

**AT 115 Automotive Fuel Injection and Fuel Systems (3)**

2 hours lecture - 3 hours laboratory

**Corequisite:** AT 115L

The principles, technical knowledge, and work experience in the field of reion and fuel injection. Specific topics include four barrel carburetors; fuel injection; fuel supply systems; and combustion evaluation instruments.

**AT 115L Automotive Fuel Systems Computer Training Lab (1)**

3 hours laboratory

**Corequisite:** AT 115

Students will use training computers to complete assignments in automotive fuel systems. Hi-tech automotive simulators and trainers will be used to enhance student learning. Software will also be used for Automotive Service Excellence (ASE) certification preparation.

**AT 120 Automatic Transmissions and Drive Lines (3)**

2 hours lecture - 3 hours laboratory

The hydraulic and mechanical function and repair of automatic transmissions. The disassembly, inspection, reassembly, and testing of three speed conventional transmissions, clutches, universal joints, and differentials.

**AT 125 Automotive Machining (3)**

6 hours lecture/laboratory

The various testing and machining operations involved in an automotive machine shop. Areas covered include cylinder head service and repair, pin fitting, cylinder boring, milling, align boring, and various other automotive machining and measuring techniques.

**AT 130 Automotive Brakes (3)**

2 hours lecture-4 hours laboratory

The hydraulic and mechanical function of automotive brake systems. Brake troubleshooting, complete system repair, and overhaul of power, drum, and disc brakes. Preparation for the State Brake License.

**AT 135 Front End Alignment and Wheel Service (3)**

2 hours lecture-4 hours laboratory

The repair and adjustment of the undercarriage of the automobile. Included are such areas as steering, geometry, turn radius, ball joints, toe track, camber, caster, suspension, bearing service, wheel balance, and tire wear identification. Preparation for the State Lamp License.

**AT 145 Auto Emissions, Diagnosis, Drivability, and Repair (3)**

6 hours lecture/laboratory

Auto emissions diagnosis and repair using an individual baseline approach and loaded-mode testing equipment to solve emission failures. Includes use of scan tools, digital storage oscilloscopes, and inflight analyzers to logically repair the vehicles.

**AT 150 Chassis Restoration and Assembly (3)**

6 hours lecture/laboratory

**Prerequisite:** A minimum grade of 'C' in AT 100**Note:** May be taken 3 times

Course covers basic disassembly and documentation of antique automotive chassis and components. Lab activities will focus on correct detailing and reassembly of vintage automobile chassis and related undercarriage elements.

**AT 155 Body Restoration and Assembly (3)**

6 hours lecture/laboratory

**Prerequisite:** A minimum grade of 'C' in R AT 50**Note:** May be taken 3 times

Course covers basic disassembly and documentation of antique automotive bodies and components. Lab activities will focus on correct detailing, restoration and reassembly of vintage automobiles and related elements, using historically authentic materials and techniques.

**AT 160 Associated Studies in Automotives (3)**

3 hours lecture

**Note:** May be taken 4 times

Applied science and technology as related to the automotive field. Areas covered include metrics, Ohms Law and electron theory, metal alloys and their properties and uses, thermal expansion, gas laws, limits and fits, and friction and torque.

**AT 165 Automotive Air Conditioning (2)**

1½ hours lecture - 1½ hours laboratory

The principles of operation and servicing of modern automotive air conditioning systems. Both lecture and lab time will be devoted to studying the refrigeration and heating system, ventilation and ducting, and the electrical system. Students will complete and receive their refrigerant license as well as be prepared for ASE certification.

**AT 196 Special Problems in Automotives (1, 2, 3)**

3, 6, or 9 hours laboratory

**Recommended preparation:** Completion of a minimum of 12 units in Automotive Technology (may include 6 concurrent Automotive Technology units)**Note:** May be taken 4 times

Special study in an area of interest related to automotives; generally research in nature. The content to be determined by the need of the student under signed contract with the instructor.

**AT 197 Topics in Automotive (.5-3)**

Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.

**Note:** May be taken 4 times

Topics in automotive technology. See Class Schedule for the specific topic offered. Course title will designate subject covered.

**AT 210 Specialized Automotive Electronics (3)**

2 hours lecture - 3 hours laboratory

**Recommended preparation:** AT 105 or 110

Electronic principles as they pertain to the automobile. Identification, diagnosis, repair, and verification of malfunctioning electronic components is the major objective of the course. Computer controls fundamentals and diagnosis of GM systems, 1981-1990.

