

# Module Descriptions

Department of Mechanical Skills

Automotive Maintenance Skills

# Module Descriptions

**Department of Mechanical Skills**

**Automotive Maintenance Skills**

**2009**





# DEGREE PLAN

## Automotive Maintenance Skills (AUMT)

### Level 1

Sr.	Module Code	Module Name	Contact Hours
1	AUMT125	Basics and General Information	32
2	AUMT126	Basics of Engine	72
3	AUMT127	Basics of Electricity and Body Electrical	104
4	AUMT128	Basics of Drive Train and Chassis 1	32
5	ENG102	English Communication 1	24
<b>TOTAL HOURS</b>			<b>264</b>

### Level 2

Sr.	Module Code	Module Name	Contact Hours
1	AUMT229	Basics of Drive Train and Chassis 2	72
2	AUMT230	Engine	72
3	AUMT231	Basics of Preventive Maintenance and Pre-Delivery Inspection	64
4	AUMT232	Engine Major Service	32
5	ENG203	English Communication 2	24
<b>TOTAL HOURS</b>			<b>264</b>

### Level 3

Sr.	Module Code	Module Name	Contact Hours
1	AUMT333	Advance Technical Systems and Body Electrical	112
2	AUMT334	Engine Overhauling	64
3	AUMT335	Drive Train and Trouble Shooting 1	64
4	TRWT304	Technical Report Writing 1	24
<b>TOTAL HOURS</b>			<b>264</b>

### Level 4

Sr.	Module Code	Module Name	Contact Hours
1	AUMT436	Drive Train and Trouble Shooting 2	48
2	AUMT437	Chassis-Suspension and Brake System	72
3	AUMT438	Steering Mechanism and Wheel Alignment	72
4	AUMT439	Air Conditioning System and Trouble Shooting	48
5	TRWT405	Technical Report Writing 2	24
<b>TOTAL HOURS</b>			<b>264</b>

### Coop (15 Weeks)

Sr.	Module Code	Module Name	Equivalent Contact Hours
1		Cooperative Training Program	<b>128</b>

Prerequisite —

Level 1

Contact Hours: 32

**Module Description**

This module covers Toyota technical programs, Safety in the shop work, Vehicles specification and classifications, Service hand tools and special service tools, classification of bolts & nuts, Disassembling the engine & acknowledge of components and knowing oil specification for oils & fuel used in the vehicle.

**Objectives**

- Acknowledge with the different safety measures in the shop
- Learn basics of electricity
- It develops to illustrate vehicle specification
- Disassembly and assembly of engine
- Identification and knowing oil and fuel specification

**Learning Outcomes**

- After completing this module the student will be able to:
- Know the different safety measures in the work shop
- Know different types of tools and equipments
- learn to determine oil, grease and fuel specification.
- Disassemble and assemble engine

**Contents**

- Safety in the shop
- Vehicle specifications and engine classification
- Service tools and special service tools
- Bolts and Nuts
- Disassembling engine, knowledge of its components and how to use tools/equipment
- Knowing oil specification for oils and fuel used in the vehicle
- Oil and grease specification

Prerequisite —

Level 1

Contact Hours: 32

### Pacing Schedule

Contact Hours	Contents	Skills Gained
2	<b>Introduction on training programs &amp; technical training. The ten principles for a better technicians</b>	Learn general information about automobile
	History of the development of Automobiles	
	A short history of the principal products and technologies of Toyota	
	What is Toyota technicians	
	The 10 principles of better workmanship for technicians	
	5 S' of good technician	
2	<b>Safety in the Shop</b>	Learn safety measure
	Description	
	Work clothes	
	Safe and Tidy work	
	Fire Prevention	
	Electrical Equipment	
2	<b>Vehicle Specifications</b>	Can tell the size of a car its performance and other important general information
	Vehicle dimension and weights	
	Performance	
	Engine specifications	
2	<b>Tools and Measurement</b>	Able to use handtools and SST measuring tools
	Hand tools	
	Special service tools	
	Measuring tools	

