for a given application.			2
	Install blind rivets and fasteners for a given application.			2
	Install Hi-shear rivets and bolts for a given application.			2
SHEET METAL HAND FORMING, LAY OUT, AND BENDING		**12**	**20**	
Metal selection	Select sheet metal for a given application.			3
Hand forming and bending metal	Calculate dimensions of the metal and prepare a layout on the metal with bend lines for the bend.			3
	Bend and form aluminum parts using reference drawing for a given application.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
SHEET METAL STRUCTURES INSPECTION AND REPAIR		**10**	**12**	
Structure	Describe the loads in the fuselage and wing.			3
	Identify the types of structural repairs.			3
Sheet metal repair	Drill holes in structural type parts.			3
	Countersink holes for flush head rivets.			3
	Dimple rivet holes using approved techniques.			3
	Cut and trim sheet metal.			3
	Form and trim metal patches and reinforcements.			3
	Install flush and non-flush skin patches.			3
	Remove damaged areas using approved techniques.			3
	Remove dents and reshape damaged metal areas.			3
	Secure sheet metal with Cleco fasteners.			3
	Stop drill cracks in sheet metal.			3
	Inspect sheet metal structures for failures or damage.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
Corrosion	Inspect aircraft structures for corrosion.			3
	Apply corrosion preventatives.			3
BONDED STRUCTURES INSPECTION		**2**	**3**	
Types of bonded structures	Identify types of bonded structures.			2
	Describe the advantages and uses of bonded structures.			2
Inspection	Inspect a section of aircraft bonded structure and determine type of repair needed.			2
PLASTICS, HONEYCOMB, AND LAMINATED STRUCTURES INSPECTION AND REPAIR		**6**	**10**	
Materials	Identify samples of plastic, fiber, and fiberglass aircraft materials.			2
Repair	Apply and prepare adhesives.			2
	Apply aerodynamic smoothing compounds.			2
	Apply fiberglass repair materials to damaged areas.			2
	Apply vacuum pressure to fiberglass repair surfaces.			2
	Finish fiberglass repairs to smooth surface.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab Levels
	Clean repair surfaces.		2
	Cure bonded honeycomb repair with approved techniques.		2
	Cut and shape replacement honeycomb core using approved techniques.		2
	Inject resin into skin delaminated areas.		2
	Monitor and adjust correct surface temperature of repair area with heat measuring device.		2
	Research repair manual for exact repair procedures on metal bonded honeycomb structures.		2
	Drill holes in plastics.		2
	Perform emergency plastic repairs.		2
Inspection	Inspect and classify fiberglass honeycomb core damage.		2
	Inspect and classify fiberglass laminated damage.		2
	Inspect and classify metal bonded honeycomb core damage.		2
	Inspect repaired or damaged area using approved techniques.		2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
WINDOWS, DOORS, AND INTERIOR FURNISHINGS INSPECTION, CHECKING, SERVICE, AND REPAIR		**6**	**7**	
Transparent enclosures	Classify damage to plastic assemblies.			2
	Identify crazing fissures.			2
	Measure surface scratches.			2
Pressure seals	Trim and fit doors and panels.			2
	Inspect and check operation of pressure seal door.			2
	Check operation of latching mechanism.			2
	Inspect pressure seal window.			2
Seats and safety belt mechanisms	Inspect, check, and adjust a reclining seat mechanism.			2
	Inspect and check operation of safety belt latch, slide, and attachment to floor.			2

FUNDAMENTAL TECHNICAL

AMT 105 - Sheet Metal Structures

Resources

Aviation Book Company. (1988). *Federal aviation regulations for mechanics.* Glendale, CA: Author.

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *CARACOMP the electronic tutor: Aviation technician airframe program computer software.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Aircraft Maintenance Record (actual or simulated)

Aircraft Type Certificate Data Sheets

Manufacturers' Service Manuals

FUNDAMENTAL TECHNICAL

AMT 107 - Assembly and Rigging

Course Overview

Course Description

This course provides a study of aircraft configurations. Topics include: proper nomenclature applicable to rotary and fixed wing aircraft; use of hand tools and equipment for assembly and rigging; aircraft assembly; alignment of aircraft structures, balancing and rigging of control surfaces; jacking of various aircraft; and airframe conformity and airworthiness inspection.

Competency Areas

Use of Hand Tools and Equipment for Assembly and Rigging
Rigging Fixed Wing Aircraft
Rigging Rotary Wing Aircraft
Checking Alignment of Structures
Assembling Aircraft
Balancing and Rigging Movable Control Surfaces
Jacking Aircraft
Airframe Conformity and Airworthiness Inspection

Prerequisite

Program admission

Credit Hours

6

Contact Hours Per Week

Class - 5

P.Lab - 5

FUNDAMENTAL TECHNICAL

AMT 107 - Assembly and Rigging

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
USE OF HAND TOOLS AND EQUIPMENT FOR ASSEMBLY AND RIGGING		**2**	**2**	
Safety	Interpret shop safety guidelines.			2
Hand tools	Select the appropriate tool for a job.			2
RIGGING FIXED WING AIRCRAFT		**4**	**8**	
Nomenclature	Use correct aircraft nomenclature.			2
Theory of flight	Recall the basic principles of aerodynamics.			1
	Identify aircraft flight controls.			2
Control surfaces	Rig control surfaces to specifications.			2
RIGGING ROTARY WING AIRCRAFT		**8**	**4**	
Characteristics	List the basic characteristics of rotary wing aircraft.			1
Flight controls	Identify the flight controls of a rotary wing aircraft.			1
Maintenance	Identify the maintenance concepts for a rotary wing aircraft.			1

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
CHECKING ALIGNMENT OF STRUCTURES		**3**	**7**	
Fuselage	Level and check the alignment of a fuselage.			2
Wing	Check alignment on a wing.			2
Control surface	Check alignment of controls.			2
Aircraft	Check alignment of assembled aircraft.			2
	Establish set up points for optical alignment of aircraft.			2
	Plumb reference points for alignment of aircraft.			2
ASSEMBLING AIRCRAFT		**6**	**8**	
Assemble components	Install components on mockup or aircraft structure using bolts, screws, nuts, and safeties.			3
	Torque to correct values.			3
	Safety the complete assembly.			3
BALANCING AND RIGGING MOVABLE CONTROL SURFACES		**4**	**8**	
Control cable	Identify types of control cable.			3
	Tag cables, identifying diameter, and type of cable.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab Levels
Swagged cable terminals	Install a swagged terminal (eye, fork, or threaded terminal).		3
	Splice cable to length using two nicopress sleeves.		3
Control response	Verify correct control response.		3
Control cable installation	Remove and install control cable.		3
	Inspect cables for serviceability.		3
	Test cable using a tensiometer.		3
	Clean cables of loose rust and corrosion.		3
	Inspect a complete cable operated control system of a specific airplane.		3
Static balance	Check static balance of a control surface.		3
	Balance control surfaces using approved techniques.		3
Push-pull control system	Inspect and adjust a push-pull control system.		3
JACKING AIRCRAFT		**2**	**4**
Preparation	Prepare aircraft for jacking.		3
	Select jacking equipment.		3
	Level aircraft.		3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Jack an aircraft or one wheel of an aircraft.			3
AIRFRAME CONFORMITY AND AIRWORTHINESS INSPECTION		**15**	**15**	
Purpose	Define the purpose of an airframe conformity and airworthiness inspection.			3
Types of inspections	Identify the types of airframe inspections.			3
100 hour and annual inspection	Conduct a 100 hour or annual inspection on an aircraft.			3
	Research airworthiness directives.			3
	Interpret type certificate data sheets and aircraft logs.			3
	Make maintenance record entries in log book.			3
Rotorcraft inspection	Outline the procedure for conducting a rotorcraft inspection.			3
Inspection precedence	Describe the conditions under which a specific inspection would take precedence over another.			3

FUNDAMENTAL TECHNICAL

AMT 107 - Assembly and Rigging

Resources

Aviation Book Company. (1988). *Federal aviation regulations for mechanics.* Glendale, CA: Author.

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *CARACOMP the electronic tutor: Aviation technician airframe program computer software.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Aircraft Maintenance Record (actual or simulated)

Aircraft Type Certificate Data Sheets

Manufacturers' Service Manuals

FUNDAMENTAL TECHNICAL

AMT 121 - Aviation Physics

Course Overview

Course Description

This course provides students with an introduction to the theory and application of physics to aerospace vehicles and their subsystems. Topics include: inclined plane, lever, and pulley; origin and transmission of sound; relationship between temperature and heat; relationships of pressure, temperature, and air mass volume; laws of confined gases; Bernoulli's principle; relationship of air density to temperature and humidity and the effect on aircraft performance; centrifugal and centripetal force; and physical factors affecting engine output.

Competency Areas

Relationship of Temperature and Heat
Relationship Between Pressure, Temperature, and Volume of Air Mass
Factors Affecting Air Pressure on an Airfoil
Physical Factors Affecting Engine Output
Relationship Between Pressure, Area, and Force
Origin of Sound
The Inclined Plane, Lever, and Pulley
Centrifugal and Centripetal Force

Prerequisite/Corequisite

AMT 102

Credit Hours

3

Contact Hours Per Week

Class - 3

Lab - 0

FUNDAMENTAL TECHNICAL

AMT 121 - Aviation Physics

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
RELATIONSHIP OF TEMPERATURE AND HEAT		**4**	**0**	
Heat	Define heat.			2
Temperature	Define temperature.			2
Heat transfer	Describe methods of heat transfer.			2
	Give examples of heat transfer in aircraft.			2
RELATIONSHIP BETWEEN PRESSURE, TEMPERATURE, AND VOLUME OF AIR MASS		**4**	**0**	
Gas laws	Solve appropriate gas law problems related to aircraft cylinders.			2
Atmosphere	Discuss the effects of atmosphere on aircraft powerplants, cabin atmosphere, and aircraft performance.			2
	Apply general gas law to pressure, volume, and temperature changes.			2
FACTORS AFFECTING AIR PRESSURE ON AN AIRFOIL		**4**	**0**	
Airfoils	Sketch an airfoil and diagram air flow patterns.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
Bernoulli's principle	Define Bernoulli's principle.			1
	Discuss the effects of air density and temperature changes on aircraft performance.			2
PHYSICAL FACTORS AFFECTING ENGINE OUTPUT		**4**	**0**	
Work	Define work.			2
Power	Define power.			2
	Describe the effects of air density on engine power.			2
RELATIONSHIP BETWEEN PRESSURE, AREA, AND FORCE		**4**	**0**	
Pressure, area, and force	Solve applicable hydraulic and pneumatic problems involving pressure, area, and force.			2
Incompressibility of liquids	Draw sketches of a simple hydraulic system.			2
ORIGIN OF SOUND		**4**	**0**	
Sound propagation	Explain the nature of sound and frequency.			2
Measurement, control of sound levels, and sound speeds	Discuss machine numbers and decibel levels.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
THE INCLINED PLANE, LEVER, AND PULLEY		**4**	**0**	
Simple machines	Demonstrate uses of simple machines.			2
CENTRIFUGAL AND CENTRIPETAL FORCE		**2**	**0**	
Newton's laws of motion	Apply Newton's three laws to examples in aviation.			2
Angular velocity	Label a diagram to illustrate centrifugal and centripetal force.			2

FUNDAMENTAL TECHNICAL

AMT 121 - Aviation Physics

Resources

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

Krees, M. J., Rardon, J. R., Bent, R. D., & McKinley, J. L. (1988). *Aircraft basic science* (6th ed.). New York: McGraw-Hill.

