Course: *Alignment Fundamentals* **Unit #:** Unit 4 - Advanced Driver Assistance Systems	**Year of Implementation:** 2024-2025
Curriculum Team Members: *Kevin Dybalski (kdybalski@lrhsd.org), Rebecca Ellis (rellis@lrhsd.org)*	

Stage One - Desired Results

Link(s) to New Jersey Student Learning Standards for this course:
{provide all applicable links to standards here}
https://www.state.nj.us/education/cccs/2020/

- **Unit Standards:** *(keep each of the following headings in place)*
  - ***Content Standards***
    - 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data.
    - 9.3.ST.6 Demonstrate technical skills needed in a chosen STEM field.
    - 9.3.ST-ET.5 Apply the knowledge learned in STEM to solve problems.
    - 9.3.ST-ET.6 Apply the knowledge learned in the study of STEM to provide solutions to human and societal problems in an ethical and legal manner.
    - 9.3.12.TD-MTN.2 Design ways to improve facility and equipment system performance.
    - 9.3.ST-SM.1 Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.
    - 9.3.ST-SM.4 Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data.
  - ***21st Century Life & Career Standards***
    - All curriculum writers/revisionists need to include standards that apply to “Career Readiness, Life Literacies, and Key Skills”. This should include a brief description of the standard and the standard number. Document only those standards and practices that apply to each unit. Use the following link to assist you [see pages of 31-36; 41-42; 53-56 for specific standard #’s and strands] https://www.state.nj.us/education/cccs/2020/2020%20NJSLS-CLKS.pdf
  - ***English Companion Standards***

- RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

- RST.11-12.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics

- ***Interdisciplinary Content Standards***
  - NJSLS-Math G-GMD.B.4 **-** Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
  - NJSLS-Math G-MG.A.1 - Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
  - NJSLS-Math G-MG.A.2 - Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
  - NJSLS-Math G-MG.A.3 - Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
  - NJSLS-Math N-Q.A.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
  - NJSLS-Math N-Q.A.2. Define appropriate quantities for the purpose of descriptive modeling.
  - NJSLS-Math N-Q.A.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

- ***NJ Statutes:*** NJ State law mandates the inclusion of the following topics in lesson design and instruction as aligned to elementary and secondary curriculum.

  Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocides in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A.18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion (N.J.S.A. 18A:35-4.36a) A board of education shall incorporate instruction on diversity and inclusion in an appropriate place in the curriculum of students in grades kindergarten through 12 as part of the district's implementation of the New Jersey Student Learning Standards.

Asian American and Pacific Islanders (AAPI) P.L.2021, c.410 Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416)

For additional information, see

NJ Amistad Curriculum: ***https://www.nj.gov/education/amistad/about/***

Diversity and Inclusion: ***https://www.nj.gov/education/standards/dei/index.shtml***

- *(Sample Activities/ Lessons):* ***https://www.nj.gov/education/standards/dei/samples/index.shtml***

Asian American and Pacific Islanders:

- ***Asian American and Pacific Islander Heritage and History in the U.S.***
  A Teacher's Guide from EDSITEment offering a collection of lessons and resources for K-12 social studies,

literature and arts classrooms that center around the experiences, achievements and perspectives of Asian Americans and Pacific Islanders across U.S. history.

Transfer Goal: Students will be able to independently use their learning to *evaluate and calibrate Advanced Driver Assistance Systems in order to produce a complete vehicle alignment.*

As aligned with LRHSD Long Term Learning Goal(s):https://www.lrhsd.org/Page/6163

1. understand the impact of technology in addressing real-world problems, enhancing life, and extending human capabilities to meet the challenges of 21st century society
2. evaluate careers using critical thinking and problem-solving skills to respond to changing societal and economic conditions
3. communicate and collaborate using appropriate technical terms to describe, analyze, interpret, and judge their work and the work of others
4. acquire, integrate, and apply design processes and essential technical skills to solve problems, create products, and improve the quality of life for our local and global community