Prerequisite —

Level 1

Contact Hours: 32

### Pacing Schedule

Contact Hours	Contents	Skills Gained
6	<b>Bolts and nuts</b>	Able to identify and measure different kinds of bolts and nuts
	Specifications of Nuts and Bolts	
	Types of Nuts and Bolts	
	Locking method	
	Bolt tightening	
	Plastic and elastic region bolt tightening	
2	<b>Fuels and Lubricants</b>	Learn to distinguished the different kinds of fuels, lubricants, fluids, sealants and engine anti freeze
	Fuels	
	Lubricants	
	Fluids	
	Sealants	
	Engine Anti-freeze	
16	<b>Disassembling Engine</b>	Able to differentiate between gas engine to diesel engine and also able to disassemble and assemble engine
	Operating Principles of Gas and Diesel engine	
	Construction of Gas and Diesel engine	
	Lubricating system	
	Cooling system	
	Fuel system	
	Ignition system	
	Intake and Exhaust system	

Reference:

Toyota books and manuals

**Module Description** This module covers basic of gas and diesel engine principles of operation, assemble and disassemble, function of each parts, fuel system, ignition system, cooling system and lubricating system.

- Objectives**
- Describe the working principles of internal combustion engine
  - Identify all engine parts and their function
  - Able to assemble and disassemble engine components
  - Able to identify and learn the function of engine systems

- Learning Outcomes** After completing this module the student will able to:
- Acquire knowledge about the theory of internal combustion engine
  - Disassemble and assemble and internal combustion engine by using proper handtools
  - Acquire knowledge about loosening and tightening method of bolts used in the engine
  - Learn the systems of gas and diesel engine operation

- Contents**
- Theory of Internal Combustion Engine ways of ignition
  - 4 stroke and 2 stroke cycle
  - Disassembly for engine components & usage of hand tools
  - Engine block disassembly and lubrication system illustration
  - Assembly of engine block
  - Cylinder head assembly and bolts tightening method and timing
  - Gasoline fuel system and carburetor
  - Gasoline fuel system & electronic fuel injection
  - Gasoline ignition systems
  - Diesel fuel and ignition systems
  - Diesel fuel and ignition systems
  - Intake and Exhaust system

Prerequisite —

Level 1

Contact Hours: 72

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
14	<b>Theory of internal combustion engine ways of ignition</b>	
	Operating principles of gasoline engine	
	Piston and crank mechanism	
	Construction of gasoline engine	
	Gasoline engine power	
28	<b>Disassembly for engine components and usage of hand tools</b>	
	Cylinder block construction	
	Cylinder head construction	
	Types of combustion chamber	
	Cylinder head gasket	
	Oil pan	
	Piston and piston rings	
	Connecting rod, piston pin and bearings	
	Flywheel	
	Valve mechanism	
28	<b>Engine systems</b>	Able to differentiate between gas engine to diesel engine and also able to disassemble and assemble engine
	Gas and diesel fuel system	
	Gas and diesel ignition systems	
	Lubricating system	
	Cooling system	
	Intake and exhaust system	

Reference:  
Toyota books and Manuals

**Module Description**

This module covers Toyota technical programs concerning the basic understanding of electricity, acquire full knowledge about fundamentals of electricity in order to be able to understand the construction and operation of electrical devices used in automobiles based on the established properties and action of electricity.

**Objectives**

- Makes the student understand the components of substances and movement of electrons
- Know types of Electricity
- How to measure current, voltage and resistance
- Illustration of circuit components
- Describe Ohms Law

**Learning Outcomes**

After completing this module the student will be able to:

- Explain the composition of substance in which divided into smaller substance without altering its original nature.
- Distinguish types of electricity and their properties
- Identify the relation between voltage, current and resistance
- Connect and measure resistance in series and in parallel circuit
- Calculate electrical power in a circuit
- Identify electrical components and main circuit in the vehicle

**Contents**

- Basic of electrical and format substance
- Types of electricity
- Voltage, current & resistance
- Electrical circuits
- Ohm's Law
- Connecting of resistances
- Electrical power
- Effect of electrical current
- Components of electrical circuits in the vehicle
- Main electrical circuits in the vehicle