FUNDAMENTAL TECHNICAL

AVT 101 - Basic Electronics

Course Overview

Course Description

Provides a review of the basic theory and application of electronics with a primary focus on use in avionic systems. Topics include: atomic theory, DC circuits, AC circuits, alternating current, inductance and transformers, capacitance, resonance and filters, vacuum tubes, and solid state devices.

Competency Areas

Atomic Theory
DC Circuits
AC Circuits
Alternating Current
Inductance and Transformers
Capacitance
Resonance and Filters
Vacuum Tubes
Solid State Devices

Prerequisite

MAT 103, diploma; MAT 191, degree

Corequisite

MAT 105, diploma; MAT 193, degree

Credit Hours

6

Contact Hours Per Week

Class - 5

D.Lab - 3

P.Lab - 2

FUNDAMENTAL TECHNICAL

AVT 101 - Basic Electronics

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
ATOMIC THEORY		**5**	**5**
Terminology	Define matter as it applies to atomic theory.		
	Define atom as it applies to atomic theory.		
	Define molecule as it applies to atomic theory.		
	Define current as it applies to electrical circuits.		
	Define electromotive force as it applies to electrical circuits.		
	Define resistance as it applies to electrical circuits.		
	Name the moving particle of electricity.		
Charged bodies	Describe the actions of charged bodies.		
	State the physical law which applies to charged bodies.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Conductors and insulators	Give examples of electrically conductive materials.		
	Give examples of electrically insulative materials.		
DC CIRCUITS		**10**	**10**
Types of current	Compare direct current with varying, pulsating, and interrupted current.		
	Give examples of components used to produce interrupted direct current.		
Safety factors	Define high voltage as it applies to electrical circuits.		
	Define lethal current as it applies to electrical circuits.		
Measurement	Name the unit of measure for resistance.		
	Explain the effect increasing cross-sectional area has on the resistance value of wire conductors.		
	Name the unit of measure for electromotive force.		
	Name the components of a dry cell.		
	State the voltages of the different types of commercially available dry cells.		
	Name the unit of measure for current flow in an electrical circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Identify the types of resistors used in electrical circuits.		
	Draw the symbols for different types of resistors used in electrical circuits.		
	State the numbers which the resistor color code represent.		
Volt-ohm-milliammeter	Explain the function of the volt-ohm-milliammeter in measuring electrical values.		
	Draw the schematic for a basic volt-ohm-milliammeter.		
	State the safety precautions to be observed while measuring active circuits with a volt-ohm-milliammeter.		
Ohm's law	Calculate the value for current flow in a circuit of known voltage and resistance.		
Components and systems	Give examples of aircraft components and systems that operate with direct current circuits.		
AC CIRCUITS		**5**	**5**
Characteristics	Compare the generation of varying, pulsating, and interrupted direct current with that of alternating current.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Define three-phase as it applies to alternating current circuits.		
	Explain the difference between true and apparent power in alternating current circuits.		
	Calculate the difference between true and apparent power in alternating current circuits.		
	Define reactance as it applies to alternating current circuits.		
Components and systems	Give examples of aircraft components and systems that operate with alternating current circuits.		
ALTERNATING CURRENT		**5**	**5**
Characteristics	Define amplitude as it applies to alternating current.		
	Define frequency as it applies to alternating current.		
Sine-wave	Draw a sine-wave through one cycle and indicate amplitude points and polarity at every 30 electrical degrees.		
	State the percentages of peak voltage present at 30, 60, 300, and 330 electrical degrees.		
	Discuss the change in period of a sine-wave when an AC generator changes speed of rotation.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Phase	Compare amplitude values for in-phase and out-of-phase sine-waves.		
INDUCTANCE AND TRANSFORMERS		**5**	**5**
Properties of inductance	Define inductance as it applies to electrical circuits.		
	State the cause of counter emf/back emf in AC circuits.		
	Describe the conditions which cause self-inductance.		
	Discuss the effect of coiling an inductor.		
Cores	State the types of cores used in constructing inductors.		
	Identify the materials used in a solid core of an inductor.		
Series and parallel inductors	State the outcome of connecting two equal value inductors in series.		
	State the outcome of connecting two unequal value inductors in parallel.		
Coupling	Define mutual inductance as it applies to AC circuits.		
	Define coefficient of coupling as it applies to inductors.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Inductive reactance	Describe the effect changing magnetic fields of an inductor has on voltage in an AC circuit.		
	Define henry as applied to inductance.		
	State the change(s) which cause the value of inductive reactance to increase in an AC circuit.		
	Draw a schematic of a basic inductor circuit.		
Phase	Discuss the phase relationship of current and voltage in an inductor circuit.		
Transformer construction	Draw the symbol for an iron-core transformer.		
	Draw the symbol for an air-core transformer.		
Operating characteristics	Compare solid core to laminated core as concerning induced eddy currents.		
	Explain hysteresis as it applies to operating transformers.		
	Explain copper loss as it applies to operating transformers.		
	Explain external-inductance as it applies to operating transformers.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	State the formula for determining voltage ratios in a transformer.		
	State the formula for determining current ratios in a transformer.		
Autotransformers	Draw the symbol for an autotransformer.		
	Describe how an autotransformer is used to increase or decrease the input voltage level.		
Application	Give examples of aircraft circuits and systems which require inductors and transformers.		
CAPACITANCE		**5**	**5**
Components	Name the elements of a fixed value capacitor.		
	Give examples of materials used for conductive plates of a capacitor.		
	Name some materials used as the dielectric of capacitors.		
Symbols	Draw the symbols for a fixed and a variable capacitor.		
Characteristics	Define capacitance.		
	Name the measurement unit for capacitance.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Discuss how the charge time of a capacitor is affected by changing resistance and capacitance.		
	Describe the effect on capacitance when plate size is increasing.		
	Describe the effect decreasing the distance between conductive plates has on the value of capacitance.		
	State the direction of change in capacitance when there is an increase in the dielectric constant.		
Working voltage	Define working voltage as it applies to capacitor ratings.		
	Discuss how various dielectric materials affect a capacitor's working voltage rating.		
Capacitive reactance	Discuss the effect increasing the frequency of the source voltage has on capacitive reactance.		
Series and parallel connections	State the direction of change in circuit capacitance when two capacitors are connected in series.		
	State the direction of change in circuit capacitance when two capacitors are connected in parallel.		
Phase	Discuss the phase relationship of current and voltage in a capacitor circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Measurement	Use a capacitor tester to measure the capacitance of mica, ceramic, paper, plastic, and electrolytic capacitors.		
Safety	Observe safety precautions while handling capacitors. State the rule to follow when working with capacitors of unknown charge condition.		
RESONANCE AND FILTERS		**5**	**5**
Series RCL circuits	Draw a basic schematic diagram for a series circuit containing a resistor, capacitor, inductor, and power source. Explain the voltage/current relationship in a series RCL circuit. Solve for the impedance value of a series RCL circuit.		
Parallel RCL circuit	Draw a basic schematic diagram for a parallel circuit containing a resistor, capacitor, inductor, and power source. Explain the voltage/current relationship in a parallel RCL circuit. Solve for the impedance value of a parallel RCL circuit.		
Series-resonant circuits	Define resonance as applied to electrical circuits.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Draw a basic schematic diagram for a series-resonant circuit with power source.		
	Describe the conditions necessary for resonance to occur in a series-resonant circuit.		
Parallel-resonant circuits	Draw a basic schematic diagram for a parallel-resonant circuit with power source.		
	State the conditions necessary for resonance to occur in a parallel-resonant circuit.		
Circuit quality (Q)	Describe how the circuit Q value is related to operational efficiency.		
	Compare the Q value of a series-resonant circuit with that of a parallel-resonant circuit.		
Decibel	Explain the term decibel as applied to electrical circuit operation.		
	Identify the characteristic number of a logarithm.		
	Identify the mantissa number of a logarithm.		
	When given input and output values, determine the decibel value and direction.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Bandwidth	Describe the effects of circuit Q on bandwidth of a resonant circuit.		
Bandpass filter	Draw a schematic diagram of a basic bandpass filter circuit.		
	Describe how shape factor influences the bandpass of a filter circuit.		
Bandstop filter	Draw a schematic diagram of a bandstop filter circuit.		
	Describe how a bandstop filter eliminates unwanted frequencies.		
	Compare constant-K, low-pass, and high-pass filters in electrical circuit operations.		
VACUUM TUBES		**5**	**5**
Diodes and rectifiers	Describe the construction of a diode vacuum tube.		
	Draw a schematic diagram for a diode circuit used to rectify AC to pulsating DC.		
Voltage and current amplification	Name the elements of a triode tube.		
	Explain bias voltage as applied to triode tube operation.		
	Describe how a triode vacuum tube is used to amplify voltage in a circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Describe how a triode is used to amplify current in a circuit.		
Multielement tubes	Explain the term secondary emission as applied to vacuum tube operation.		
	Describe the purpose of a screen grid in a vacuum tube.		
	Describe the purpose of a suppressor grid.		
Gaseous tubes	Identify the components of a gaseous tube as applied to vacuum tubes.		
	State the advantages of gaseous tubes over other electrical components.		
SOLID STATE DEVICES		**5**	**5**
Doped semiconductors	Name some materials used to construct solid-state devices.		
	Explain valence electron as applied to semiconductor material.		
Solid-state diodes	Describe the effect of bias voltage on a semiconductor barrier area.		
	Define forward-biased as applied to solid-state diodes.		
	Explain how a light-emitting diode operates.		
Transistors	Name the components of an NPN-transistor.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Draw a schematic diagram for an NPN amplifier.		
	Draw a schematic diagram for a PNP amplifier.		
	Distinguish the difference in construction between FET, MOSFET, UJT, ZENER, TUNNEL, and VARIACTOR diodes.		
Frequency loops, synthesizers, and operational amplifiers	Describe the operation of frequency loops.		
	Describe the operation of synthesizers.		
	Describe the operation of operational amplifiers.		
Construction	Construct an integrated circuit.		
	Operate an integrated circuit.		
	Measure the operational characteristics of an integrated circuit.		

FUNDAMENTAL TECHNICAL

AVT 101 - Basic Electronics

Resources

Boylestad, R., & Nashelsky, L. (1989). *Electronics: A survey* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Eismin, T. K., Bent, R. D., & McKinley J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

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FUNDAMENTAL TECHNICAL

AVT 103 - Advanced Electronics

Course Overview

Course Description

Introduces the theory and application of radio frequency transmission and reception. Topics include: power supplies, measuring devices, oscillators, amplifiers, transmitters, amplitude modulation, AM receivers, frequency modulation, and antenna systems.

