

Mt. San Jacinto Community College District Secondary and Community College Course Articulation Agreement

Statement of Intent

This agreement enables students to receive college credit and/or a waiver of a prerequisite coursework at the secondary level comparable to courses offered by Mt. San Jacinto Community College District. The granting of college "credit-by-examination" is based upon achievement of competencies through a course, or courses, as defined in Attachment B, which specifies the conditions of the articulation agreement.

Terms of Agreement

This agreement between Mt. San Jacinto Community College District and high schools or R.O.P. shall remain in force for an indefinite period of time but shall be reviewed for consideration and continuation every three years. This review will include an examination of up-to-date course outline and a discussion of current teaching methodologies and stated competencies. Either party to the agreement may terminate this agreement at the close of any school year by proper written notice delivered to the Superintendent/President of Mt. San Jacinto College or to the Superintendent of the secondary or R.O.P. educational institution.

AUME 120
Suspension and Alignment Principles

RCOE/ROP Course # 10058
NATEF Suspension Steering

Name and Number of Course/MSJCCD

Name & Number of Course/High School/ROP

Mt. San Jacinto Community College District

Secondary/ROP Educational Institution

Department Chair Date

Dean, Instruction Date

Curriculum Committee (Information item) Date

Vice President Date

President/Superintendent Date

Principal/Program Administrator Date

Superintendent Date

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President/Superintendent Date

Claire Spens 12/03/09

Principal/Program Administrator Date

Nancy Land 12 2009

Superintendent Date



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Attachment

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AUME 120
Suspension and Alignment Principles

(Name and Number of course/MSJCCD)

Mt. San Jacinto Community College District

Cathy Adams 4/7/07
(Department Chair) (Date)

Kurt Sch 4/7/07
(Dean, Instruction) (Date)

Richard Rowley 4/25/07
(Curriculum Committee-Information item) (Date)

P. Deegan 7/1/07
(Vice President) (Date)

[Signature] 7/17/07
(President/Superintendent) (Date)

Riverside County / ROP Course #10058
NATEF Suspension Steering

(Name and Number of Course/High School/R.O.P.)

Secondary/R.O.P. Educational Institution

Claire Spence 12-7-07
(Principal Program Administrator) (Date)

Nancy Pordatz 12-7-09
(Superintendent) (Date)



**Mt. San Jacinto Community College District
Secondary and Community College
Articulated Course Standards and Criteria**

Date October 24, 2006

Suspension Steering AUME 120
Suspension And Alignment Principles, Course # AUME 120

NATEF Suspension Steering
Hemet High School, Course # 16600

Description of Articulated High School or ROP Course Standards
(Please attach the course outline)

Content or Theory Summary: This course provides an in-depth study of the design and operation of domestic and import suspension and steering systems. Emphasis is placed on the problems of accurate diagnosis and the proper repair procedures for these suspension and steering systems. This course is designed for the learner wishing to develop skills in diagnosis and repairing contemporary technologies of suspension and steering. In order to articulate this course the student must pass the NATEF, AYES, or MSJC A-4 Exit exam, and have completed documentation specific for each NATEF task that is completed including a minimum of 26 Priority 1, 20 Priority 2, and 6 Priority 3 tasks. The maximum number of units that a student may articulate in the Automotive Technology program is limited to 5.5 units.

Competencies:

A. General Suspension and Steering Systems Diagnosis
1. Identify and interpret suspension and steering concern; determine necessary action. P-1
2. Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins. P-1
3. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals). P-1
B. Steering Systems Diagnosis and Repair
1. Disable and enable supplemental restraint system (SRS). P-1
2. Remove and replace steering wheel; center/time supplemental restraint

(including tilt mechanism) determine necessary action. P-2
4. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action. P-3
5. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action. P-3
6. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action. P-2