Prerequisite —

Level **1**

Contact Hours: **104**

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
5	Basic of electrical and format substance	Theory
	Composition of substance	
4	Types of Electricity	Theory
	Static electricity	
	Dynamic electricity	
5	Electric Current	Theory
	what is electric current	
	The unit measurement of electric current	
	Action cause by electric current	
5	Voltage and Resistance	Measurement and calculation voltage
	Voltage and electromotive force	
	The unit measurement of voltage and electromotive force	
	Electrical Resistance – conductors, semi conductors and non conductors	
	The unit measurement for electrical resistance	
10	Electrical Circuits	Theory
	Basic theories of electrical circuits	
	Load	
	Automotive electrical circuits	
10	Ohm's Law	Computation of voltage, current and ohms law
	What is Ohm's Law	
	Application of Ohm's Law	
10	Connecting of Resistance	Computation of voltage, current and ohms law Learn to connect the following connection
	Series connection	
	Voltage drop	
	Parallel Connection	
15	Series and parallel	Theory and application
	Electrical Power	
	Electric Power	
10	Work done by electricity	Theory
	Effect of electric current	
	Heat generating action of electric current	
	Magnetic action of electric current	
	Learn to check connections	Components of electrical circuit in the vehicle
		How to check connector
		Handling precautions
		Normal circuit
20	Short circuit	Theory and practical skill in different circuits
	Increase in total circuit resistance	
	Main electrical circuit in the vehicle	
	Ignition, starting and charging	
	Lighting circuit	
	Signals and meters	
Wiper and washing system		
	Additional electrical circuits	

Reference: Toyota books and Manuals

**Module Description**

This module covers basics of Drive Train and Chassis mainly Manual and Automatic Transmission, Differentials, Drive shafts clutch. It also covers the chassis components like suspension, brake systems, steering mechanism, wheels, wheel alignment and tires.

**Objectives**

- Illustrate the power flow of drive train
- Describe each function and usage of drive train components
- Disassemble and assemble components of drive train

**Learning Outcomes**

After completing this module the student will be able to:

- illustrate and describe the power flow in the drive train
- Identify drive train and chassis components

**Contents**

- Illustration for drive train system
- Clutch
- Manual transmission for front engine-front drive(FF)
- Manual transmission front engine-Rear drive(FR)
- Automatic transmission

Prerequisite —

Level **1**

Contact Hours: **32**

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
10	Illustration of drive train	Theory
	Outline of the drive train	
	Clutch	Naming of parts and their function. Assemble and disassemble of parts
	Clutch assembly	
	Clutch cover assembly	
	Clutch disc	
	Operating mechanism	
	Checked and adjustment of clutch	
10	Manual Transmission	Naming of parts and their function. Assemble and disassemble of parts
	Description	
	Gear combinations	
	Transmission for FR ( Front – engine Rear – drive ) vehicles	
	Shafts and Gears	
	Gear shift control mechanisms	
6	Automatic Transmission	Naming of parts and their function. Assemble and disassemble of parts
	Description	
	Torque converter	
	Planetary gear	
	Propeller shaft	
6	Outline of the chassis	Naming of parts and their function. Assemble and disassemble of parts
	Suspension	
	Steering	
	Brake system	
	Wheels, wheel alignment and Tires	

References :  
Toyota books and manuals

**Module Description** English Communication 1 is a module for level 1 students of specialization program, as part of the English communicative competence requirement for their diploma. The module is built around a communicative competency-based program that focuses on general English language skills and workplace competencies.

- Objectives**
- To help students build on and enhance EL proficiency achieved at level 4 of BSEL 406.
  - To help them achieve target language competencies required at work.
  - To help them learn and practice the same competencies for job success.

- Learning Outcomes** At the end of the course the students will be able to:
- Illustrate points and express preferences.
  - Listen to and speak about job safety and team work.
  - Participate effectively in meetings.
  - Tell about cause and effect.
  - Express disapproval, make counter-argument, conclude, compare and contrast statements

- Contents**
- Understanding Company Benefits
  - Employees' Rights
  - Job Safety
  - Teamwork
  - Meetings and Minutes
  - Tools and Supplies
  - Unions and Employment Contracts
  - Using Business Machines
  - Self-Employment