Competency Areas

Power Supplies
Measuring Devices
Oscillators
Amplifiers
Transmitters
Amplitude Modulation
AM Receivers
Frequency Modulation
Antenna Systems

Prerequisite

AVT 101

Credit Hours

6

Contact Hours Per Week

Class - 5

D.Lab - 3

P.Lab - 2

FUNDAMENTAL TECHNICAL

AVT 103 - Advanced Electronics

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
POWER SUPPLIES		**5**	**5**
Terminology	Define the term power supply.		
	Name the various types of power supplies.		
Half-wave rectifier	Name the components of a half-wave rectifier.		
Full-wave rectifier	Distinguish between a bridge-type and a center-tap full-wave rectifier circuit.		
Filters and chokes	Describe capacitive filtering as applied to power supply operation.		
	Describe inductive filtering as applied to power supply operation.		
	Describe the operation of a resistor-capacitor filter in a power supply circuit.		
	Explain how choke coils filter variations in power supply operation.		
	Explain the advantage of a swinging choke over other types of filters.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Three-phase power supplies	Describe the difference between delta and wye connection as applied to three-phase power. Draw the schematic diagram for a half-wave Y-connected power supply. Draw the schematic diagram for a full-wave Y-connected power supply.		
MEASURING DEVICES		**5**	**5**
Analog and digital meters	Compare analog to digital meters as indicating devices in electrical measuring instruments. Identify the component that is the source of measurement in the d'Arsonval meter.		
DC and AC voltage	Operate DC and AC measuring instruments.		
Resistance	Measure resistance using various types of analog and digital ohmmeters.		
Current	Demonstrate the use of a DC ammeter to measure current in a DC circuit.		
Power	Demonstrate the use of wattmeters to measure the power level of an operating electrical circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Frequency counter	Demonstrate the use of a frequency counter to determine operating frequency of electrical circuits.		
Oscilloscope	Demonstrate the use of an oscilloscope to measure DC voltage in an operational circuit.		
	Measure peak voltage of an AC signal using an oscilloscope.		
	Measure the period of an AC signal using an oscilloscope.		
OSCILLATORS		**5**	**5**
Function	Describe how oscillators are used in electrical and electronic circuits.		
Types	Distinguish between schematic diagrams for Armstrong, Colpitts, and Hartley oscillators.		
Adjustment	Tune various oscillators for maximum power output at a desired frequency.		
Utility	Compare advantages and disadvantages of LC and crystal controlled oscillators.		
AMPLIFIERS		**5**	**5**
Terminology	Define coupling as applied to amplifier circuits.		
	Define biasing as applied to amplifier circuits.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	Define neutralization as it applies to amplifier circuits.		
	Identify an amplifier circuit suited to broadband operation.		
	Name the type of amplifier circuit used as a multiplier.		
	Identify an amplifier circuit suited to power transfer of an AC signal.		
	Define the term fidelity as applied to amplifier operation.		
Adjustment	Align amplifiers for maximum output in the area(s) for which they are designed to operate.		
Measurement	Measure input and output voltages of an operational amplifier.		
	Measure input and output power levels for an operational amplifier.		
TRANSMITTERS		**5**	**5**
Requirements	Name the four basic requirements for a radio transmitter in aircraft communication systems.		
Power comparison	Compare transmitter power requirements of an FM signal with that of an AM signal in aircraft communication systems.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Major components	Sketch a block diagram of a VHF transmitter used in aircraft communication systems.		
VHF limitation	Discuss a limitation of VHF transmitters in aircraft communication systems.		
Frequency modulation	Describe the purpose of the frequency multiplication circuits of aircraft transmitters.		
MOPA circuit	Explain the purpose of MOPA circuits used in aircraft transmitters.		
Oscillator circuits	Discuss the use of oscillators in aircraft transmitters.		
Harmonics	Describe the effect of harmonics in aircraft transmitters.		
AMPLITUDE MODULATION		**5**	**5**
RF intelligence	Explain radio frequency wave intelligence and how it is transmitted.		
Components	Define the components of an amplitude modulated wave.		
	Discuss the types of injection used in AM aircraft transmitters.		
	Describe the signal components of single-sideband aircraft transmitters.		
	Describe the carrier wave and modulation envelope of aircraft transmitters.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
AM RECEIVERS		**5**	**5**
Demodulation	Describe demodulation as used in aircraft AM receivers.		
	Explain how radio waves are received by aircraft AM receivers.		
Regenerative	Explain the use of regenerative circuits in aircraft AM receivers.		
TRF	Discuss the operation of TRF circuits of aircraft AM receivers.		
Crystal detectors	Give an example of crystal detectors used in aircraft AM receivers.		
Superheterodyne	Discuss the operation of a superheterodyne aircraft AM receiver.		
IF amplifiers	Describe the function of IF amplifiers in aircraft AM receivers.		
Troubleshooting	Discuss causes of signal loss in aircraft AM receivers.		
FREQUENCY MODULATION		**5**	**5**
Advantages	Discuss the advantages of FM receivers over AM receivers for aircraft communication systems.		
Repeater stations	Discuss the use of repeater stations in aircraft communication systems.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
FM carrier	Describe the change to the carrier when it is frequency modulated.		
ANTENNA SYSTEMS		**10**	**10**
Types	Name the types of antennas used in aircraft communications.		
Polarization	Define polarization as used in aircraft antenna systems.		
Skip	Describe the skip effect as applied to aircraft antennas.		
Transmission lines	State the nominal impedance for aircraft antennas.		
	Name the most commonly used coaxial cable in aircraft transmission lines.		
	Describe the use of matching transformers in aircraft transmission lines.		
	Fabricate a BNC connector for an aircraft coaxial cable.		
	State the main advantage of using coaxial cable for aircraft transmission lines.		
Arrays	Describe the construction of a simple VOR antenna for aircraft communication systems.		
	Describe the construction of a balun for aircraft communication systems.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	State the purpose of a balun in the antenna system.		
	Describe the minimum components needed to construct a half-wave antenna.		
	State the advantage the loop antenna system has over other antenna systems.		
	Describe the construction of a quarter-wave antenna.		
	State the purpose of a ground plane in an aircraft antenna system.		
	State the formula for computing the length of a half-wave antenna.		
VSWR	Discuss the effect that standing waves have on power output of aircraft communication systems.		
	Discuss methods for eliminating standing waves on an aircraft transmission line.		
	State the formulas for computing the voltage standing-wave ratio.		
	Name the instrument used to measure the VSWR of an aircraft communication system.		
	Describe how aircraft transmission lines are tested for VSWR.		

FUNDAMENTAL TECHNICAL

AVT 103 - Advanced Electronics

Resources

Boylestad, R., & Nashelsky, L. (1989). *Electronics: A survey* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Eismin, T. K., Bent, R. D., & McKinley J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

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Patrick, D. R., & Fardo, S. W. (1990). *Electricity and electronics* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall.

Shrader, R. L. (1985). *Electronic communication* (5th ed.). New York: McGraw-Hill.

Shrader, R. L., & Dailey, D. J. (1986). *Instructor's manual to accompany laboratory manual for electronics communication* (5th ed.). New York: McGraw-Hill.

FUNDAMENTAL TECHNICAL

CMP 101 - Introduction to Microcomputers

Course Overview

Course Description

Introduces fundamental concepts and operations necessary to utilize microcomputers. Emphasis is placed on basic functions and familiarity with computer use. Topics include: computer terminology; computer operating systems; data storage; file management; equipment care and operation; and an introduction to word processing, database, and spreadsheet applications.

Competency Areas

Computer Terminology
Disk Operating Systems
Data Storage
File Management
Hardware and Software Care and Operation
Introductory Word Processing, Database,
and Spreadsheet Applications

Prerequisite

Provisional admission

Credit Hours

3

Contact Hours Per Week

Class - 1

D.Lab - 4

FUNDAMENTAL TECHNICAL

CMP 101 - Introduction to Microcomputers

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
COMPUTER TERMINOLOGY		**2**	**0**
Computer uses	Describe how all people are being affected by computers in their day to day lives.		
	List five daily occurrences which involve computers.		
	Describe how computers will be used in the near future.		
Computer theory	List three simple definitions of a computer.		
	Describe how a computer is similar to an on/off switch.		
	Describe the binary numbering system.		
	Define bit and byte.		
	Describe how standards such as the ASCII code allow users to communicate with computers.		
Computer components	Describe the function and list examples of common input devices.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Describe the function and list examples of common output devices.		
	Describe the function and list examples of common auxiliary storage devices.		
	Describe the function and list examples of common CPUs.		
	Describe the function of computer RAM and ROM.		
	Describe the flow of data through all components of a computer.		
Sources of computer information	List five sources of up-to-date computer information.		
Estimating computer power	Compute the power of a computer using addressable RAM, ROM size, CPU clock speed, width of data path, and auxiliary storage access time.		
Computer specifications	Given specifications and cost data on different computers and the purpose for the computer, select the best value.		
	Write computer specifications given the usage requirements for the computer.		
DISK OPERATING SYSTEMS		**2**	**5**
Disk Operating System (DOS) concepts	Describe how DOS allows a user to control a computer.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	Explain how DOS controls the computer after the bootstrap loader in ROM is finished.		
	Explain the role of DOS between a user, the computer, and applications software.		
Typical DOSs	List three typical DOSs used in modern computers.		
	List the most commonly used DOS in the world.		
	Describe how the choice of DOS can later affect the software available for the computer.		
DOS versus utilities	Differentiate between DOS and utility programs supplied with the DOS.		
DOS operations	Perform a cold start, a warm reboot, and a shutdown of a computer using DOS.		
	Interpret typical DOS error messages.		
DATA STORAGE		**1**	**5**
Storage media	Differentiate among various data storage media in terms of capacity, advantages, and disadvantages.		
	Discuss how to care for and handle storage media.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	List common reasons that data storage media is damaged or data is lost.		
Media preparation	Given a computer, DOS, and storage media, prep the storage media according to manufacturer's specifications.		
	Check previously prepped data storage media for capacity and defects.		
Data protection	Describe how data stored on typical media can be protected.		
	Describe the concept of physical separation of data.		
Data backup	Describe commonly accepted principles of data backup.		
	Backup data according to commonly accepted frequencies.		
Data encryption	Describe common user methods for encrypting data.		
	List advantages and disadvantages of data encryption and password protection.		
Archival data storage	Describe the process for the archival storage of data valuable to an organization.		
	Perform archival data storage.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
FILE MANAGEMENT		**1**	**5**
File types	Describe the following file types: COM, EXE, ASCII, .dbf, .wk1.		
	Use the TYPE command to identify file types.		
Filenames	List DOS rules for creating filenames.		
	Describe common sense approaches for naming data files.		
	Use filenames and file extensions to create self-explanatory filenames.		
Directories and subdirectories	Explain "tree structure."		
	Describe how subdirectories allow files to be stored in a logical manner.		
	Create and delete disk subdirectories.		
Copying files	Physically describe what happens during the DOS copy process.		
	Differentiate between files copied with COPY commands and files copied with DISKCOPY commands.		
	Copy files using common DOS commands.		
	Copy files using common DOS commands and wild card characters.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Deleting files	Delete files using common DOS commands.		
	Explain the dangers involved in deleting files using wild card characters.		
	Delete files using common DOS commands and wild card characters.		
Moving files	Move files using common DOS commands.		
	Move files using common DOS commands and wild card characters.		
Sorting files	Sort the files in a subdirectory using date created, file size, filename, or file extension as the sort key.		
Searching files	Search files for specific text contents.		
File management software	Describe the concept of a "DOS Shell."		
	Utilize file management software to perform all common file management techniques.		
HARDWARE AND SOFTWARE CARE AND OPERATION		**1**	**5**
Hardware	Demonstrate proper care of major computer components.		
	Assemble major computer components as they typically come from the manufacturer.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Given a computer system and a DOS, boot up the computer, read the directory of the DOS disk, perform a warm reboot of the system, and shut down the system according to manufacturer's guidelines.		
	Troubleshoot a computer system at the major component level.		
Software	Differentiate between computer hardware and software.		
	List eight generic categories of computer software and discuss the functions of each.		
	Discuss the legal aspects of commercial software ownership.		
	Discuss the legal aspects of public domain and shareware software.		
	Describe "user interface."		
	Differentiate between easy to use and difficult to use software.		
INTRODUCTORY WORD PROCESSING, DATABASE, AND SPREADSHEET APPLICATIONS		**3**	**20**
Word processing software	List typical functions performed by word processing software.		
	Compare word processing packages by functions available, user interface, and value.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Word processing applications	Using word processing software, create and save a document, modify a document, and print a document.		
	Save different versions of a document under different filenames.		
	Save documents in ASCII format.		
	Utilize spell check software or features.		
Database software	List typical functions performed by database software.		
	Compare database packages by functions available, user interface, and value.		
Database applications	Using database software, create and save a database, modify a database, and generate a report from a database.		
	Perform sorts and indexes on databases.		
	Import and export data from other application packages into database packages.		
Spreadsheet software	List typical functions performed by spreadsheet software.		
	Compare spreadsheet packages by functions available, user interface, and value.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Spreadsheet applications	Using spreadsheet software, create and save a spreadsheet, modify a spreadsheet, and print a spreadsheet. Import and export data from other application packages into spreadsheet packages.		