**AT 215 Automotive Emission Control (3)**

3 hours lecture-2 hours laboratory

**Recommended preparation:** AT 110 and 115

Auto emission controls as prescribed by Federal Law and California Air Resources Board. Analysis and testing of emission controls will be presented. Study of current laws for state exam preparation.

**AT 220 Advanced Automotive Transmissions (3)**

6 hours lecture/laboratory

**Prerequisite:** A minimum grade of 'C' in AT 120

Advanced specialized training in automatic transmissions currently in use in General Motors, Ford, and Chrysler cars and light trucks.

**AT 225 Automotive Engine Rebuilding (3)**

2 hours lecture-4 hours laboratory

The complete rebuilding of at least one automobile engine using the machine tools and techniques of industry.

**Aviation Sciences (AVIA)**

Contact the Earth, Space, and Aviation Sciences Department for further information.

(760) 744-1150, ext. 2512

Office: NS-110G

For transfer information, consult a Palomar College Counselor.

**Associate in Arts Degrees -**

AA Degree requirements are listed in Section 6 (green pages).

- Aviation Operations and Management
- Aircraft Commercial Pilot

**Certificates of Achievement -**

Certificate of Achievement requirements are listed in Section 6 (green pages).

- Aviation Operations and Management
- Aircraft Commercial Pilot

## PROGRAMS OF STUDY

**Aviation Operations and Management**

For students interested in the business or piloting aspects of aviation. Transfers to some four year programs in this field.

**A.A. DEGREE MAJOR OR  
CERTIFICATE OF ACHIEVEMENT**

Program Requirements	Units
AVIA 100 Introduction to Aviation Sciences	3
AVIA 105 Basic Pilot Ground School	3
AVIA 120 Aviation Weather	3
BUS 205 Business Writing	3
ECON 101 Principles of Economics (Macro)	3
ECON 102 Principles of Economics (Micro)	3
<b>Elective Courses (Select 15 units minimum)</b>	
ACCT 103 and Financial Accounting	4
ACCT 104 Accounting Spreadsheet Laboratory	1
AVIA 106 Commercial Pilot Ground School	3
AVIA 107 Instrument Pilot Ground School	3
AVIA 115 Air Traffic Control	3
AVIA 125 Instrument Simulator Lab	1.5
AVIA 145 Glass Cockpits and GPS Navigation	1
AVIA 205 Principles of Aerodynamics	3
AVIA 210 Aviation Safety and Accident Investigation	3
BUS 115 Business Law	3
BUS 155 Marketing	3
BMGT 110 Human Resource Management	3
BMGT 115 Organizational Theory and Design	3
CSIT 105 Computer Concepts and Applications	3
GEOG 110 Meteorology: Weather and Climate	3
MATH 115 Trigonometry	3
MATH 120 Elementary Statistics	3
PHYS 120 General Physics	4
PHYS 121 General Physics	4
CE 100 Cooperative Education	1, 2, 3, 4
<b>TOTAL UNITS</b>	<b>33</b>

Flight training is the sole responsibility of each student and is contracted with an F.A.A. approved flight school at the student's own expense. The Palomar Community College District accepts no responsibility or liability for the student's flight training program.

**Aircraft Commercial Pilot**

Prepares students for employment as commercial pilots in air taxi and other field related flying operations. Transfers to some four year programs in this field.

**A.A. DEGREE MAJOR OR  
CERTIFICATE OF ACHIEVEMENT**

Program Requirements	Units
AVIA 75 Private Pilot Certification	2
AVIA 80 Instrument Rating Certification	2
AVIA 85 Commercial Pilot Certification	3
AVIA 100 Introduction to Aviation Sciences	3
AVIA 105 Basic Pilot Ground School	3
AVIA 106 Commercial Pilot Ground School	3
AVIA 107 Instrument Pilot Ground School	3
AVIA 110 Basic Pilot Flight Procedures	2
AVIA 120 Aviation Weather	3
AVIA 125 Instrument Simulator Laboratory	1.5
AVIA 145 Glass Cockpits and GPS Navigation	1
<b>Elective Courses (Select 9 units minimum)</b>	
AVIA 115 Air Traffic Control	3
AVIA 205 Principles of Aerodynamics	3

AVIA 210	Aviation Safety and Accident Investigation	3
AVIA 215	Complex Aircraft Systems and Propulsion	3
GEOG 110	Meteorology: Weather and Climate	3

**TOTAL UNITS** **35.5**

Flight training is the sole responsibility of each student and is contracted with an F.A.A. approved flight school at the student's own expense. The Palomar Community College District accepts no responsibility or liability for the student's flight training program.

