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Office hours: Refer to the posted office hour schedule.

AUTO 2475 AV Technology and Application.

Course Description.

This course builds on the AUTO 2470 ADAS Technology and Application and makes a connection between the various ADAS technologies and the logical conclusion – fully autonomous vehicles. Neural networks and AI (Artificial Intelligence) in the context of autonomous vehicles will be explored. Human-machine interfaces will be discussed.
(4 credits /2cl /2l)

Prerequisites.

AUTO 2470 ADAS Technology and Application or Instructor approval.

Course Focus:

Students successfully completing this class will have gained a fundamental understanding of autonomous vehicle technology and understand the importance of proper calibration and use of these systems.

Text, References, and Materials:

Instructor and manufacturer provided material as needed.
In the lab you will have use of a basic hand tool set, or you can use your own tools. You are solely responsible for the tools and tool box. You will receive an inventory sheet where all the tools provided are listed and you will sign off that you did receive all the items. Keep the tool box key with you at all times and keep the tool box locked when you are not immediately using it. Since you are responsible for the tools, this is just common sense. Remember, since this is the 4th and final semester you will be working alone and on your own as much as is practical. At school you are required to wear uniform shirts. We provide you with 2 uniform shirts that are yours. You are welcome to purchase more. You are responsible for the upkeep of these shirts.
While enrolled in the program you are required to have use of a laptop capable of running the software we will use in our daily class and lab activities. **You cannot be reliant on the program laptops.**
While in the lab you are required to wear safety glasses and approved work boots. You may also be required to wear High Voltage protective gear, depending on activities performed. You will be using a complete ADAS calibration system and an ADAS equipped vehicle with autonomous capabilities along with relevant service information.

Class goals/objectives:

The following list of goals will be addressed during the class and lab activities:

Unit 1: Interpersonal skills.

1. Show professional conduct.
2. Display ability to resolve conflicts.
3. Demonstrate effective communication skills with customers.
4. Being able to relate to customers at their level.
5. Be reliable.
6. Be punctual.
7. Show willingness to go above and beyond to resolve vehicle repair issues.

Unit 2: Fundamentals of autonomy specifically related to machinery and vehicles.

1. The different levels of autonomy or self-driving capabilities in vehicles.
2. The past, now, the future.
3. Hardware requirements.
4. Software requirements.
5. Calibration requirements.
6. AI.

Unit 3. Ethical considerations.

1. Who is responsible when something goes wrong?
2. What choices should the software/AI make in different scenarios?

This course is web enhanced. Most all of the home work and testing will be performed on line. Most all presentations and handouts used in class will also be available online. This means that internet access is required to successfully complete this course. The school library has computers for use, if you do not have internet access at home.

Course Focus

Autonomous vehicle technology and human/machine interfaces.

Course Schedule.

Please refer to Brightspace for the class schedule for this and any other classes.

Goal types, objectives, and outcomes.

Students will be able to: Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them. Articulate and defend the actions they would take on various issues.

See the Master Course Outline (MCO) for further information regarding goals, objectives, and outcomes.

The following list of course specific goals will be addressed in the course. These goals are related to the stated performance objectives.

1. Gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive, and conscious of possible bias in the information selected.
2. Analyze the logical connections among the facts, goals, and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.
3. Interpret test results to develop a diagnosis of an automotive electronics fault.
4. Read vehicle wiring diagrams.
5. Use wiring diagrams to diagnose circuits.
6. Use various types of test equipment.
7. Use an oscilloscope for diagnostic purposes.
8. Use a scan tool for diagnostic purposes.
9. Test operation of vehicle accessories.

Student Contributions and Commitment:

You have decided to come to school and learn a trade. This trade will enable you to earn a good living and support those you care about. However, to be successful in your endeavor, you must resolve to make a commitment to spend the necessary time and effort in class, on homework, as well as in the lab. Good attendance does not in and of itself guarantee success, but poor attendance does guarantee failure.

If you have commitments outside of school, such as children, sick family members or other, be sure to have a "family plan" in place. Example; who takes care of your children if the child care is closed?

If at any time during the semester you are having academic difficulties or are thinking about withdrawing from the class, please contact me immediately. If you are having personal difficulties or problems preventing you from being successful, contact the Riverland counselors by email at counselors@riverland.edu or call 1-800-247-5039 to schedule a counseling appointment.

Each student is expected to spend at least 16 hours per week preparing for class. In general, homework will be assigned on a daily basis. Plan on spending some non-class/lab time completing your homework.

A brief description of the lab projects is incorporated into this syllabus. You can choose to do the lab projects in any order, using sound judgment.

Students are asked to refrain from text messaging or making phone calls during class periods. Students creating a disturbance during class will be asked to leave. Students not in compliance with any safety procedure may be dismissed from the shop area.

You must have a valid driver's license in order to be able to operate a vehicle. If you do not have a license, or if you lose your license, you must notify the instructor and abstain from driving any vehicles during the class.