A-4 SUSPENSION AND STEERING CONTINUED

B. Steering Systems Diagnosis and Repair Continued
7. Adjust manual or power non-rack and pinion worm bearing preload and sector lash. P-3
8. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets. P-1
9. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. P-1
10. Inspect power steering fluid levels and condition. P-1
11. Flush, fill, and bleed power steering system. P-2
12. Diagnose power steering fluid leakage; determine necessary action. P-2
13. Remove, inspect, replace, and adjust power steering pump belt. P-1
14. Remove and reinstall power steering pump. P-3
15. Remove and reinstall power steering pump pulley; check pulley and belt alignment. P-3
16. Inspect and replace power steering hoses and fittings. P-2
17. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. P-2
18. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps. P-1
19. Test and diagnose components of electronically controlled steering systems using a scan tool; determine necessary action. P-3

A-4 SUSPENSION AND STEERING CONTINUED

C. Suspension Systems Diagnosis and Repair

1. Front Suspension

1. Diagnose short and long arm suspension system noises, body sway, and uneven riding height concerns; determine necessary action. P-1

2. Diagnose strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action. P-1

3. Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers. P-3

4. Remove, inspect and install strut rods (compression/tension) and bushings. P-2

5. Remove, inspect, and install upper and/or lower ball joints. P-2

6. Remove, inspect, and install steering knuckle assemblies. P-2

7. Remove, inspect, and install short and long arm suspension system coil springs and spring insulators. P-2

8. Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts. P-3

9. Remove, inspect, and install stabilizer bar bushings, brackets, and links. P-2

10. Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount. P-1

11. Lubricate suspension and steering systems. P-2

2. Rear Suspension

1. Remove, inspect, and install coil springs and spring insulators. P-2

2. Remove, inspect, and install transverse links, control arms, bushings, and mounts. P-2

3. Remove, inspect, and install leaf springs, leaf spring insulators (silencers), shackles brackets bushings and mounts. P-3

A-4 SUSPENSION AND STEERING CONTINUED

C. Suspension Systems Diagnosis and Repair Continued

3. Miscellaneous Service

1. Inspect, remove, and replace shock absorbers. P-1
2. Remove, inspect, and service or replace front and rear wheel bearings. P-1
3. Test and diagnose components of electronically controlled suspension systems using a scan tool; determine necessary action. P-3

D. Wheel Alignment Diagnosis, Adjustment, and Repair

1. Differentiate between steering and suspension concerns using principles of steering geometry (caster, camber, toe, etc). P-1
2. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action. P-1
3. Perform prealignment inspection; perform necessary action. P-1
4. Measure vehicle riding height; determine necessary action. P-1
5. Check and adjust front and rear wheel camber; perform necessary action. P-1
6. Check and adjust caster; perform necessary action. P-1
7. Check and adjust front wheel toe; adjust as needed. P-1
8. Center steering wheel. P-1
9. Check toe-out-on-turns (turning radius); determine necessary action. P-2
10. Check SAI (steering axis inclination) and included angle; determine necessary action. P-2
11. Check and adjust rear wheel toe. P-2
12. Check rear wheel thrust angle; determine necessary action. P-2
13. Check for front wheel setback; determine necessary action. P-2
14. Check front cradle (subframe) alignment; determine necessary action. P-3

A-4 SUSPENSION AND STEERING CONTINUED

E. Wheel and Tire Diagnosis and Repair

- 1 Diagnose tire wear patterns, determine necessary action P-1
- 2 Inspect tires, check and adjust air pressure P-1
- 3 Diagnose wheel/tire vibration, shimmy, and noise, determine necessary action P-2
- 4 Rotate tires according to manufacturer's recommendations P-1
- 5 Measure wheel, tire, axle, and hub runout; determine necessary action. P-2
- 6 Diagnose tire pull (lead) problem; determine necessary action. P-2
- 7 Balance wheel and tire assembly (static and dynamic). P-1
- 8 Dismount, inspect, repair, and remount tire on wheel. P-2
- 9 Reinstall wheel; torque lug nuts. P-1
10. Inspect and repair tire. P-2

*NATEF Suspension and Steering Task Priority Breakdown

P-1 = 28	_____ No. Completed	(95% - 26 Required for NATEF)
P-2 = 25	_____ No. Completed	(80% - 20 Required for NATEF)
P-3 = 11	_____ No. Completed	(50% - 6 Required for NATEF)

Measurement Methods:

