



**AUTO 735 ----- TRANSMISSION/DRIVE TRAINS - DIAGNOSIS/REPAIR**

**Instructor:** Thomas G. Broxholm

**Contact Information:** Office Phone: 650-738-4131  
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Office #: 8111

**Office Hours:** Tuesday through Friday 1:10p to 2:10p.  
Mondays by arrangement or call my cell phone.

**Meeting Time:** 8:00 am to 1:10 pm Tuesday through Friday

**Meeting Dates:** 8/19/2009 to 12/11/2009

**Final Exams:** 12/13/2009 to 12/19/2009

**Website:** <http://www.smccd.edu/accounts/broxholm>

**Email:** broxholm@smccd.edu

**Course Units:** 15 units Transferable to the CSU system.

**Prerequisites:** Admission through the special automotive application.

**Books & Materials:** All Required  
Manual Drive Trains & Axles 5<sup>th</sup> Edition. By: Thomas Birch -----(Book store)  
Automatic Transmissions & Transaxles. 4th Edition By: Check Chart -----(Book Store)  
Notebook, dividers, paper, #2 pencil, Scranton answer sheets.  
Safety Glasses------(Tool Room)  
Basic and Specialty Tool Sets

**Description:**  
This course is designed to give the student a through understanding of Automotive drive line systems. Automotive drive lines are defined as: Manual & Automatic Transmissions/Transaxles, Transfer Cases, Clutch Systems Differentials, Drive Shafts and Axle Shafts. Servicing overhaul and system diagnosis will be stressed. Forty Five percent of this course will be hands on work experience.

**Homework & Quizzes:**

All homework must be turned in before 8:20 am on the due date. Any homework turned in afterwards will be considered late. Late homework is subject to a 20% loss of points. No late assignment will be excepted after the assignment has been graded.

There are **NO** makeup quizzes. Quizzes can and will be given without prior notice. There will be open and closed note quizzes through out the semester.

**Final Exam:**

The written final exam is broken up into thirds. The first exam will be on differentials and drive shafts. The second exam will be on clutches and manual transmission/transaxles. The third exam will be on automatic transmission/transaxles. Each exam will be given right after the completion of each subject.

**Indirect Assesment:**

Indirect assessment is an observation grade by the instructor combined with a rubrick of questions the instructor will use to score each student.

**Student Evaluation:**

This is done on a point system with category weights.

**Grading Policy:**

Homework	13 %	Attendance	5%	Indirect Assesment	12%
Closed note quiz	12%	Open note quiz	10%	Lab	15%
Written Final exams	25%	Extra Credit	05%	Hands-on Final exams	08%

The above percentages are subject to change and the students will be notified if a change is made.

**Course Grading:**

A = 90% - 100%	B = 80% - 89.9%	C = 70% - 79.9%
D = 60% - 69.9%	F = 59.9% and below.	

**Department Seniority:**

Enrollment into additional semesters within the automotive department is based on seniority within the automotive department. Seniority is given to all students who achieve a grade “C” or better in their previous automotive classes.

**Progress Reports:**

Students can check their progress though my website link. The student will need to know his/her student ID number. (SS # will not work) Progress reports are updated approximately every 2 to 4 weeks.

### **Student Learning Outcomes:**

Mastery of these SLO objectives is proportional to the students grade in the class.

Upon successful completion of the course the student will be able to:

- Develop and improve the students automotive driveline terminology and to demonstrate knowledge of the operational principals of: Manual & automatic transmission/transaxles, clutches, differentials, drive axles/shafts, transfer cases, all wheel drive & four wheel drive systems.
- Build the students critical thinking skills and formulate methods and techniques for diagnosis, overhaul & repair of: Manual & automatic transmission/transaxles, clutches, differentials, drive axles/shafts, transfer cases, all wheel drive & four wheel drive systems.

### **Student Conduct:**

Conduct in class is very important and all students are expected to act as an adult college student. That means being ready to start class on the designated time, being prepared for class by having paper, pencil, Scantrons, safety glasses, tool chits and tools. No social talking during lecture, no cell phones, no immature noise making, no throwing of objects, no plagiarism, no cheating on tests or quizzes and no copying of someone else's work. All students are expected to complete all homework and take home assignments on time.

### **Cell Phones:**

Cell phones must be turned off during class except when the teacher allow you to use them as a calculator or stop watch.

### **Smoking:**

Smoking is only allowed in designated parking lot area which are clearly marked.

### **Support Services:**

The library is located in building 5, all student services are located in building 2, Automotive reference material and information can be found on one of the automotive computers. Special website links are setup on our home page for automotive related research.

### **DSPS Students:**

All DSPS students who wish to have additional considerations must identify themselves to the instructor as a DSPS student. In addition if the student needs additional accommodations he/she must obtain an accommodation letter from the DSPS office. The DSPS office is located in building 2 and can be reached at (650) 738-4280.