Attendance policy:

For the purpose of this policy, the following definitions are used:

- Work is defined as homework, tests, lab work, or any other given assignment.
- An excused absence is an absence where you have notified your instructor prior to 8am on the day that you will miss time by sending an email to olle.gladso@riverland.edu or by leaving a message on (507) 379-3347.
- An unexcused absence is defined as not being present and no message given by the above means.
- An excepted absence is an absence caused by military service or a medical emergency.

Work that is missed due to unexcused absences cannot be made up. Unexcused absences will affect the professionalism grade. Each unexcused absence will result in the loss of 1 professionalism point. (We do this, because the industry tells us absenteeism, especially without notification, is one of the bigger problems affecting their ability to conduct business effectively)

If you do have an excused or excepted absence, you will have 1 week from your return to class to make up missed work. Excepted absences require proper documentation, such as a note from the doctor.

No work is accepted after 4 pm on the last day of the class.

Make-up class or lab sessions may be offered, at the discretion of the instructor, but only for work missed due to excepted absences.

Absenteeism will affect the professionalism grade. Attendance is tracked and 25 out of the available 100 professionalism points are assigned to attendance.

Academic honesty policy:

Refer to the student handbook for the academic honesty policy at Riverland Community College.

Accommodations:

If you have a disability and need accommodations to participate and succeed in this course, please contact your instructor within one week of the first class day. The course information can be made available in alternative format, such as Braille, large print, or in an audio format, upon request.

Faculty absence.

Students are reminded that faculty absences will be posted on the Riverland Website and if the instructor is able, on each course's Brightspace site along with any information concerning alternate assignments for the time the instructor is absent.

College closure.

For information related to possible College Campus closure due to weather or other issues, please go the Riverland Community College website at <http://www.riverland.edu/current-students/> for further information and/or instructions. Students are encouraged to register for the free cell phone or email StarAlert emergency notification system. Accommodations.

ADA statement and accommodations information.

Riverland Community College is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Accessibility Services (AS) to

establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, AS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at: <https://www.riverland.edu/student-services/accessibility-services/>

The course material and information will be made available in alternative formats such as braille, large print, or audio upon advanced request by informing <https://www.riverland.edu/student-services/accessibility-services/>

Veterans support statement.

Riverland is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with schedule course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Veterans Services Office at <https://www.riverland.edu/admissions/studenttype/veterans-military-members/>

Institutional learning outcomes.

This course addresses the following Riverland Institutional Learning Outcome(s):

ILO 1: Critical thinking.

ILO 4: Communication and collaboration.

Affirmative action statement.

Riverland Community College is an affirmative action, equal opportunity employer and educator accredited by the Higher Learning Commission. Individual college programs are accredited by other associated professional organizations. For more information, go to <http://www.riverland.edu/about-riverland/policies-and-procedures/> to review the Equal Opportunity and Nondiscrimination in Employment and Education Policy or to complete the online Complaint Form.

Covid 19 procedures:

The delivery method of this course may change to ensure the safety of the students and faculty. These changes may come through the governor's executive orders or college administration. These adjustments may include but are not limited to:

- Adjustments to the amount of on-campus course sessions and online learning
- Adjustments to the course assignment due dates
- Additional accommodations for students to complete tests, labs and assignments

If changes are needed, I will communicate with you as soon as possible via email, Brightspace or in-person during class time regarding any adjustments necessary to the course because of COVID-19. Face masks are optional at this time, but procedures are subject to change.

You are responsible for attending class regularly and checking D2L Brightspace and your Riverland email every day to stay informed of any changes to your courses.

If you are sick: you need to stay home and contact me immediately.

In order to help ensure the safety of the other students in the class, I will help you with the proper procedures to get tested, and the MN Dept of Health will guide us with the length of time you need to quarantine and notify others properly. If you need to miss class due to COVID 19 or another valid reason which prevents you from completing course work, I will work with you to determine the best type of absence accommodation.

This may require you to complete your coursework in a different method or schedule to complete the learning objectives of the course.

Course Evaluation:

Your grade is available on D2L at any time and is calculated as follows:

- 25% of your grade is based on home work performance.
- 25% of your grade is based on test performance.
- 25% of your grade is based on lab performance. *(The lab grade may possibly not be up to date at any given time.)*
- 25% of your grade is based on professionalism and attendance.

The combined average grade cannot be less than 72 and is assigned as a letter grade using the following table:

<72%	F
>72%	D-
>74%	D
>76%	D+
>78%	C-
>80%	C
>82%	C+
>84%	B-
>86%	B
>88%	B+
>90%	A-
>94%	A

You must also pass a shop competency with 100% accuracy. The competency can be found in the worksheet booklet for this class

Meeting times:

Refer to Brightspace for the meeting times of this class.

Lab projects:

Some projects may be graded on the flat rate time given for that project. For the actual number of each project that you must perform, please refer to the work sheet booklet.

- Successfully and completely set up an AV calibration system including targets.
- Successfully and completely perform a complete AV system calibration on a suitable vehicle.
- Successfully perform a road test to verify AV system calibration and performance.
- Successfully perform an AV system problem diagnosis.
- Successfully perform an AV system problem repair.