Prerequisite **BSEL 406**

Level **1**

Contact Hours: **24**

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
3	Understanding Company Benefits	Illustrating points and express preferences using appropriate words and phrases
3	Employees' Rights	Describing events chronologically and telling about past situations using past perfect tense
<b>Quiz 1</b>		
3	Job Safety	Predicting consequences using past simple present and past
3	Teamwork	Telling about tasks and predicting consequences using causative verbs
<b>Midterm</b>		
3	Meetings and Minutes	Expressing indifference and disapproval and indicating order and sequence using unreal conditional with 'would' and 'could'
3	Tools and Supplies & Unions and Employment Contracts	Persuading and explaining using 'could have', 'would have' and 'however'
<b>Quiz 2</b>		
3	Using Business Machines	Talking about the future and inferring using passive simple future
3	Self-employment	Concluding, comparing and contrasting using 'might have', 'as---as'.
<b>Final Examination</b>		

Reference: Put English to Work , Level 5 by Sandra Linn

**Module Description**

This module consist of Manual and Automatic Transmission, Differentials, Drive shafts and clutch. It also covers the chassis components like suspension, brake systems, steering mechanism, wheels, wheel alignment and tires.

**Objectives**

- Describe each function and usage of drive train components
- Assemble and disassemble components of drive train components
- Discuss working principles of brake system and function of each components
- Describe suspension, steering mechanism, wheel alignment and tires

**Learning Outcomes**

After completing this course the student will be able to:

- Illustrate and describe the power flow in the drive train.
- Identify all drive train components
- Disassembly and assembly of drive train components
- Describe suspension system, steering mechanism, wheel alignment and tires

**Contents**

- Manual and Automatic transmission with 4 wheel drive transfer case
- Differential gears
- Drive train shafts
- Illustration of chassis components
- Wheels
- Brake components
- Suspension components
- Suspension system and its types
- Brake system and its components
- Brake types, components and its maintenance
- Steering mechanism
- Wheels, wheel alignment and tires

Prerequisite —

Level 2

Contact Hours: 72

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
16	4 wheel drive transfer case	Naming of parts and their function. Assemble and disassemble of parts
	Description	
	Parts and function components	
16	Differentials	Naming of parts and their function. Assemble and disassemble of parts
	Description	
	Principles of differential gear unit	
	Basic construction of differential gear unit	
8	Drive train shafts	Naming of parts and their function. Assemble and disassemble of parts
	Description	
	Types of constant velocity joint	
	Axle and shaft	
32	Illustration of chassis components	Naming of parts and their function. Assemble and disassemble of parts
	Outline of the chassis	
	Suspension	
	Steering	
	Brake system	
	Wheels, wheel alignment and Tires	

References:

Toyota books and manuals

**Module Description**

This module covers the fundamental operation of engine and system operation particularly valve mechanism, engine timing, lubrication system and their principles of work, illustration of carburetor fuel system, illustration of cooling system and knowledge of their components, ignition system, emission control system and environment protection. Electronic fuel injection system.

**Objectives**

- Describe valve mechanism and engine timing
- Illustrate engine system components
- Differentiate between carburetor fuel system and electronic fuel injection system

**Learning Outcomes**

After completing this module the student will be able to:

- Set valve mechanism according to its procedures
- Install and set ignition timing
- Describe emission and environment protection
- Learn the operation of ignition system and cooling system
- Illustrate all engine system and understand the difference between carburetor and fuel injection system.

**Contents**

- Knowledge of valve mechanism and engine timing
- Lubrication system components and their principles of work
- Oil passage in engine block
- Illustration of carburetor fuel system
- Emission control system and environment protection
- Illustration of cooling system and knowledge of its components
- Studying ignition system and knowledge of its components
- Electronic fuel injection system.

