

## Course Outline

### 1. COURSE INFORMATION

<b>Session Offered</b>	Fall 2015										
<b>Course Name</b>	Automotive Engineering Technology II										
<b>Course Code</b>	AUTOTECH 3AE3										
<b>Date(s) and Time(s) of lectures</b>	Lectures: Tuesdays 8:30am-11:30am and Wednesdays 12:30pm-1:30pm Labs: Fridays 8:30am-10:30am Fridays 10:30am-12:30am Fridays 12:30pm-2:30pm Sept 8, 2015 – Dec 8, 2015										
<b>Program Name</b>	Automotive and Vehicle Technology										
<b>Calendar Description</b>	Spark ignition engines; diesel engines, transmissions and driveline; steering systems and dynamics; suspensions; brakes; tires; vehicle aerodynamics; transmission matching and vehicle performance; alternative vehicles; case studies										
<b>Instructor(s)</b>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Lecture: Dr. Lucian Balan</td> <td>Phone: MARC 289-674-0250 ext.59102</td> </tr> <tr> <td></td> <td>E-Mail: Avenue Email</td> </tr> <tr> <td></td> <td>Office: MARC 271</td> </tr> <tr> <td>Lab: George Apostol</td> <td>Phone: 289-260-2664</td> </tr> <tr> <td></td> <td>E-mail: georgeapostol53@yahoo.com</td> </tr> </table>	Lecture: Dr. Lucian Balan	Phone: MARC 289-674-0250 ext.59102		E-Mail: Avenue Email		Office: MARC 271	Lab: George Apostol	Phone: 289-260-2664		E-mail: georgeapostol53@yahoo.com
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### 2. COURSE SPECIFICS

<b>Course Description</b>	<p>The lectures will cover the construction and operation of the major mechanical components of the automotive systems, with the exception of the engines which will be studied in another course. Here, the major specifications of spark ignited and Diesel engines are introduced with the purpose of listing the sensors and presenting the engine diagnostics.</p> <p>Clutches, manual and automatic transmissions, drive shafts, CV joints and differentials, as major systems included in the transmission and drive train, are investigated and the design methodologies of some components is provided.</p> <p>After describing the tires and wheel, the courses presents the steering and suspension systems of the road vehicles.</p> <p>The dynamic effects of the aerodynamics are investigated. The course also looks into the alternate vehicle power system, a topic covered in detail in a different course.</p> <p>The labs will provide hands-on testing and advanced analysis using onboard control systems and data acquisition to reinforce the understanding of the automotive systems.</p>		
<b>Instruction Type</b>	<b>Code</b>	<b>Type</b>	<b>Hours per term</b>
	C	Classroom instruction	38
	L	Laboratory, workshop or fieldwork	24
	T	Tutorial	
	DE	Distance education	
	<b>Total Hours</b>		62
<b>Resources</b>	<b>ISBN</b>	<b>Textbook Title &amp; Edition</b>	<b>Author &amp; Publisher</b>

	9780131248908	Automotive Technology: Principles, Diagnosis, and Service, Canadian Edition	Halderman, J.D. et al Pearson Education Canada
	9780132542616	Automotive Technology: Principles, Diagnosis, and Service, Fourth Edition	Halderman, J.D. Pearson Education Canada
	<b>Other Supplies</b>	<b>Source</b>	
	Safety glasses, safety boots		
<b>Prerequisite(s)</b>	AUTOTECH 2AE3, 2TS3		
<b>Corequisite(s)</b>	None		
<b>Antirequisite(s)</b>	None		
<b>Course Specific Policies</b>	<ul style="list-style-type: none"> <li>○ E-mail communication for this course is exclusively through Avenue Mail (from student's Avenue account to instructor's Avenue account).</li> <li>○ Lab attendance is mandatory. Lab participation and involvement are graded, and calculated as a multiplication of the two marks.</li> <li>○ The lab quizzes can be taken only if the corresponding lab was attended by the student.</li> </ul>		
<b>Departmental Policies</b>	<p>Students must maintain a GPA of 3.5/12 to continue in the program.</p> <p>In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of "out-of-class" work for every scheduled hour in class. "Out-of-class" work includes reading, research, assignments and preparation for tests and examinations.</p> <p>Where group work is indicated in the course outline, such collaborative work is mandatory.</p> <p>The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception.</p> <p>Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.</p> <p>Instructor has the right to submit work to software to identify plagiarism.</p>		
<b>3. SUB TOPIC(S)</b>			
Week 1	Spark-ignited and Diesel engine operation, parts and specifications Engine condition diagnostics	Chapter 4 Chapter 5	
Week 2	Ignition system operation and diagnostics Computers and sensors operation and diagnostics	Chapter 24 Chapter 25	
Week 3	Computers and on-board diagnostics Engine fuels and combustion	Chapter 26 Chapter 27	
Week 4	Gasoline and Diesel fuel injectors Emission control device operation	Chapter 29 Chapter 30	
Week 5	Clutches Manual transmission / Transaxles	Chapter 44 Chapter 45	
<i>Mid-term recess (Monday, October 12 to Saturday, October 17)</i>			
Week 6	<i>Term test #1 (2 hours)</i> Drive shafts and CV joints	Weeks 1...5 Chapter 46	
Week 7	Differentials	Chapter 47	