FUNDAMENTAL TECHNICAL

CMP 101 - Introduction to Microcomputers

Resources

Alberte-Hallam, T., & Hallam, S. F. (1988). *Microcomputer use: Software applications and problem solving with Wordperfect 4.2 & 5.0, Wordstar, Lotus 1-2-3, dBase III Plus.* San Diego: Harcourt Brace Jovanovich.

Date, C. J. (1990). *An introduction to database systems* (Vol. 1). (5th ed.). Reading, MA: Addison-Wesley.

Davis, W. S. (1990). *Computing fundamentals: Productivity tools PC & MSDOS, Wordperfect 5.0, Lotus 1-2-3, dBase III Plus.* Reading, MA: Addison-Wesley.

Fulcher, J. (1989). *An introduction to microcomputer systems.* Reading, MA: Addison-Wesley.

Hallam, S. F. (1986). An introduction to microcomputer spreadsheets. San Diego: Harcourt Brace Jovanovich.

Hallam, S. F. (1986). *An introduction to microcomputer word processing.* San Diego: Harcourt Brace Jovanovich.

Meinhardt, C., & Verno, R. (1987). *Business applications using the IBM PC: Wordperfect, dBase II-III, Lotus 1-2-3, and data transfer between applications.* New York: McGraw-Hill.

Sharman, G. (1987). *Introduction to dBase on the microcomputer.* Reading, MA: Addison-Wesley.

Werner, D. M., & Warrner, T. W. (1990). *PC applications for business, using Lotus 1-2-3 (version 2.2), Wordperfect 5.0, and dBase IV.* Glenview, IL: Scott, Foresman.

Wolff, T. B. (1988). *Microcomputer applications: Using small systems software.* Boston: Boyd & Fraser.

SPECIFIC TECHNICAL

AMT 201 - Fluid Power and Landing Gear Systems

Course Overview

Course Description

This course provides a study of the principles of generation, distribution, and management of hydraulic and pneumatic power throughout the aircraft structure. Topics include: wheels, brakes, tires, and fixed and retractable landing gear systems; position indicating and warning systems; steering systems; hydraulic fluids and laws of physics; and hydraulic and pneumatic power systems.

Competency Areas

Inspect and Maintain Landing Gear Systems
Inspect and Maintain Brake Systems
Inspect and Maintain Wheels and Tires
Inspect and Maintain Steering Systems
Identify Hydraulic Fluids and Review Laws of Physics
Repair Hydraulic and Pneumatic Power System Components
Inspect and Maintain Hydraulic and Pneumatic Power Systems
Position and Warning Systems

Prerequisite

Program admission

Credit Hours

9

Contact Hours Per Week

Class - 7

P.Lab - 8

SPECIFIC TECHNICAL

AMT 201 - Fluid Power and Landing Gear Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT AND MAINTAIN LANDING GEAR SYSTEMS		**10**	**11**	
Safety	Follow safety guidelines.			3
Nomenclature	List the basic parts of a landing gear assembly.			3
Types	Identify the types of landing gear systems.			3
Shock struts	Describe the operation of a shock strut.			3
Servicing	Test, operate, and adjust a retractable landing gear.			3
	Adjust locks and switches to specified tolerances.			3
	Service and repair landing gear components.			3
Inspection	Inspect a retractable landing gear.			3
Retraction systems	Inspect, check, and service retraction systems.			3
	Troubleshoot landing gear emergency extension/retraction mechanisms.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
Alignment	Check landing gear alignment.			3
INSPECT AND MAINTAIN BRAKE SYSTEMS		**10**	**10**	
Brake systems	Describe the operation of brake systems.			3
	Inspect, check, and service brake systems.			3
	Bleed air from brake systems.			3
Brake assemblies	Differentiate among various brake assemblies.			3
	Remove, inspect, and replace a brake assembly.			3
	Adjust brake clearances.			3
	Determine probable cause of brake malfunctions.			3
Anti-skid systems	Inspect, check, service, and repair anti-skid systems.			3
INSPECT AND MAINTAIN WHEELS AND TIRES		**12**	**10**	
Types of wheels	Describe the different types of wheels.			3
Inspection of wheels	Inspect wheels for corrosion, cracks, dents, and warpage.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
Tire features	Describe the basic construction features of tires.			3
Cleaning and storage	Outline the proper cleaning procedures for tires.			3
	Describe the procedure for storing tires and rubber products.			3
Wheel assembly	Demount, inspect, repair, and remount tires on a wheel.			3
	Remove, inspect, service, and reinstall a wheel assembly.			3
INSPECT AND MAINTAIN STEERING SYSTEMS		**3**	**4**	
Nose wheel	Explain how nose wheel steering systems of large and small aircraft differ.			3
	Inspect, adjust, and service a nose wheel steering mechanism.			3
Tail wheel	Inspect, adjust, and check a tail wheel steering mechanism.			3
Damping mechanisms	Identify types of shimmy dampers.			3
	Inspect, check, and service a shimmy damper.			3
Steering system	Troubleshoot landing gear steering system.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
IDENTIFY HYDRAULIC FLUIDS AND REVIEW LAWS OF PHYSICS		**4**	**4**	
Review of hydraulic principles	Recall laws of physics applicable to hydraulics and pneumatics.			1
Selection of hydraulic fluids	Identify samples of vegetable-base, petroleum-base, and synthetic-base fluids.			3
	Select hydraulic fluid for a specific application.			3
Seals	Identify types and designs of seals.			3
	Select and install a seal for a specific application.			3
Basic hydraulic system	Describe the operation of a basic hydraulic system and its components.			3
Basic pneumatic system	Describe the operation of a basic pneumatic system and its components.			3
REPAIR HYDRAULIC AND PNEUMATIC POWER SYSTEM COMPONENTS		**6**	**12**	
Hydraulic reservoirs	Identify and service hydraulic reservoirs.			2
Hydraulic filter	Identify and inspect a hydraulic filter.			2
Hydraulic pumps	Describe the operation of constant and variable displacement hydraulic pumps.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Inspect, check, remove, and install hydraulic power pumps.			2
Pressure control valve	Identify and describe the operation of a pressure control valve.			2
Hydraulic accumulator	Inspect, check, and service a hydraulic accumulator.			2
Hydraulic actuator	Inspect, check, and service a hydraulic actuator.			2
Pneumatic system components	Inspect and check pneumatic system components.			3
	Remove or install pneumatic system components.			3
	Inspect, check, service, and repair shock struts.			3
INSPECT AND MAINTAIN HYDRAULIC AND PNEUMATIC POWER SYSTEMS		**20**	**24**	
Hydraulic power systems	Inspect and leak check hydraulic systems.			3
	Remove or install hydraulic system plumbing.			3
	Service hydraulic systems.			3
	Troubleshoot and repair hydraulic system malfunctions.			3
Pneumatic power systems	Inspect and leak check pneumatic systems.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Remove or install pneumatic system components.			3
	Service pneumatic systems.			3
	Troubleshoot and repair pneumatic system malfunctions.			3
POSITION AND WARNING SYSTEMS		**5**	**5**	
Warning systems	Describe the principles of operation of the speed, stall, and take-off warning systems.			1
	Inspect, check, and service speed, stall, and take-off warning systems.			1
Anti-skid control systems	Describe the principles of operation of anti-skid brake control systems.			1
	Inspect and check anti-skid systems.			1
Position indicating and unsafe warning systems	Inspect, check, troubleshoot, service, and repair landing gear position indicating and warning systems.			3
Annunciator systems and caution lights	Inspect and check annunciator systems and caution lights.			3

SPECIFIC TECHNICAL

AMT 201 - Fluid Power and Landing Gear Systems

Resources

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

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SPECIFIC TECHNICAL

AMT 202 - Utility Systems

Course Overview

Course Description

This course provides a study of the heating, cooling, ventilation, and pressurization of the aircraft interior and protection of exterior surfaces from ice accumulation. Topics include: fire detection and extinguishing systems; fuel storage, transfer, distribution, and dump systems; aircraft flight instrument systems; cabin atmosphere system; and ice and rain control systems.