Prerequisite —

Level **2**

Contact Hours: **72**

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
10	Knowledge of valve mechanism	Able to assemble and disassemble valve mechanism
	Construction	
	Valve operation	
	Valve drive method	
10	Lubrication system components and their principles of work	Able to illustrate the working principle of lubricating system
	Types of lubrication system	
	Roles of lubricating system	
10	Illustration of carburetor system	Assemble and disassemble carburetor
	Description	
	Air fuel mixture	
	Air fuel – ratio	
	Operating principle of carburetor	
	Basic construction of carburetor	
	Venture	
4	Emission control system	Analyze exhaust gasses according to emission standard
	Exhaust gasses	
	Emission standard	
	Emission control system	
	Trouble shooting	
10	Illustration of cooling system	Able to describe cooling system principles
	Water cooling system	
	Construction	
	Radiator	
	Radiator core	
	Radiator cap	
	Reservoir tank	
	Water pump	
Cooling pan		
14	Studying of ignition system	Learn the different function of ignition system
	Function of components parts	
	Conventional ignition system	
	Function of transistorized type	
14	Electronic fuel injection system	Able to differentiate electronic fuel injection from carburetor
	Types of EFI system	
	Basic EFI system configuration	

Reference:  
Toyota books and manuals

**Module Description** This Module covers the purpose of delivery service that consist inspection, test condition and the operation of the functional components and mechanism.

- Objectives**
- Describe the importance of preventive maintenance and delivery inspection
  - To ensure that the vehicle is in top condition
  - Train student with the proper way of handling the responsibility applied in preventive maintenance and pre delivery inspection

**Learning Outcomes** After completing this module the student will be able to:

- Apply the basics of Preventive Maintenance and Pre- Delivery Maintenance inspection.

- Contents**
- Basic of service
  - Vehicle preparation of service
  - Principles of Pre Delivery Inspection
  - 1000 km service
  - Preventive Inspection
  - Preventive maintenance (5000 15000 km.... etc.)
  - Intermediate services (10000 30000 km.....etc.)
  - Training on Pre – delivery inspection
  - Training on preventive inspection
  - Training on preventive maintenance (10000 30000 km....etc.)

Prerequisite —

Level **2**

Contact Hours: **64**

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
32	<b>Basics of Service</b>	Application of Preventive Maintenance
	Before inspection	
	Work around inspection	
	Engine compartment	
	Under vehicle	
	Road test	
	Final inspection	
32	<b>Principle of Pre – Delivery Inspection</b>	Application of Pre-Delivery Inspection
	Preventive Inspection	
	Preventive maintenance (5000 15000 km.... etc.)	
	Intermediate services (10000 30000 km.....etc.)	
	Training on Pre – delivery inspection	
	Training on preventive inspection	
	Training on preventive maintenance (10000-30000 km....etc.)	

Reference:  
Toyota books and manuals

Prerequisite —

Level **2**Contact Hours: **32**

**Module Description** This Module covers engine major services

- Objectives**
- Describe the importance of major service I and major service II
  - To ensure that the vehicle is in top condition
  - Train student with the proper way of handling the responsibility applied in engine major services

**Learning Outcomes** After completing this module the student will be able:

- Perform engine major services

- Contents**
- Major Service I (20,000, 60,000 km... etc.)
  - Major Service II (40,000 to 80,000 km... etc.)

### Pacing Schedule

Contact Hours	Contents	Skills Gained
32	<b>Major Service I (20,000 to 60,000 km....etc.) and Major Service II (40,000 to 80,000 km... etc.)</b>	Application of Engine Major service
	Battery – check specific gravity etc.	
	Fuel filter replace	
	Ignition Timing, and engine idle	
	Engine cooling system	
	Exhaust system	
	Spark plugs	
	Valve mechanism	
	Valve timing	
	Valve adjustment	

Reference:  
Toyota books and manuals

Prerequisite **ENGC 102**

Level **2**

Contact Hours: **24**

**Module Description**

English Communication 2 is a module for level 2 students of specialization program that builds on English Communication 1 as part of the communicative competence requirement for their diploma. The module is built around a communicative competency-based program that focuses on communication skills and workplace competencies.

**Objectives**

- To consolidate the students' communicative competence achieved at level 1 of the skill program.
- To develop language skills, document literacy, critical thinking and problem solving in workplace situations.
- To develop purposeful use of language in realistic contexts and communicative competence.

**Learning Outcomes**

At the end of the course the students will be able to:

- Check assumptions, express values and understand social systems
- Express wishes and confirming conjectures
- Summarize, bargain and predict things
- Analyze and express values and judgments , negotiate and talk about causes and effects.

