Course: *Automotive Diagnostics* **Unit #:** *3 - Diagnostics and Repair*	**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-ET.1 Use STEM concepts and processes to solve problems involving design and/or production.
    - 9.3.ST-ET.2 Display and communicate STEM information.
    - 9.3.ST-ET.3 Apply processes and concepts for the use of technological tools in STEM.
    - 9.3.ST-ET.4 Apply the elements of the design process.
    - 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.
  - ***21st Century Life & Career 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.1 Use STEM concepts and processes to solve problems involving design and/or production.
    - 9.3.ST-ET.4 Apply the elements of the design process.
  - ***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***
  - N-Q.A.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  - HS-ETS1-3 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

- ***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 *develop an efficient plan using the design process and implement a repair procedure in regards to a vehicle's driveability and performance.*

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* ● correctly repairing a vehicle is essential in maintaining a vehicle as well as the business relationship to the owner of the vehicle. ● automotive technology is constantly changing and requires continuous education and training.	*Essential Questions* ● *How can you most efficiently repair a vehicle?* ● *Why would you need additional training in the field of automotive?* ● *What changes in the future could require new training in automotive technology?*
Knowledge *Students will know . . .* *EU 1* ● the importance of time management when working on a vehicle. (9.3.ST-ET.6) ● the fundamentals of various systems of an automobile. (9.3.12.TD-MTN.2) ● how various systems are interrelated and can affect each other. (HS-ETS1-3) ● the difference between a vehicle's driveability and performance. (RST.9-10.5) ● the design process and how it is applied in the automotive field. (9.3.ST-ET.4)	*Skills* *Students will be able to. . .* *EU 1* ● use prodemand software to create an invoice. (9.3.ST.2) ● repair common vehicle system malfunctions. (9.3.ST-ET.4) ● perform service procedures for various systems. (9.3.ST.2) ● demonstrate use of equipment to repair vehicle malfunctions (9.3.ST.2) ● create a plan of various service procedures. (9.3.ST-ET.4) ● investigate technical service bulletins (9.3.ST-ET.4) ● use prodemand to assist in the repair procedure. (9.3.ST-ET.4)

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:

- *Teacher led discussion on the design process (A, EU1)*
- *Student demonstration on the design process (M, EU1)*
- *Teacher demonstration on the prodemand software (A, EU1)*
- *Student demonstration on the prodemand software (M, EU1)*
- *Teacher demonstration on using technology resources to brainstorm*
- *Activity on using youtube for brainstorming plans (T, EU1)*
- *Activity on using ProDemand software for finding various TSB's (T, EU1)*
- *Activity on vehicle creating repairs to various vehicle malfunctions (T, EU1)*
- *Student research on finding manufacturer specifications in regards to torque (M, T, EU1)*

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	12
2	Pre-Service Inspection	12
3	Diagnostics and Repair	43

Instructional Materials

Modern Automotive Technology 9th Edition, Goodheart-Wilcox
Pro Demand Software
OBD scan tools
Shop vehicle
Measurement equipment calipers, micrometers, vacuum gauges, pressure gauges, alignment machine, tire balancing, etc.

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.