Engine System Engineering

Syllabus Number 1L305
Special Subjects
Elective 2 credit

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1. Course Description

Learn the following:
(1) Structure and function of fuel system
(2) About fuel injection control of the electronic control unit
(3) Structure and function of gasoline engine and hybrid
This class is mainly a lecture style, but the exercises are conducted in a pair work, and the answers are presented by everyone, and all the members discuss.
In this class, students will acquire knowledge, techniques, and attitudes regarding the degree awarding policy DP2, DP3, and DP4.

2. Course Objectives

Students can gain basic knowledge of electronic control systems by understanding the function and structure of each part related to the electronic control system of the car engine, and explain the contents of the engine control system required for the car engineer . Students will be able to use the engine system theory they have acquired to develop the ability to envision the future of engines for a sustainable society.

3. Grading Policy

Grade 15 (80%) and quiz (20%).
After the test and quiz are finished, the answer will be explained. An example answer is shown in LMS.

4. Textbook and Reference

Textbook
Supervised by the Ministry of Land, Infrastructure, Transport and Tourism Third-class automobile gasoline engine Japan Automobile Development Association Federation No ISBN code listed
Supervised by the Ministry of Land, Infrastructure, Transport and Tourism Second-class gasoline car engine Japan Automobile Development Association Federation No ISBN code listed
Teruo Sai Introduction to internal combustion engine engineering Ohmsha ISBN978-4-274-22082-1
Reference
Automotive technology handbook Japan Society for Automotive Engineers ISBN978-4-904056-59-2

5. Requirements(Assignments)

As a preparation course, please read the class contents posted on the LMS and read through the applicable range of textbooks and reference books to understand the contents. In addition, some homework such as assignments will be shown almost every time, so please do it by the next round. Approximately one hour for preparation and two hours for assignments and reviews.

6. Note

Strictly check for late / early leave / absence.
A quiz will be conducted in the 7th session to confirm intermediate understanding. In addition to using the LMS for self-directed learning support, we will also implement Mobile-MARS test and questionnaire functions as an interactive class.

7. Schedule

[1] Fuel and lubricant
Preparatory training: Read through the third grade textbooks P135-140 and understand fuel for automobiles
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[2] Outline, structure and function of fuel system (injector, fuel pump, pressure regulator, etc.)
Preparation: Read textbooks P51-53 to understand the outline of fuel injection system for automobiles
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[3] Structure and function of fuel system (fuel tank, fuel filter, etc.)
Preparation: Read through the third grade textbooks P69-73 to understand the fuel supply sources of automobiles
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[4] Structure and function of fuel system II (LPG, etc.)
Preparation: Read through two textbooks P53-56 to understand LPG fuel and its fuel supply equipment
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[5] Overview of OBD regulations and functions of J-OBD II
Preparation: read through two textbooks P105-106 and understand external diagnostic equipment
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[6] Structure and function of electronic control device Air flow detection device (vacuum sensor, air flow meter, etc.)
Preparation: Read through the two textbooks P106-108 and understand the electronic control unit of the engine.
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[7] Structure and function of electronic control device Air flow detection device (throttle position sensor, etc.) and small test
Preparation: Read through the two textbooks P108-109 and understand the electronic control unit of the engine.
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[8] Structure and function of electronic control unit {frequency signal sensor} etc.
Preparation: Read through the two textbooks P109-113 to understand the electronic control unit of the engine
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[9] Structure and function of electronic control unit (linear signal sensor, ON / OFF signal sensor), etc.
Preparation: Read through the two textbooks P113-117 to understand the electronic control unit of the engine
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[10] Structure and function of electronic control unit actuator drive circuit
Preparation: Read through the two textbooks P117-119 and understand the electronic control unit of the engine.
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[11] Structure and function of electronic control unit 装置 ECU control (control at start, control after start, etc.)
Preparation: Read through the two textbooks P119-120 and understand the electronic control unit of the engine
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[12] Structure and function of electronic control unit 装置 ECU control (air-fuel ratio learning control, various corrections, etc.)
Preparation: Read through the two textbooks P121-128 and understand the electronic control unit of the engine.
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[13] Structure and function of ignition control device 装置 ECU control (ignition timing control, energization time control, etc.)
Preparation: Read through the two textbooks P129-135 and understand the electronic control unit of the engine.
Review: Re-understand the contents of the lecture range based on LMS teaching materials

[14] Presentation and general discussion on the issues
Preliminary lesson: Learn about a given task and create a presentation or report
Review: Consider the subject again based on the content announced on the day of the lecture

[15] Test, Summary