Enduring Understandings Students will understand that. . . *EU 1* ● advanced driver assist systems reduce accidents, protect property, and save lives.	*Essential Questions* ● *How do advanced driver assist systems help drivers arrive at their destination safely?* ● *How do advanced driver assist systems help reduce insurance premiums?* ● *How do advanced driver assist systems rely on road maintenance to ensure safety?* ● *Who is responsible for the property loss in the event of an accident if the advanced driver assist system fails?*

Knowledge *Students will know . . .* *EU 1* ● the components and operating systems of the advanced driver assist systems. (9.3.12.ED.10, 9.3.ST-SM.4) ● how the steering and advanced driver assist systems are interrelated. (9.3.ST-ET.5, 9.3.ST-SM.4) ● how to properly use the advanced driver assist calibration system to maintain the vehicle. (9.3.ST-ET.5, 9.3.ST-SM.4) ● where to find manufacturer specifications for the advanced driver assist systems. (9.3.ST-SM.4, RST.9-10.5, NJSLS-Math N-Q.A.3)	*Skills* *Students will be able to. . .* *EU 1* ● identify and illustrate proper operation of suspension system components (9.3.12.ED.10, 9.3.ST-SM.4) ● demonstrate proper procedure for inspecting the advanced driver assist systems. (9.3.ST-ET.5, 9.3.ST-SM.4) ● set up trainer vehicles to illustrate various adjustments to the advanced driver assist systems. (9.3.ST-ET.5, 9.3.ST-SM.4) ● complete a vehicle calibration using the advanced driver assist link to manufacturer specifications. (9.3.ST-SM.4, RST.9-10.5, NJSLS-Math N-Q.A.3)
Stage Two - Assessment	

-

Stage Three - Instruction

Learning Plan: **Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.** *{place A, M and/or T along with the applicable EU number in parentheses after each statement} All knowledge and skills must be addressed in this section with a corresponding lesson/activity which teaches each concept. The following color codes are used to notate activities that correspond with interdisciplinary connections and 21st Century Life & Career Connections (which involves Technology Literacy): Red = Interdisciplinary Connection; Purple = 21st Century Life & Career Connection*

For example:

- *Safety Videos (A, EU 1)*
- *ADAS component identification (A, EU 1)*
- *ADAS equipment identification (A, EU 1)*
- *Teacher led demonstrations on ADAS equipment (A, EU 1)*
- *Teacher led demonstrations on measuring devices (A, EU 1)*
- *Activity on using ADAS equipment (M, EU 1)*
- *Activity on using measuring equipment (M, EU 1)*
- *Student demonstrations on ADAS equipment (T, EU 1)*
- *Student practical on ADAS equipment use (T, EU 1)*

Pacing Guide

{This chart will be identical in all of the units for this course.}

Unit #	***Title of Unit***	***Approximate # of teaching days***
1	Safety, Equipment and Measurement	12
2	Steering and Suspension Systems	12
3	Alignment Geometry & Procedures	31
4	Advanced Driver Assistance Systems	12

Instructional Materials

{Provide a list of all instructional materials used for this curriculum here. Items such as chromebooks and teaching tools such as Peardeck, EdPuzzle, etc… should NOT be listed.}

Modern Automotive Technology 9th Edition, Goodheart-Wilcox
Hunter Engineer Company Alignment Fundamentals Training Guide
Hunter Engineer Company Intermediate Wheel Alignment Training Guide
Hunter Engineer Company Advanced Tire and Wheel Service Training Guide
Tire Changer
Tire Balancer
Hunter Alignment Machine
Advanced Driver Assist Link and Sensor Board
Shop Vehicle

Accommodations

Special Education: The curriculum will be modified as per the Individualized Education Plan (IEP). Students will be accommodated based on specific accommodations listed in the IEP.
Students with 504 Plans: Students will be accommodated based on specific accommodations listed in the 504 Plan.
English Language Learners: Students will be accommodated based on individual need and in consultation with the ELL teacher.
Students at Risk of School Failure: Students will be accommodated based on individual need and provided various structural supports through their school.
Gifted and Talented Students: Students will be challenged to enhance their knowledge and skills through acceleration and additional independent research on the subject matter.