**COURSE OFFERINGS**

Courses numbered under 100 are not intended for transfer credit.

**AVIA 75 Private Pilot Certification (2)**

4 hours lecture/laboratory

**Note:** Pass/No Pass grading only

Upon presentation of a Private Pilot Certificate, the student will be given credit (no grade). Flight training is to be completed off campus with an F.A.A. certified flight instructor of the student's choice and at the student's own expense. The Palomar Community College District accepts no responsibility or liability for the flight training obtained from private instructors. The student should register for this course in the semester during which the training is to be completed.

**AVIA 80 Instrument Rating Certification (2)**

4 hours lecture/laboratory

**Note:** Pass/No Pass grading only

Upon presentation of an Instrument Rating, the student will be given credit (no grade). Flight training is to be completed off campus with an F.A.A. certified flight instructor of the student's choice and at the student's own expense. The Palomar Community College District accepts no responsibility or liability for the flight training obtained from private instructors. The student should register for this course in the semester during which the training is to be completed.

**AVIA 85 Commercial Pilot Certification (3)**

6 hours lecture/laboratory

**Note:** Pass/No Pass grading only

Upon presentation of a Commercial Pilot Certificate, the student will be given credit (no grade). Flight training is to be completed off campus with an F.A.A. certified flight instructor of the student's choice and at the student's own expense. The Palomar Community College District accepts no responsibility or liability for the flight training obtained from private instructors. The student should register for this course in the semester during which the training is to be completed.

**AVIA 100 Introduction to Aviation Sciences (3)**

3 hours lecture

**Transfer acceptability:** CSU

A survey of the aerospace field including the functions and operations of various federal and state regulating aviation agencies and airport based companies such as air carrier, general aviation, aviation maintenance, flight schools, and other major occupational and supportive areas.

**AVIA 105 Basic Pilot Ground School (3)**

3 hours lecture

**Transfer acceptability:** CSU

A study of Federal Aviation Regulations, flight data, aerodynamics, weather and navigation, radio communications, aircraft and engine operation, flight instruments, and aircraft performance. Prepares the student for the Federal Aviation Administration's Private Pilot written examination.

**AVIA 106 Commercial Pilot Ground School (3)**

3 hours lecture

**Prerequisite:** Private Pilot Certificate or AVIA 105 with concurrent or prior flight training

**Transfer acceptability:** CSU

A comprehensive study of aircraft performance, Federal Aviation Regulations, navigation, flight charts and graphs, radio navigation and communications, meteorology, emergency procedures, aerodynamics, flight instruments, and multi engine procedure. Prepares the student for the Federal Aviation Administration's Commercial Pilot written examination.

**AVIA 107 Instrument Pilot Ground School (3)**

3 hours lecture

**Prerequisite:** Private Pilot Certificate or AVIA 105 with concurrent or prior flight training**Transfer acceptability:** CSU

The rules and regulations for instrument flight, interpretation of flight instruments, air navigation, meteorology, instrument flight techniques, air traffic control, and flight planning. Prepares the student for the Federal Aviation Administration's Instrument written examination.

**AVIA 110 Basic Pilot Flight Procedures (2)**

2 hours lecture

**Prerequisite:** A minimum grade of 'C' in AVIA 105, or concurrent enrollment in AVIA 105**Transfer acceptability:** CSU

A classroom study of procedures required for the private pilot practical test. Includes discussion of cross country flight planning, radio navigation, communication procedures, controlled airspace, and airport operations.

**AVIA 115 Air Traffic Control (3)**

3 hours lecture

**Prerequisite:** A minimum grade of 'C' in AVIA 105**Transfer acceptability:** CSU

The national airspace system and the handling of air traffic within this area. Emphasis is placed on the operation of Federal Aviation Administration controlling agencies.