	Four-wheel drive and all-wheel drive	Chapter 48
Week 8	Automatic transmission / Transaxle principles	Chapter 49
Week 9	Brake systems principles and operation Master cylinders and the hydraulic systems Wheel bearings Drum brakes	Chapter 32 Chapter 33 Chapter 34 Chapter 35
Week 10	Disk brakes Power assisted brakes	Chapter 36 Chapter 38
Week 11	<i>Term test #2 (2 hours)</i> Antilock brakes Tires and wheels	<i>Weeks 6...10</i> Chapter 39 Chapter 40
Week 12	Steering systems Suspension systems Wheel alignment principles Project presentations	Chapter 41 Chapter 42 Chapter 43
Week 13	Project presentations	
Classes end – Tuesday December 8, 2015 Final examination period: Wednesday December, 9, 2015 to Tuesday, December 22, 2015 All examinations MUST BE written during the scheduled examination period.		
<b>List of experiments</b>		
Lab 1	Temperature sensors.	
Lab 2	Throttle position sensor. Electronic Throttle Control.	
Lab 3	Manifold Absolute Pressure (MAP) sensor.	
Lab 4	Mass Air Flow (MAF) sensor.	
Lab 5	Oxygen sensors diagnosis.	
<i>Mid-term recess (Monday, October 12 to Saturday, October 17)</i>		
Lab 6	Exhaust Gas Recirculation (EGR) systems.	
Lab 7	Brakes.	
Lab 8	Power steering.	
Lab 9	Torque convertor and clutches.	
Lab 10	Suspension.	
Lab 11	Four-wheel drive.	
Lab 12	Tiers and ABS system.	
Lab schedule	Some of the labs will be performed on a rotating basis. The actual lab schedule will be provided by the instructor.	
<p>Note that this structure represents a plan and is subject to adjustment term by term. The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.</p>		
<b>4. ASSESSMENT OF LEARNING *including dates*</b>		<b>Weight</b>
Lab attendance and involvement (individual)		10
Lab reports		10
Term Test #1		15
Term Test #2		15
Project (group)		15
Final examination (tests cumulative knowledge)		35
<b>TOTAL</b>		<b>100%</b>

Percentage grades will be converted to letter grades and grade points per the University calendar.

## 5. LEARNING OUTCOMES

1. Understanding of principles of operation and construction of the above listed subjects
2. Perform and evaluate mechanical and electronic measurements
3. Network handheld equipment to computer controlled systems for data analysis
4. Operate advanced electronic alignment equipment
5. Understand and operate chassis dynamometer
6. Be aware of gasoline and diesel engine requirements
7. Be familiar with sensory systems for temperature, pressure, G-force and rotary motion
8. Understand evaluation of systems efficiencies
9. Managing manufacturers technical information
10. Problem solving and diagnostic strategies

## 6. POLICIES

### Anti-Discrimination

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

<http://www.mcmaster.ca/policy/General/HR/Anti-Discrimination%20policy.pdf>

### Academic Integrity

You are required to exhibit honestly and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, located at: <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>.

The following illustrates only three forms of academic dishonesty:

1. Plagiarism. E.g. the submission of work that is not own or for which other credit has been obtained
2. Improper collaboration in group work
3. Copying or using unauthorized aids in tests and examinations.

### Requests for Relief for Missed Academic Term Work (Assignments, Mid-Terms, etc.)

The McMaster Student Absence Form is a self-reporting tool for **Undergraduate Students** to report absences that last up to 3 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately regarding the nature of the accommodation.

If you are absent more than 3 days or exceed 1 request per term you **MUST** visit your Associate Dean's Office (Faculty Office). You may be required to provide supporting documentation.

This form should be filled out immediately when you are about to return to class after your absence. <http://www.mcmaster.ca/msaf/>

### E-Learning Policy

Consistent with the Bachelor of Technology's policy to utilize e-learning as a complement to traditional classroom instruction, students are expected to obtain appropriate passwords and accounts to access Avenue To Learn for this course. Materials will be posted by class for student download. It is expected that students will avail themselves of these materials prior to class. Students should be aware that, when they access the electronic components of this course, private information such as first and last names,

user names for the McMaster e-mail account, and program affiliation may become apparent to all other students in the course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about this disclosure please discuss this with the course instructor. Avenue can be accessed via <http://avenue.mcmaster.ca>.

### **Communications**

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

### **Turnitin (Optional)**

This course will be using a web-based service (Turnitin.com) to reveal plagiarism. Students submit their assignment/work electronically to Turnitin.com where it is checked against the internet, published works and Turnitin's database for similar or identical work. If Turnitin finds similar or identical work that has not been properly cited, a report is sent to the instructor showing the student's work and the original source. The instructor reviews what Turnitin has found and then determines if he/she thinks there is a problem with the work. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to

<http://www.mcmaster.ca/academicintegrity/turnitin/students/>

### **Protection of Privacy Act (FIPPA)**

The Freedom of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and posting of grades must be done in a manner that ensures confidentiality.

<http://www.mcmaster.ca/univsec/fippa/fippa.cfm>

### **Academic Accommodation of Students with Disabilities Policy**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail [sas@mcmaster.ca](mailto:sas@mcmaster.ca). For further information consult McMaster's policy for Academic Accommodation of Students with Disabilities

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

Students must forward a copy of the SAS accommodation to the instructor of each course and to the Program Administrator of the B.Tech. Program immediately upon receipt. If a student with a disability chooses NOT to take advantage of a SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. <http://sas.mcmaster.ca>

### **Student Code of Conduct**

The Student Code of Conduct (SCC) exists to promote the safety and security of all the students in the McMaster community and to encourage respect for others, their property and the laws of the land. McMaster University is a community which values mutual respect for the rights, responsibilities, dignity and well-being of others. The purpose of the Student Code of Conduct is to outline accepted standards of behavior that are harmonious with the goals and the well-being of the University community, and to define the procedures to be followed when students fail to meet the accepted standards of behavior. All students have the responsibility to familiarize themselves with the University regulations and the conduct expected of them while studying at McMaster University.

<http://judicialaffairs.mcmaster.ca/pdf/SCC.pdf>