Competency Areas

Inspect and Maintain Cabin Atmosphere Control Systems
Inspect and Maintain Ice and Rain Control Systems
Inspect and Maintain Fire Protection Systems
Inspect and Maintain Aircraft Fuel Systems
Inspect and Maintain Aircraft Instrument Systems

Prerequisite

Program admission

Credit Hours

10

Contact Hours Per Week

Class - 8

P.Lab - 7

SPECIFIC TECHNICAL

AMT 202 - Utility Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT AND MAINTAIN CABIN ATMOSPHERE CONTROL SYSTEMS		**25**	**20**	
Safety	Interpret shop safety rules and guidelines.			1
Air conditioning and pressurization	Define air conditioning and pressurization terminology.			1
Cabin pressure	Identify the component parts of a cabin pressurization system.			1
	Describe the control and operation of cabin pressurization.			1
Combustion heaters	Identify components of an aircraft combustion heater.			1
	Inspect, check, and troubleshoot aircraft combustion heaters and exhaust type heat exchangers.			1
Vapor cycle system	Identify components of aircraft vapor cycle systems.			1
	Check, service, and troubleshoot aircraft vapor cycle systems.			1
Air cycle cooling systems	Identify components of aircraft air cycle systems.			1

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Check, service, and troubleshoot air cycle cooling systems.			1
Electronic temperature controls	Identify electronic temperature controls and describe their function.			1
Oxygen systems	Differentiate among types of oxygen systems.			2
	Inspect, check, and service an oxygen system.			2
	Troubleshoot and repair an oxygen system.			2
Air conditioning and pressurization components	Repair or replace air conditioning and pressurization components.			1
Oxygen system components	Service gaseous oxygen systems.			1
	Repair or replace aircraft oxygen system components.			1
INSPECT AND MAINTAIN ICE AND RAIN CONTROL SYSTEMS		**8**	**7**	
Effects of ice	Explain how icing affects aircraft performance.			2
Pneumatic de-icing systems	Describe the operation of a pneumatic de-icing system.			2
	Identify the components of a pneumatic de-icing system.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
	Inspect, check, troubleshoot, service, and repair a pneumatic de-icing system.			2
Thermal anti-icing systems	Describe the operation of the different types of anti-icing systems.			2
	Inspect, check, troubleshoot, service, and repair a thermal anti-icing system.			2
Rain control systems	Identify the components of a rain control system.			2
	Inspect, check, troubleshoot, service, and repair a rain control system.			2
INSPECT AND MAINTAIN FIRE PROTECTION SYSTEMS		**7**	**8**	
Fire detection systems	Differentiate among fire detection systems for aircraft.			1
Cabin and cockpit interiors	Inspect, check, and service smoke and carbon monoxide detection systems.			1
Fire extinguishing agents	Identify types of fire extinguishing agents.			1
Fire extinguishing systems	Describe the types of fire extinguishing systems.			3
	Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT AND MAINTAIN AIRCRAFT FUEL SYSTEMS		**25**	**20**	
Aircraft fuel system	Explain the operation of an aircraft fuel system.			3
	Inspect, check, service, troubleshoot, and repair an aircraft fuel system.			3
Fuel system components	Identify fuel system components.			2
	Repair aircraft fuel system components.			2
	Inspect and repair fluid quantity indicating systems.			2
	Explain the operation of the fuel pump system.			2
Fuel management	Perform fuel management, transfer, and defueling.			1
Pressure fueling systems	Inspect, check, and repair pressure fueling systems.			1
Fuel warning system	Inspect and check a fuel warning system.			2
	Troubleshoot, service, and repair fluid pressure and temperature warning systems.			2
Fuel dump system	Check and service a fuel dump system.			1

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT AND MAINTAIN AIRCRAFT INSTRUMENT SYSTEMS		**15**	**15**	
Aircraft instruments	Identify the types of instruments required in modern aircraft.			1
	Describe the proper techniques for handling and storing instruments.			1
	Install instruments.			2
Instrument systems	Inspect, check, service, troubleshoot, and repair heading, speed, altitude, time, attitude, temperature, pressure, and position indicating systems.			1
	Check pitot static system.			3

SPECIFIC TECHNICAL

AMT 202 - Utility Systems

Resources

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Krees, M. J., Rardon, J. R., Bent, R. D., & McKinley, J. L. (1988). *Aircraft basic science* (6th ed.). New York: McGraw-Hill.

SPECIFIC TECHNICAL

AMT 203 - Aircraft Electrical and Navigation Systems

Course Overview

Course Description

This course provides a study of aircraft electrical, communication, and navigation systems. Topics include: circuit protection devices, switches and ratings; proof of current requirements; wire requirements; inventer systems; alternators; aircraft voltage systems; AC generators; and transformer-rectifier principles. Additional topics are radio and transmitter principles; instrument landing systems; emergency locator transmitters; and installation procedures.

Competency Areas

Install, Check, and Service Airframe Electrical Wiring, Controls, Switches, Indicators, and Protective Devices
Inspect, Check, Troubleshoot, Service, and Repair AC and DC Electrical Systems
Repair Aircraft Electrical System Components
Inspect, Check, and Service the Autopilot and Approach Control Systems
Inspect, Check, and Service Aircraft Electronic Communication and Navigation Systems
Inspect and Repair Antenna and Electronic Equipment Installations

Prerequisite

AVT 101

Credit Hours

9

Contact Hours Per Week

Class - 7

P.Lab - 8

SPECIFIC TECHNICAL

AMT 203 - Aircraft Electrical and Navigation Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSTALL, CHECK, AND SERVICE AIRFRAME ELECTRICAL WIRING, CONTROLS, SWITCHES, INDICATORS, AND PROTECTIVE DEVICES		**19**	**21**	
Aircraft fuses, circuits, breakers, and switches	Identify the types and characteristics of aircraft fuses, circuits, breakers, and switches.			3
Aircraft electrical switches and wiring	Select and install aircraft electrical switches and wiring to components.			3
Installation requirements	Describe installation requirements and characteristics for aircraft electrical wiring systems and junction boxes.			3
Terminals, splices, and bonding jumpers	Select and install terminals, splices, and bonding jumpers.			3
Electrical wiring in a conduit	Remove wiring for conduit and clean.			3
	Install aircraft electrical wiring in a conduit.			3
Quick-disconnect plugs and receptacles	Check and connect quick-disconnect plugs and receptacles.			3
Protective devices	Install guarded or safety covers on emergency switches to protect against accidental actuation.			3

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT, CHECK, TROUBLESHOOT, SERVICE, AND REPAIR AC AND DC ELECTRICAL SYSTEMS		**20**	**24**	
DC generator electrical systems	Describe methods of controlling output current and voltage of compound generators.			3
	Check, troubleshoot, and repair aircraft type DC motors.			3
	Explain how to provide AC in aircraft having only DC electrical systems.			3
	Troubleshoot and repair a DC electrical system supplied by an alternator.			3
AC aircraft electrical systems	Identify characteristics and advantages of an AC aircraft electrical system.			3
	Identify components and operating elements of a 208/115 volt AC aircraft electrical system.			3
REPAIR AIRCRAFT ELECTRICAL SYSTEM COMPONENTS		**6**	**10**	
Switch chatter	Determine causes and effects of switch chatter in solenoid switches and relays.			2
Anticollision and position lights	Inspect installation and check circuits of anticollision and position lights.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
Landing and taxi lights	Inspect, check, and repair landing and taxi light installation.			2
Interior lighting	Inspect, check, service, and repair aircraft interior lighting installations.			2
Cockpit lights and lighting circuits	Inspect, check, service, and repair cockpit lights and lighting circuits.			2
Equipment installations	Inspect and check equipment installations for integrity of mounting and connections.			2
Electrical component replacement	Locate replacement procedures and part numbers for electrical component replacement.			2
INSPECT, CHECK, AND SERVICE THE AUTOPILOT AND APPROACH CONTROL SYSTEMS		**10**	**9**	
Autopilot systems	Explain the operation of the autopilot system.			1
Autopilot system maintenance	Describe the inspection and servicing of an autopilot system.			1
Approach control systems	Inspect the installation of an approach control system.			1
	Describe the inspection, checks, and servicing of an approach control system.			1

Recommended Outline	After completing this section, the student will:	Hours Class	Lab	Levels
INSPECT, CHECK, AND SERVICE AIRCRAFT ELECTRONIC COMMUNICATION AND NAVIGATION SYSTEMS		**14**	**10**	
Basic radio principles	Explain the basic radio principles underlying a communication and navigation system.			1
Equipment	List the basic components required for a communication and navigation system.			1
Communication systems	Inspect, check, and service a communication system.			1
Navigational equipment	Explain the procedures for swinging a compass.			1
	Describe the inspection, checks, and servicing performed on navigational equipment.			1
INSPECT AND REPAIR ANTENNA AND ELECTRONIC EQUIPMENT INSTALLATIONS		**1**	**6**	
Equipment installation	Repair or replace an aircraft antenna and related electronic equipment.			2
Radio interference	Describe the purpose of static dischargers.			2
	Identify different types of static dischargers.			2

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab	Levels
	Describe the function of each type of static discharger.			2
FCC regulations	Recall the FCC regulations pertaining to two-way radio operation.			2

SPECIFIC TECHNICAL

AMT 203 - Aircraft Electrical and Navigation Systems

Resources

IAP, Inc. (1976). *Airframe and powerplant mechanics general handbook.* Casper, WY: Author.

IAP, Inc. (1988). *AC 43.13-1A-change three -- acceptable methods, techniques, and practices.* Casper, WY: Author.

IAP, Inc. (1990). *FAR handbook for aviation maintenance technicians.* Casper, WY: Author.

Krees, M. J., Rardon, J. R., Bent, R. D., & McKinley, J. L. (1988). *Aircraft basic science* (6th ed.). New York: McGraw-Hill.

SPECIFIC TECHNICAL

AVT 104 - Microprocessors

Course Overview

Course Description

Introduces the theory and application of microprocessors with a primary focus on their use in avionic systems. Topics include: numbering system, logic gates, Boolean algebra, flip-flops, and registers and counters.

Competency Areas

Numbering System
Logic Gates
Boolean Algebra
Flip-Flops
Registers and Counters

Prerequisite

AVT 101

Credit Hours

6

Contact Hours Per Week

Class - 5

D.Lab - 3

P.Lab - 2

SPECIFIC TECHNICAL

AVT 104 - Microprocessors

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
NUMBERING SYSTEM		**10**	**10**
Numbering system characters	Name the characters used in the decimal numbering system.		
	Name the characters used in the binary numbering system.		
	Name the characters used in the octal numbering system.		
	Name the characters used in the hexadecimal numbering system.		
Conversion	Convert a binary number to a decimal number.		
	Convert a decimal number to a binary number.		
	Describe the procedures used to convert a hexadecimal number to a decimal number.		
Operations	State the octal number for a given decimal number.		
LOGIC GATES		**15**	**20**
Purpose	Describe the function of a gate in an electronic circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
ANDgate	Identify an ANDgate schematic diagram.		
	Identify the logic symbol for an ANDgate.		
	Construct a truth table for a two-input ANDgate.		
ORgate	Identify an ORgate schematic diagram.		
	Identify the logic symbol for an ORgate.		
	Construct a truth table for a two-input ORgate.		
NANDgate	Identify a NANDgate schematic diagram.		
	Identify the logic symbol for a NANDgate.		
	Construct a truth table for a two-input NANDgate.		
NORgate	Identify a NORgate schematic diagram.		
	Identify the logic symbol for a NORgate.		
	Construct a truth table for a two-input NORgate.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
XNORgate	Identify the logic symbol for an XNORgate.		
	Construct a truth table for a two-input XNORgate.		
XORgate	Identify the logic symbol for an XORgate.		
	Construct a truth table for a two-input XORgate.		
Inverter	Identify the schematic diagram for an inverter.		
	Identify the logic symbol for an inverter.		
	Construct a truth table for an inverter.		
Application	Give an example of an ANDgate use in an aircraft electronic circuit.		
	Give an example of an ORgate use in an aircraft electronic circuit.		
	Give an example of a NANDgate use in an aircraft electronic circuit.		
	Give an example of a NORgate use in an aircraft electronic circuit.		
	Give an example of an XNORgate use in an aircraft electronic circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	Give an example of an XORgate use in an aircraft electronic circuit.		
	Give an example of an inverter use in an aircraft electronic circuit.		
BOOLEAN ALGEBRA		**10**	**5**
Expressions	Write the Boolean logic expression for an ANDgate.		
	Write the Boolean logic expression for an ORgate.		
	Write the Boolean logic expression for a NANDgate.		
	Write the Boolean logic expression for a NORgate.		
	Write the Boolean logic expression for an XNORgate.		
	Write the Boolean logic expression for an XORgate.		
FLIP-FLOPS		**10**	**10**
Reset-set	Sketch a schematic diagram for an RS flip-flop having two BJTs.		
	Identify the symbol for an RS flip-flop.		
Clocked flip-flop	Discuss the purpose of a clock input to a flip-flop circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Identify the symbol for a clocked D flip-flop.		
	Construct a truth table for a clocked D flip-flop.		
	Identify the symbol for a clocked JK flip-flop.		
Application	Give an example of an RS flip-flop use in an aircraft electronic circuit.		
	Give an example of a clocked D flip-flop use in an aircraft electronic circuit.		
	Give an example of a clocked JK flip-flop use in an aircraft electronic circuit.		
REGISTERS AND COUNTERS		**5**	**5**
Word storage	Describe how flip-flops are connected to construct a register.		
	Identify the logic symbol for a 4-bit register.		
3-state gates	Discuss the difference between a register with four ANDgates and one with four 3-state gates.		
Memories	Describe the function of a word memory cell in a random access memory circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Dividers	Discuss the operation of a JK flip-flop used to count pulses. Discuss the operation of a clocked D flip-flop used to count pulses.		