**AVIA 120 Aviation Weather (3)**

3 hours lecture

**Transfer acceptability:** CSU

Basic principles relating to weather with particular emphasis placed upon the relationship of weather to aviation. Practical instruction is given in the use and interpretation of weather reports, forecasts, and charts.

**AVIA 125 Instrument Simulator Laboratory (1.5)**

1 hour lecture-2 hours laboratory

**Prerequisite:** Private Pilot Certificate**Note:** May be taken 3 times for increased proficiency by utilizing more advanced lesson plans and taped lesson plans in the lab.**Transfer acceptability:** CSU

Instrument flight including VOR navigation, holding patterns, and ILS, LOC, NDB, and VOR approaches through use of a ground trainer.

**AVIA 145 Glass Cockpits and GPS Navigation (1)**

1 hour lecture

**Transfer acceptability:** CSU**Prerequisite:** A minimum grade of 'C' in AVIA 105 or Private Pilot Certificate

A practical examination of glass cockpit technology and global positioning system navigation in aviation.

**AVIA 197 Aviation Sciences Topics (.5 - 4)**

Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture, laboratory, or lecture/laboratory may be scheduled by the department. Refer to Class Schedule.

**Note:** May be taken 4 times.**Transfer acceptability:** CSU

Topics in Aviation Sciences. See class schedule for specific topic covered. Course title will designate subject covered.

**AVIA 205 Principles of Aerodynamics (3)**

3 hours lecture

**Transfer acceptability:** CSU

Introduction to the theory of flight; applications of the basic laws of physics to the principles of flight. Aircraft design is considered with respect to airfoils, wings, viscous effects, propellers, and aircraft performance.

**AVIA 210 Aviation Safety and Accident Investigation (3)**

3 hours lecture

**Prerequisite:** A minimum grade of 'C' in AVIA 105 or Private Pilot Certificate**Transfer acceptability:** CSU

Accident prevention principles through a study of recent mishaps. Pilot physical and psychological factors and their role in mishaps. A study of crash survival and post crash survival techniques. Fundamentals of mishap investigation and reporting.

**AVIA 215 Complex Aircraft Systems and Propulsion (3)**

3 hours lecture

**Prerequisite:** A minimum grade of 'C' in AVIA 105 or Private Pilot Certificate**Transfer acceptability:** CSU

Turboprop and turbojet engines and their operation. Electrical, pressurization, hydraulic, and fuel systems will be examined.

**AVIA 295 Directed Study in Aviation Sciences (1, 2, 3)**

3, 6, or 9 hours field work

**Prerequisite:** A minimum grade of 'C' in AVIA 100 and approval of project proposal**Note:** May be taken 4 times**Transfer acceptability:** CSU

Individual study in field or library within the field of air transportation.

**Biology (BIOL)**

Contact the Life Sciences Department for further information.

(760) 744-1150, ext. 2275

Office: NS-207A

**Associate in Arts Degrees -**

AA Degree requirements are listed in Section 6 (green pages).

- Biology - General
- Biology - Preprofessional

**Certificates of Achievement -**

Certificate of Achievement requirements are listed in Section 6 (green pages).

- Biology - General
- Biology - Preprofessional

**PROGRAMS OF STUDY****Biology – General****A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT**

Program Requirements		Units
BIOL 200	Foundations of Biology I	5
BIOL 201	Foundations of Biology II	5
ZOO 100 or	General Zoology	
ZOO 101/101L	Animal Kingdom	4
<b>Group One (Select 3-4 units)</b>		
BOT 101/101L	General Botany	4
BOT 110	Botany of Spring Wildflowers	4
BOT 115	Plants and People	3
<b>Group Two (Select 4-5 units)</b>		
BIOL 114/114L	Ecosystem Biology	4.5-5
BIOL 118/118L	General Ecology	4
BIOL 130 or	Marine Biology	
BIOL 131/131L	Marine Biology	4
ZOO 115 or	Natural History of Animal Life	
ZOO 116/116L	Natural History of Animal Life	4
<b>Group Three (Select 9-11 units)</b>		
Biology	Any course not used above (100 and up)	
Botany	Any course not used above	
Microbiology	Any course	
Zoology	Any course not used above	
<b>MINIMUM TOTAL UNITS</b>		<b>32</b>

Recommended Electives: BIOL 215; CHEM 100, 110, 110L, 115, 115L; MATH 110, 115, 135; CSIT 105