**Attendance:**

Attendance is taken with time cards and no student is allowed to punch in or out someone else’s time card. Class starts at 8:00 am. All students must be punched in **before** 8:00 am and in the classroom ready to go at 8:00 am. The time clock is the official clock in time unless for some reason it is grossly misadjusted.

To be fair to everyone there are no excused absences or tardies.

Students punching in on or after 8:00 am will be considered tardy. Students who punch in after 10:00 am will be considered absent for the day. Any student who repeatedly (5 or more) clocks in between 9:30 am & 10:00 am without special permission will no longer have a 2 hour tardy window. This student must arrive and clock in on or before 9:00 am. At 9:01 am the student will be considered absent for the day and it will count towards the total number of absent days allowed.

Each student is assigned 100 attendance points for the semester. Each tardy will reduce that number by 2 points. Each absence will reduce that number by 5 points.

Each student is allowed up to 12 absences. Upon the 13 absence the student will be given a failing grade. Every 2 tardies is considered as 1 absence towards this policy. Any combination of absences and tardies can add up to the failing status of 13 absences.

Special or extenuating circumstances must be approved by the instructor.

**Important dates:**

- Last day to add a class -----September 1, 2009
- Last day to drop with eligibility for partial refund-----September 1, 2009
- Final payment due. -----September 4, 2009
- Last day to drop without appearing on your record.-----September 11, 2009
- Last day to apply for a degree/certificate-----October 2, 2009
- Last day to withdraw-----November 18, 2009
- Final exams-----December 13 – 19, 2009
- No School -----September 5 – 7, 2009
- No School -----November 11 – 15, 2009
- No School -----November 26 – 29, 2009
- Final grades on WebSmart -----January 8, 2010

**Course Outline Summary:**

**Week 1**

- Driveline Introduction
- Gears

- Gear Ratio's

### **Weeks 2 – 6**

- Differential principals
- Differential components and component operation
- Differential overhaul
- Differential diagnosis and servicing.
- Front Wheel Drive (FWD) axle shafts & CV joints
- Rear Wheel Drive (RWD) drive shafts and U-Joints.
- Final exam on Differentials, FWD axle shafts & RWD drive shafts.

### **Weeks 7 – 11**

- Clutch system principals
- Clutch components and component operation
- Clutch replacement
- Clutch services and adjustments
- Clutch diagnosis
- Manual transmission/transaxle & transfer case operation & components
- Manual transmission/transaxle & transfer case overhaul
- Manual transmission/transaxle & transfer case servicing & diagnosis.
- Manual transmission/transaxle replacement.
- Final exam on clutches and manual transmission/transaxle. (Practical and Written)

### **Weeks 12 – 16**

- Automatic transmission/transaxle operation & components
- Automatic transmission/transaxle overhaul
- Automatic transmission/transaxle servicing & diagnosis
- Automatic transmission/transaxle electronic controls
- Final exam on automatic transmission/transaxle.

## **Homework Assignments:**

Unless otherwise noted or instructed all multiple choice homework questions are to be answered on a Scranton answer sheet using a # 2 pencil. Short answer questions are to be answered on a separate sheet of paper. Make sure to put your name and homework chapter on all assignments.

### **Manual Drivelines:**

Answer the chapter quiz questions that are found in the back of each chapter.

### **Automatic Drivelines:**

Answer the chapter questions that are found on my website at <http://www.smccd.net/accounts/broxholm/class-info.html>. These can be printed from the internet or any computer in the automotive department. If you have any difficulties and need me to provide you with the questions just ask.

The following assignment due dates are flexible and might be changed through out the semester.

### **Manual Drive Lines**

(These dates are subject to change)

9/4/2009 ..... Chapter 11  
9/11/2009 .... Chapter 12  
9/17/2009 .... Chapter 9  
9/23/2009 .... Chapter 10 Extra Credit  
10/1/2009 .... Chapter 4 (written ex-cr)  
10/13/2009 ... Chapter 5  
10/15/2009 ... Chapter 6  
10/21/2009 ... Chapter 7  
10/22/2009 ... Chapter 13

### **Automatic Drive Lines**

(These dates are subject to change)

TBA Chapters 3 & 4  
TBA Chapter 5  
TBA Chapter 2  
TBA Chapter 6  
TBA Chapters 8

### **Final Exam Dates:** (These dates are subject to change)

9/24/2009           Differentials & Drive Shafts  
10/23/2009       Clutch & Manual Trans. Practical  
10/27/2009       Clutch & Manual Trans. Written  
TBA                 Automatic Transmission

### **Lab Dates:** (These dates are subject to change)

TBA                 Differential bench overhaul  
9/18/2009       Driveshaft & Half shaft replacement & overhaul  
10/6 – 10/9       Clutch replacement  
TBA                 Automatic Transmission servicing.  
TBA                 Automatic Transmission & Transaxle Overhaul & repair.  
(Combined with lecture)