SPECIFIC TECHNICAL

AVT 104 - Microprocessors

Resources

Brey, B. B. (1988). *Microprocessors and peripherals: Hardware, software, interfacing, and applications* (2nd ed.). Columbus, OH: Merrill.

Eismin, T. K., Bent, R. D., & McKinley J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

Gilmore, C. M. (1982). *Introduction to microprocessors*. New York: McGraw-Hill.

Gilmore, C. M. (1989). *Microprocessors, principles, and applications*. Benton Harbor, MI: Heath.

Harris, F. (1983). *Electronic circuit devices*. Casper, WY: IAP.

Hughes, F. W. (1989). *Microprocessor technology: Theory, experimentation, and troubleshooting*. Englewood Cliffs, NJ: Prentice Hall.

IAP, Inc. (1987). *Avionic fundamentals*. Casper, WY: Author.

Metzger, D. L. (1988). *Microcomputer electronics, a practical approach to hardware, software, troubleshooting, and interfacing*. Englewood Cliffs, NJ: Prentice Hall.

O'Connor, P. J. (1989). *Digital and microprocessor technology*. Englewood Cliffs, NJ: Prentice Hall.

Pasahow, E. J. (1988). *Microprocessor technology and microcomputers*. New York: McGraw-Hill.

Shrader, R. L. (1985). *Electronic communication* (5th ed.). New York: McGraw-Hill.

SPECIFIC TECHNICAL

AVT 105 - Avionics Maintenance Practices

Course Overview

Course Description

Provides practical experience in maintaining avionics systems. Topics include: construction of solid state circuits, use of test instruments, calibrating systems, component removal techniques, repair procedures, and troubleshooting techniques.

Competency Areas

Solder/Solderless Connecting
Use of Test Instruments
Component Installation/Removal Techniques
Repair Procedures
Troubleshooting Techniques

Prerequisite

AVT 101

Credit Hours

5

Contact Hours Per Week

Class - 3

P.Lab - 7

SPECIFIC TECHNICAL

AVT 105 - Avionics Maintenance Practices

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
SOLDER/SOLDERLESS CONNECTING		**5**	**10**
Soldering	Fabricate aircraft electrical and electronic circuits using industry standard soldering techniques.		
Solderless connectors	Fabricate aircraft electrical and electronic circuits using industry standard solderless connection techniques.		
USE OF TEST INSTRUMENTS		**10**	**20**
Measuring DC	Perform operator calibration of analog indicating DC measuring instruments. Use an analog indicating instrument to measure the DC voltage, current, and resistance of an aircraft electrical circuit. Perform operator calibration of digital indicating DC measuring instruments. Use a digital indicating instrument to measure DC voltage, current, and resistance of an aircraft electrical circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Measuring AC	Perform operator calibration of analog indicating AC measuring instruments.		
	Use an analog indicating instrument to measure AC voltages of an aircraft electrical circuit.		
	Perform operator calibration of digital indicating AC measuring instruments.		
	Use a digital indicating instrument to measure AC voltage of an aircraft electrical circuit.		
Power	Perform operator calibration of a DC voltage and current measuring instrument.		
	Measure voltage and current level of an aircraft DC circuit and compute the power level.		
	Perform operator calibration of power measuring instruments.		
	Use an electrodynamometer-type meter to measure DC and AC power levels of aircraft electrical circuits.		
Resistance	Perform operator calibration of bridge-type resistance measuring instruments.		
	Use a bridge-type instrument to measure low value resistance of aircraft electrical circuits.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Waveform measuring	Perform operator calibration of oscilloscopes.		
	Use an oscilloscope to measure the DC voltage level of an aircraft circuit.		
	Use an oscilloscope to measure the AC amplitude of an aircraft electrical circuit.		
	Use an oscilloscope to measure the AC period of an aircraft electrical circuit.		
	Use an oscilloscope to measure IF and RF frequencies of aircraft avionics systems.		
Waveform generation	Perform operator calibration of signal generators used to test aircraft electrical and electronic circuits.		
	Use signal generators to establish AC, AF, IF, and RF frequencies for testing aircraft electrical and electronic circuits.		
Frequency counters	Perform operator calibration of frequency measuring instruments used to test aircraft electrical and electronic circuits.		
	Use frequency counters to measure AC, AF, IF, and RF frequencies of aircraft electrical and electronic circuits.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
COMPONENT INSTALLATION/ REMOVAL TECHNIQUES		**5**	**20**
Materials and equipment	Name solder compositions and solder flux approved for maintenance of aircraft and avionics systems.		
	Match soldering iron type to repair task for aircraft electrical and electronic systems.		
Installation	Install axial lead components in aircraft electrical and electronic circuits.		
	Install DIPs and ICs in aircraft electrical and electronic circuits.		
	Describe the positioning acceptability criteria for surface mounted devices.		
	Install flat packs and surface mounted devices to aircraft electrical and electronic circuits.		
Removal	Name the types of coatings used on aircraft electrical and electronic circuits.		
	Remove coating from aircraft electrical and electronic components.		
Types	Name the types of solder removal techniques used in aircraft electrical and electronic system maintenance.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Heat/pull	Use the heat/pull technique to remove soldered components from aircraft electrical and electronic circuits.		
Heat/vacuum	Use the heat/vacuum technique to remove soldered components from aircraft electrical and electronic circuits.		
Wicking braid	Use the wicking braid to remove solder from components of aircraft electrical and electronic circuits.		
Soldering iron	Remove surface mounted devices from aircraft electrical and electronic circuits using soldering iron techniques.		
Hot air	Remove surface mounted devices from aircraft electrical and electronic circuits using hot air jet techniques.		
Tweezer	Remove surface mounted devices from aircraft electrical and electronic circuits using tweezer methods.		
Hot gas/air	Remove surface mounted devices from aircraft electrical and electronic circuits using hot gas/air workstation methods.		
Preheat	Remove surface mounted devices from aircraft electrical and electronic circuits using preheat methods.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
REPAIR PROCEDURES		**5**	**10**
Jumper method	Use the jumper method to repair aircraft electrical and electronic circuits.		
Foil method	Use the foil method to repair aircraft electrical and electronic circuits.		
Pads, tracks, and plated-through holes	Repair pads, tracks, and plated-through holes of circuit boards used in aircraft electrical and electronic systems.		
Lifted areas	Perform repair to lifted or damaged land area of circuit boards used in aircraft electrical and electronic systems.		
TROUBLESHOOTING TECHNIQUES		**5**	**10**
Shorts and opens	Use a voltmeter to isolate an open or shorted component or wire in an aircraft electrical or electronic system. Use an ohmmeter to locate an open or shorted component or wire in an aircraft electrical or electronic system.		
Power supply	Use a voltmeter to measure the operating potential at various components of power supply circuits in aircraft electrical and electronic systems.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Audio frequency	Use a VTVM/DVM to measure operating voltage in audio circuits of aircraft electrical and electronic systems.		
	Use a frequency counter to monitor the operational frequency of audio circuits in aircraft electrical and electronic systems.		
	Use a signal generator to inject a trace signal in audio circuits of aircraft electrical and electronic systems.		
	Use an oscilloscope to troubleshoot audio frequency circuits of aircraft electrical and electronic systems.		
Intermediate frequency	Use a VTVM/DVM to measure operating voltage in intermediate circuits of aircraft electrical and electronic systems.		
	Use a frequency counter to monitor the operational frequency of intermediate circuits in aircraft electrical and electronic systems.		
Radio frequency	Use a frequency counter to monitor the operational frequency of radio circuits in aircraft electrical and electronic systems.		
Special waveforms	Use an oscilloscope to monitor signals from wave shaping circuits of aircraft electrical and electronic systems.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Use a spectrum analyzer to monitor the envelope of a pulsed oscillator circuit in aircraft communication transmitters.		
RF power	Use a power meter and appropriate attenuator pads to monitor power output level of pre/final amplifiers.		

SPECIFIC TECHNICAL

AVT 105 - Avionics Maintenance Practices

Resources

Bose, K. W. (1983). *Aviation electronics* (4th ed.). Casper, WY: IAP.

Helfrick, A. D., & Cooper, W. D. (1990). *Modern electronic instrumentation and measurement techniques.* Englewood Cliffs, NJ: Prentice Hall.

Patrick, D. R., & Fardo, S. W. (1989). *Understanding AC circuits: Concepts, experiments, and troubleshooting.* Englewood Cliffs, NJ: Prentice Hall.

Patrick, D. R., & Fardo, S. W. (1989). *Understanding DC circuits: Concepts, experiments, and troubleshooting.* Englewood Cliffs, NJ: Prentice Hall.

Perozzo, J. (1989). *Systematic electronic troubleshooting: A flowchart approach.* Delmar, NY: Author.

Shrader, R. L. (1985). *Electronic communication* (5th ed.). New York: McGraw-Hill.

Wilson, J. A. (1990). *Electronic troubleshooting procedures and servicing techniques.* Englewood Cliffs, NJ: Prentice Hall.

Aircraft Maintenance Record (actual or simulated)

Aircraft Type Certificate Data Sheets

Manufacturers' Service Manuals

SPECIFIC TECHNICAL

AVT 106 - Aircraft Logic Systems

Course Overview

Course Description

Focuses on microprocessor based computers used in avionics systems. Topics include: memory, mass storage, computer systems, data bases, and logic systems repair procedures.