Grading Policy

1. Excellent - A

- a. Complete all minimum course objectives.
- b. Participate in 90% of class discussion and lab assignments. Make-up time available.
- c. Maintain test score average 86% or more.
- d. Demonstrate good work habits in manipulative activities appropriate for entry level automotive service employees. The major points of evaluation in this area include:
 1. safety
 2. cleanliness of work areas and oneself
 3. assistance to and with others
 4. care of customer vehicles and other property
 5. punctuality

2. Above Average - B

- a. Complete all minimum course objectives.
- b. Participate in 80% of class discussions and lab assignments. Make-up time available.
- c. Maintain test score average 75% - 85%.
- d. Demonstrate good work habits in manipulative activities appropriate for entry level

2. cleanliness of work areas and oneself
 3. assistance to and with others
 4. care of customer vehicles and other property
3. **Average - C**
- a. Complete all minimum course objectives.
 - b. Participate in 70% of class discussions and lab assignments. Make-up time available.
 - c. Maintain test score average 65% - 74%.
 - c. Demonstrate good work habits in manipulative activities appropriate for entry level automotive service employees. The major points of evaluation in this area include:
 1. safety
 2. cleanliness of work areas and oneself
 3. assistance to and with others
 4. care of customer vehicles and other property
4. **Barely Passing - D (Not recommended for trade employment)**
- a. Complete all minimum course objectives.
 - b. Participate in 60% of class discussion and lab assignments. Make-up time available.
 - c. Maintain test score average 51% - 64%.
5. **Failure - F**
- a. Not meeting requirements for D grade in all three areas of evaluation (parts a, b, & c).
 - b. Test scores 50% or below.

Application of Lab: Students will apply what they have learned in the classroom to perform all required NATEF tasks in the lab. Students will be issued applicable NATEF task sheets, a vehicle or equivalent training unit, and appropriate tools to perform task within a prescribed time frame.

Hours of Instruction: 95 Hours total instruction, 35 Hours classroom/ lecture, and 60 Hours lab.

Textbook or Other Support Materials (Including Software):

Modern Automotive Technology, by James Duffy

And workbook for Modern Automotive Technology, by James Duffy

Special Equipment: All NATEF required tools and equipment.

Other: High school must have a representative attend the advisory board meeting twice per year.

Signature _____

Signature _____

**Mt. San Jacinto Community College District
Secondary and Community College
Course Articulation Agreement
“Credit-By-Examination Criteria”**

Course Name: Automotive 120: Automotive Suspension, Steering and Alignment Systems

Please describe the “credit-by-examination” method (exam, project, portfolio, etc...) required for student to receive college credit. Attach a sample if possible.

The following articulation procedure is what the auto staff agreed upon for AUME 120, Automotive Suspension, Steering and Alignment Systems. The agreement was that the ROP county office would administer the “credit-by-examination” written exam. Students who want credit for the AUME 120, Automotive Suspension, Steering and Alignment Systems course would have to pass the ROP auto final exit exam with a minimum of a B (80% correct). The student designated as having successfully passed the exam would then have to pass the MSJC administered “hands-on competency” assessment. This hands-on assessment requires the completion of ten [10] designated AUME 120, Automotive Suspension, Steering and Alignment Systems “hands-on tasks,” which are based on NATEF standards. These would be administered by one of the MSJC AUME 120, Automotive Suspension, Steering and Alignment Systems auto instructors at the MSJC campus. Students must pass these tasks with a minimum of a B [8/10].

Please describe the necessary procedure for the test to be administered (who will administer the test, where will it be taken, how will it be scored, etc...)

ROP county office has the master written exam. The county distributes the test at the end of the semesters to the auto instructors. They give the tests and the county corrects them. Students identified with the articulation would have the grades submitted to MSJC by the ROP county office.

Students passing the “credit-by-examination” written exam with a B grade will schedule an appointment with the MSJC automotive department for the “hands-on competency” assessment. MSJC will notify the ROP county office of the results of the “hands-on competency” assessment. Students meeting the credit-by-examination criteria for both the written and hands-on assessments will be eligible for course credit per the articulation agreement.