Competency Areas

Memory
Mass Storage
Computer Systems
Data Bases
Logic Systems Repair Procedures

Prerequisite/Corequisite

AVT 104

Credit Hours

6

Contact Hours Per Week

Class - 5

D.Lab - 3

P.Lab - 2

SPECIFIC TECHNICAL

AVT 106 - Aircraft Logic Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
MEMORY		**15**	**25**
Read-write and read-only	Explain the difference between read-write and read-only memory.		
	Name the four kinds of read-only memories.		
Access and cycle time	Explain the difference between memory-access time and memory-cycle time.		
Static and dynamic	Give the advantages of using static or dynamic memories.		
Row and column decoder	Describe the purpose of a memory chip's row and column decoder.		
High-density RAM	Explain why high-density RAMs use multiplexed addressing.		
DMA and paging	Discuss the purpose of direct memory access.		
	Define paging as it applies to a memory system.		
Interpret data	Complete a ROM comparison chart.		
	Complete a RAM comparison chart.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
Troubleshooting	Use an oscilloscope to locate defective memory Integrated Circuits (ICs).		
MASS STORAGE		**10**	**0**
Input/output devices	Name the two types of input and output devices that microprocessor systems communicate with.		
	Identify the device most used by people to input data to microprocessor systems.		
	Describe the encoded device a keyboard is attached to.		
Tapes, disks, and discs	Give examples of devices used for mass storage.		
	Compare the advantages and limitations of mass-storage devices.		
Parallel interface	Explain parallel interface as applied to microprocessor systems.		
Serial interface	Explain the use of serial communications in microprocessor systems.		
	Compare the advantages and disadvantages of parallel interface with serial interface.		
UART	Discuss the operation of a universal asynchronous receiver-transmitter, (UART).		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	State the purpose of a UART in a microprocessor system.		
ASCII (Ask-key)	Compare baud rate to bytes per second in the American Standard Code for Information Interchange.		
Serial communication lines	Explain the difference between the RS-232 and the 20-ma current loop as they apply to serial lines in microprocessor systems.		
Polling and interrupts	Name the two ways microprocessor I/O devices get service in microprocessor systems.		
	Describe how a microprocessor system responds to polling instructions.		
	Describe how a microprocessor system responds to interrupt instructions.		
COMPUTER SYSTEMS		**10**	**0**
Cabin pressure and central air data computers	Name the source of input data for the cabin pressure computer.		
	Explain the purpose of the central air data computer.		
Digital air data computer	Compare the output of a central air data computer with that of a digital air data computer.		

Recommended Outline	After completing this section, the student will:	Hours Class	Lab
	Give examples of the digital and analog outputs of a Digital Air Data Computer (DADC).		
Attitude	Discuss the operation of the roll computer.		
	Discuss the operation of the pitch computer.		
Navigation	Name the input and output data associated with the navigation computer of a typical area navigation system.		
	Describe the conditions which limit the use of an area navigation system.		
Flight management computer system	Name the sub-system units of a typical flight management computer system.		
	Name the unit of the flight management computer system which contains the alphanumeric keyboard.		
	Discuss the purpose of the scratch pad on the control display unit of the flight management computer system.		
DATA BASES		**10**	**0**
Eight bit digital data bus	Discuss the purpose of the eight bit digital data bus.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Give examples of systems which provide data input to the eight bit digital data bus. Discuss the operation of a typical, 1980s, digital data bus system. Describe the advantages of a 1990s digital bus system using a fiber optic system.		
Display unit	Discuss the data base of the format update, page control, and mode select features of the central display unit.		
Performance data base	Name the sensors which provide data input for the development of the performance data base. Name the sensors which provide data input for the development of the navigation data base.		
Operation program	Discuss the function of the operation program data base of the central processor in the flight management computer.		
LOGIC SYSTEMS REPAIR PROCEDURES		**5**	**25**
Safety	Describe the labels used to warn maintenance personnel of the need to take protective measures to prevent degrading equipment performance.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Static electricity	Give examples of actions and items that can produce static electricity.		
	Give examples of locations for static electricity warning labels on aircraft structure and avionics components.		
Operational checks	Perform operational checks of avionic systems containing logic circuits.		
Troubleshoot	Troubleshoot aircraft logic systems to the unit level.		
Repair	Remove defective units of aircraft logic systems.		
	Replace defective units of aircraft logic systems.		
Calibrate	Use appropriate measuring instruments to calibrate aircraft logic systems.		

SPECIFIC TECHNICAL

AVT 106 - Aircraft Logic Systems

Resources

Eismin, T. K., Bent, R. D., & McKinley, J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

Gilmore, C. M. (1982). *Introduction to microprocessors.* New York: McGraw-Hill.

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SPECIFIC TECHNICAL

AVT 107 - Aircraft Communication Systems

Course Overview

Course Description

Continues the study of avionics maintenance practices with emphasis on aircraft communication systems. Topics include: component operation, component location, integration, analysis, maintenance, and ACARS.

Competency Areas

Component Operation
Component Location
Integration
Analysis
Maintenance
ACARS

Prerequisite/Corequisite

AVT 104

Credit Hours

7

Contact Hours Per Week

Class - 6

D.Lab - 2

P.Lab - 2

SPECIFIC TECHNICAL

AVT 107 - Aircraft Communication Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
COMPONENT OPERATION		**15**	**15**
Operational checks	Perform an operational check of each component of the following aircraft communication systems: VHF communication systems; HF communication systems; UHF communication systems; interphones; public address systems; microphones, speakers, and headsets; selcal; ELT; ACARS; cockpit voice recorder; call systems; audio integrated systems, and static discharge systems.		
COMPONENT LOCATION		**5**	**5**
Racks	Locate the racks where aircraft communication systems units are installed.		
Wiring harnesses	Locate the electrical wiring harnesses used to connect aircraft communication systems units.		
INTEGRATION		**10**	**0**
Data link to: flight management computer, EICAS, performance data computer, and flight and maintenance data recorder	Use block and schematic diagrams to identify which units and components of aircraft communication systems are operational interfaces.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
ANALYSIS		**10**	**5**
Symptoms	Given entry from flightlog or work order, analyze a reported malfunction of aircraft communication systems.		
Troubleshoot	Use appropriate electronic measuring instruments to troubleshoot an aircraft communication system to unit, or component level where applicable, and isolate the defective item(s).		
MAINTENANCE		**15**	**15**
Remove and replace	Perform removal of units and components of aircraft communication systems.		
	Replace units and components of aircraft communication systems.		
Documentation	Document removal and replacement action performed on aircraft communication systems in accordance with maintenance directives and Federal regulations.		
ACARS		**5**	**0**
Air to ground data link	Describe the air to ground data link provided by the Arinc Communications Addressing and Reporting System (ACARS).		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Sensors	Give examples of sensors which feed data to the ACARS.		
A to D convention	Discuss the process used by the ACARS to convert analog input data to a digital output data base.		

SPECIFIC TECHNICAL

AVT 107 - Aircraft Communication Systems

Resources

Bose, K. W. (1983). *Aviation electronics* (4th ed.). Casper, WY: IAP.

Eismin, T. K., Bent, R. D., & McKinley, J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

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IAP, Inc. (1990). *The best of AMJ maintenance tips*. Casper, WY: Author.

Powell, J. (1981). *Aircaft radio systems*. Casper, WY: IAP.

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SPECIFIC TECHNICAL

AVT 108 - Navigation Systems

Course Overview

Course Description

Continues the study of avionics maintenance practices with emphasis on aircraft navigational systems. Topics include: bridges and monitors, synchros, gyros, and navigation systems.

Competency Areas

Bridges and Monitors
Synchros
Gyros
Navigation Systems

Prerequisite/Corequisite

AVT 104

Credit Hours

7

Contact Hours Per Week

Class - 6

D.Lab - 2

P.Lab - 2

SPECIFIC TECHNICAL

AVT 108 - Navigation Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
BRIDGES AND MONITORS		**5**	**5**
DC bridges	Explain how voltage may be reversed in a sensing member of a DC bridge. Discuss current flow in an unbalanced DC bridge. Discuss current flow in a DC bridge under null condition.		
AC bridges	Explain phase reversal as it applies to AC bridge circuits. Discuss the use of capacitive and inductive elements in an AC bridge circuit and the resultant phase angles they produce in an unbalanced condition. Give an example of the aircraft system application of an AC bridge using a variable capacitor.		
Signal monitors	Discuss the operation of a signal presence monitor circuit. Give the condition which causes a "flag" to appear in a signal monitor circuit.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Modulator/demodulator	Explain the operation of a 400 Hz modulator.		
	Explain the operation of a 400 Hz demodulator.		
Summing points	Define summing point as it applies to avionics circuits.		
	Draw the symbol which represents a summing point with three inputs and one output.		
SYNCHROS		**10**	**5**
Vectors	Name the components of vector problems associated with aircraft flight.		
	Explain the resultant vectors of cross winds and speed.		
	Explain the resultant vectors of angular winds and speed.		
Magnetic vectors	Explain the effect on a magnetic field when two "like" fields approach straight on and at various angles.		
	Explain the effect on a magnetic field when two "unlike" fields approach straight on and at various angles.		
Two and three coil	Describe a two-coil electromagnetic field and how changes in coil voltage level affect the resultant vector.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Describe a three-coil electromagnetic field and how changes in coil voltage level affect the resultant vector.		
Rotor and stator	Define the term rotor as it relates to synchros.		
	Define the term stator as it relates to synchros.		
Abbreviations	State the meaning of the abbreviations TX and REC as they apply to synchro schematics.		
Null	Explain phase reversal when a synchro rotor passes through null.		
	Determine direction of the field vector when presented with diagrams of various synchro rotor positions.		
Application	Give examples of use of synchros in aircraft avionics systems.		
Differential	Explain the purpose of a differential synchro.		
Resolver	Compare the output of a resolver synchro with that of a receiver synchro for any given degree of rotor movement.		
Interpretation of diagrams	Recognize circle and coil schematic symbols for transmit, receive, differential, and resolver synchros.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Servo motors	Explain the operational similarities and differences of synchros and servo motors.		
Servo application	Give examples of the use of servos in avionics systems.		
Operational check	Operationally check avionics systems which use servos to control position.		
GYROS		**5**	**5**
Precession	Explain the angle of precession of a spinning gyro when the axis is tilted.		
Free	Compare the position of a spinning perfect free gyro as it is moved to different locations of the earth.		
Application: horizon direction rate turn and slip	Give examples of avionics systems which make use of a gyro to provide attitude information.		
Operation check	Operationally check indicators which use gyros to develop position information.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
NAVIGATION SYSTEMS		**40**	**25**
	(Apply all tasks to each lesson.)		
Compass Inertial navigation system (INS) Automatic direction finder (ADF) Instrument landing system (ILS) Transponders Distance measuring equipment (DME) Marker beacon Radio altimeter Air data systems (ADS) Weather radar Omega navigation system (ONS) Loran navigation Area navigation Ground proximity warning system (GPWS) VHF omni-range (VOR)	Perform an operational check of each component of aircraft navigation systems. Perform removal of units and components of aircraft navigation systems. Given entry from flightlog or work order, analyze a reported malfunction of aircraft navigation systems. Use appropriate electronic measuring instruments to troubleshoot aircraft navigation systems to the unit, or component level where applicable, and isolate the defective item(s). Replace units and components of aircraft navigation systems. Document maintenance actions performed on aircraft navigation systems in accordance with local directives and Federal regulations.		

SPECIFIC TECHNICAL

AVT 108 - Navigation Systems

Resources

Bose, K. W. (1983). *Aviation electronics* (4th ed.). Casper, WY: IAP.

Eismin, T. K., Bent, R. D., & McKinley, J. L. (1989). *Aircraft electricity and electronics* (4th ed.). New York: McGraw-Hill.

IAP, Inc. (1985). *Basic electronics and radio installation*. Casper, WY: Author.

IAP, Inc. (1987). *Avionic fundamentals*. Casper, WY: Author.

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SPECIFIC TECHNICAL

AVT 109 - Flight Director and Autopilot Systems

Course Overview

Course Description

Continues the study of avionics maintenance practices with emphasis on flight director and autopilot systems. Topics include: flight director systems, autopilot systems, and avionics line maintenance test equipment.

Competency Areas

Flight Director Systems
Autopilot Systems
Avionics Line Maintenance Test Equipment

Prerequisite/Corequisite

AVT 108

Credit Hours

7

Contact Hours Per Week

Class - 6

D.Lab - 2

P.Lab - 2

SPECIFIC TECHNICAL

AVT 109 - Flight Director and Autopilot Systems

Course Outline

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
FLIGHT DIRECTOR SYSTEMS		**20**	**10**
Purpose	State the purpose of the flight director system.		
Unit identification	Identify the units that make up an aircraft flight director system.		
Function	Explain the function of each unit in an aircraft flight director system.		
Aerodynamic response	Discuss the flight guidance control elements and the source of feedback to system sensors.		
Accelerometers	Describe how accelerometers are used to sense aircraft attitude during flight.		
Operational checks	Perform operational checks of flight director system.		
Symptoms	Given entry from flightlog or work order, analyze a reported malfunction of the flight director system.		
Troubleshoot	Use appropriate electronic measuring instruments to troubleshoot the flight director system to the unit, or component level where applicable, and isolate the defective item(s).		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Remove and replace	Perform removal of units and components of aircraft flight director system.		
	Replace units and components of aircraft flight director system.		
Documentation	Document maintenance actions taken on the aircraft flight director system in accordance with local directives and Federal regulations.		
AUTOPILOT SYSTEMS		**20**	**10**
Comparison with flight director system	Compare the autopilot system operation with pilot action when using the flight director system.		
Purpose	State the purpose of the autopilot system.		
Unit identification	Identify the units that make up an aircraft autopilot system.		
Function	Explain the function of each unit in an aircraft autopilot system.		
Feedback	Discuss the source of feedback in the autopilot system.		
Operational checks	Perform operational checks of autopilot system.		
Symptoms	Given entry from flightlog or work order, analyze a reported malfunction of the autopilot system.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
Troubleshoot	Use appropriate electronic measuring instruments to troubleshoot the autopilot system to the unit, or component level where applicable, and isolate the defective item(s).		
Remove and replace	Perform removal of units and components of aircraft autopilot system. Replace units and components of aircraft autopilot system.		
Documentation	Document maintenance actions taken on the aircraft autopilot system in accordance with local directives and Federal regulations.		
AVIONICS LINE MAINTENANCE TEST EQUIPMENT		**20**	**20**
ILS test sets DME test sets Transponder test sets Radio test sets Weather radar test sets Data-bus analyzers	Describe the purpose of each type of test equipment used to perform line maintenance on aircraft avionics systems. Verify test equipment has been calibrated and is within acceptable use period. Perform test equipment self-check procedures where applicable. Connect test equipment to aircraft avionics system while observing personal safety and equipment use cautions.		

Recommended Outline	After completing this section, the student will:	Hours Class	Hours Lab
	Perform test in accordance with local directives and while observing Federal airways regulations where applicable.		
	Perform line maintenance as applicable to system service manuals.		
	Perform avionics system alignment and calibration using line test equipment.		
	Remove line test equipment from aircraft installed avionics system.		
	Upon completion of line maintenance, connect all units and components of aircraft avionics system.		
	Perform operational check of repaired aircraft avionics system.		
	Store line test equipment after use.		

SPECIFIC TECHNICAL

AVT 109 - Flight Director and Autopilot Systems

Resources

Bose, K. W. (1983). *Aviation electronics* (4th ed.). Casper, WY: IAP.

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APPENDIX A

APPENDIX A

Avionics Maintenance Technology

Tools and Equipment List

AC generators and controls
AC motors
Acetone
Air compressor
Air filler fittings
Air hose, fluid line
Air pressure regulator
Air transformer
Aircraft chocks
Aircraft control surfaces
Aircraft fire detection and extinguishing system
Aircraft fuelage, fins, and stabilizer
Aircraft metal
Aircraft oils and grease
Aircraft prints
Aircraft rivets
Aluminum tubing
Amp meter
Anti-icer fluid
Audiovisual equipment
Auger bit files
Auger bits
Auxiliary power unit
Aviation fuels
Aviation snips
Axial flow jet engine
Bar folder
Basic hand tools
Battery cart
Battery charger
Battery test equipment
Beading machine
Bendix magneto overhaul tools
Bolt gage
Booster coils
Bore scope power saws
Box brake
Brake and wheel mock ups
Brake bleeder pot
Brazing rod
Bucking bars
Bungee shock cords
Cable
Cable splicing clamps and tools
Cable swaging tools
Cable thimbles
Capacitor tester
Carbon-pile generator controls
Carburetors
Centrifugal flow jet engine
Chalk line
Chemical inspection kits
Clamps
Cleaning agents
Cleco fasteners
Cold cylinder indicator
Compression tester
Copper tubing
Cornish break
Counter sinks
Counter weight propeller
Cutting torch
DC motors
Depth gages and dial indicators
Dial bore gage
Dimpling tools
Dopes thinners
Drafting equipment

Drill motors, bits, and files
Drill press
Dry sump engines
Dzus fasteners
Electric step-head governors
Electrical propellers
Electrical terminals
Electronics teaching aids and boards
Enamel paint
Enamel thinner
Engine instruments
Etching material
Exhaust systems
FAA forms
Fabric tester
Fastener installing tools
Fiberglass
50' tape
Finishing tape
Fire extinguishers
Fixed pitch metal propeller
Fixed pitch wood propeller
Flashlights
Flexible hose
Flow bench
Flux
Forming roll
Fuel injection systems
Fuel pump test stand
Fungicidal dope
Generator and control test stand
Generator mock-up board
Glass bead blaster
Grease
Grease gun
Grease pencils
Grinding wheelGrommets
Ground adjustable propeller
Hamilton Standard propellers, hydromatic
Hamilton Standard removal tools
Hardness tester
Hardwood for forming metal
Harness tester
Hi shear rivets
High tension Bendix magnetos, 54 & 56 series
High tension Bendix magnetos, 1200 series
High tension Bendix magnetos, 200 series
High tension Bendix magnetos, SF series
High tension Eiseman magnetos
High tension Slick magnetos
Honeycomb structure
Humidity indicator
Hydraulic fluid
Hydraulic lines
Hydraulic mock-up board
Hydraulic seals
Induction system cutaways
Induction vibrators
Inspection forms
Inspection mirrors
Inspection rings
Instrument cutaways
Instrument test bench
Instrument test stand
Jacks
Jointer
Landing gear cutaway
Layout dye
Lettering stencil
Leveling equipment
Lever
Live aircraft
Log books
Low tension Bendix magnetos, 600 series
M. ethyl ketone
Magnaflux machine
Magneto test stand
Masking tape

Metal cutting band saw
Micrometers
Miter box and saw
Mock-up board of aircraft electrical system
Multimeters
Nails and screws
Natural aspirated engines
Oil cooler
Oil cooler test bench
Oil dilution system
Oil tanks
Opposed engines
Oscilloscope
Oven
Oxygen mask
Oxygen regulator
Oxygen tank
Paint strainers
Penetrant inspection kits
Plastic cement and plastic cleaner
Plexiglass
Plumb bobs
Portable torch dead weight tester
Pressure pot spray gun
Prop protractor
Propeller bench
Propeller bench protractor
Propeller portable blade protractor
Pulley
Radial engines
Respirators
Rigging pins
Right angle drill attachment
Rigid line flaring equipment
Riv-nut installing tools
Rivet cutters
Rivet squeezer
Riveting guns
Rotary shear
Rotary wing aircraft
Safety goggles
Safety wire, locking devices, and cotter keys
Sander
Sandpaper
Saw horses
Scales
Schematics
Selection of aircraft hardware and components
Sheet metal screws
Shrinking machine
Signal generator
Silver solder, soft solder
Single and double magnetos
Slitting shear
Soldering copper and flux
Soldering irons
Solderless connector kit
Spar varnish
Spark plug cleaner and tester
Spark proof paint room
Special engine tools
Spirit level
Squaring shear
Stainless steel tubing
Stakes
Steam cleaner
Strands and hoist
Strut pump
Suction cup spray gun
Switches and relays
Taps and dies
Telescoping gages
Tensiometer

APPENDIX B

APPENDIX B

Tool Kit for
Avionics Maintenance Technicians

Spring dividers
7" diagonal cut pliers
6" needle nose pliers
Service mirror
3-Drawer tool chest
1/2" dr. flex handle 15"
1/2" dr. 7/8 deep socket
Hex wrench set 20 pc
Pliers wire cutter 8"
Arc joint pliers
8 oz. ball pein hammer
Plastic tip hammer
#1 phillips screwdriver 3"
#2 phillips screwdriver 4"
Reed/Prince screwdriver
Stubby screwdriver
17 pc set - combination wrenches
9 pc punch and chisel set
3 pin punches
3/8 center punch, 4 cold chisels
5/32 pin punch
3/16 pin punch
1/4 dr. socket std. 12 pt. 1/4"
1/4 dr. socket std. 12 pt. 3/16"
1/4 dr. socket std. 12 pt. 7/32"
1/4 dr. socket std. 12 pt. 9/32"
1/4 dr. socket std. 12 pt. 5/16"
1/4 dr. socket std. 12 pt. 11/32"
1/4 dr. socket std. 12 pt. 3/8"
1/4 dr. socket std. 12 pt. 7/16"
1/4 dr. socket std. 12 pt. 1/2"
1/4 dr. quick release ratchet
3/8 dr. socket std. 12 pt. 3/8"
3/8 dr. socket std. 12 pt. 7/16"
3/8 dr. socket std. 12 pt. 1/2"
3/8 dr. socket std. 12 pt. 9/16"
3/8 dr. socket std. 12 pt. 5/8"
3/8 dr. socket std. 12 pt. 11/16"
3/8 dr. socket std. 12 pt. 3/4"
3/8 dr. socket std. 12 pt. 13/16"
3/8 dr. quick release ratchet
16" speed handle, 1/4" dr.
3" ext 3/8 dr.
5" ext 3/8 dr.
10" ext 3/8 dr.
1/4" socket rack
3/8" socket rack
Right snips
Left snips
Straight snips
Combination square
Multi-tester
Flat smooth file, 10"
1/2 round file, smooth 10"
Hacksaw