**Contents**

- Career Planning and Self-Assessment
- Taxes and Tax Forma
- Rights, Responsibilities and Benefits.
- Performance Reviews
- Health Problems on the Job
- Emergency Procedures
- Scheduling and Budgeting
- Using Computers
- Job Promotions

**Pacing Schedule**

Contact Hours	Contents	Skills Gained
3	Career Planning and Self-Assessment	Checking assumptions, expressing values and analyzing using tag questions and appropriate noun clauses
3	Taxes and Tax forms	Paraphrasing and confirming conjectures using past subjunctive and direct speech
<b>Quiz 1</b>		
3	Rights and Responsibilities	Summarizing, bargaining and predicting using future perfect and future conditional
3	Performance Reviews	Reporting information and complimenting using passive simple future and passive present perfect
<b>Midterm</b>		
3	Health Problems on the Job	Predicting and analyzing using future perfect continuous.
3	Emergency Procedures	Expressing values, requesting information and predicting consequences using present continuous conditional and embedded questions.
<b>Quiz 2</b>		
3	Scheduling and Budgeting	Compromising and negotiating using clauses with 'although' and 'unless'.
3	Using Computers and Job Promotions	Talking about possibility, cause and effect and expressing judgment using causative and past unreal conditional
<b>Final Examination</b>		

Reference: Put English to Work – Level 6 by Sally Gearhart

Prerequisite —

Level 3

Contact Hours: 112

**Module Description**

This module covers the function of the engine control system include EFI, ESA and ISC, which control basic engine performance; a diagnostic function, which is useful when repairs are made; and failsafe and back up function.

**Objectives**

- To prepare the student with the illustration of fuel injection system & acknowledgement of sensors, actuators and ECU.
- Acknowledge of automatic controlled system compared with the conventional system.

**Learning Outcomes**

After completing the course the student will be able to:

- Illustrate Toyota Computer Control System (TCCS).
- Understand the different function of Toyota Computer Control system (TCCS).

**Contents**

- Advance Electronic Fuel Injection
- Toyota Computer Control Systems (TCCS)
- Engine Control Unit (ECU) components
- Electrical circuit and electrical wiring diagram

## Pacing Schedule

Contact Hours:	Contents	Skills Gained
32	<b>Advance Electronic Fuel Injection Toyota Computer Control Systems (TCCS)</b>	Illustration of automatic control system
	What is electronic?	
	Work principles	
48	<b>Engine Control Unit (ECU) components</b>	Illustration of automatic control system
	Semi-conductors, Diodes and Transistors	
	ABS module (Anti-Lock Brake System)	
	Semi-conductors, Diodes and Transistors	
	Integrated circuits – Logic gates	
	BCM – Body Control Module	
	Electronic parts	
	SRS- Supplementary Restraint System (Airbag)	
	Static electricity and its properties, electro-static	
	Induction, condenser, diode semi-conductor and transistor	
32	<b>Electrical circuit and electrical wiring diagram</b>	Illustration of automatic control system
	Electrical wiring diagram (EWD) and how to use	
	Inspecting the electrical circuits	
	Body electrical maintenance	
	Battery chemical reaction, charging, discharging, capacity, internal resistance and connecting series or parallel electrolytes	
	Battery inspection	

Reference:  
Toyota Books and Manuals

Prerequisite —

Level **3**

Contact Hours: **64**

**Module Description**

This module includes engine servicing procedures on valve and valve trains for camshaft-in-block and overhead-camshaft engines. It also includes servicing procedures on cylinder heads, pistons and related parts, bearings, and crankshafts and cylinder blocks. Typical specifications are given for many of the most important engine measurements.

**Objectives**

- Provides the student an actual application of engine services.
- Diagnose different causes of engine troubles, causes and remedy
- Learn how to replace different engine worn out parts within the specifications.

**Learning Outcomes**

After completing this course, the student will be able to:

- Describe engine servicing operation.
- Overhaul internal combustion engine.

**Contents**

- Overhauling the engine with the proper usage of measurement, specification and tools

**Pacing Schedule**

Contact Hours:	Contents	Skills Gained
64	Overhauling the engine with the proper usage of measurement, specifications and tools	Overhaul an Engine
	Engine service; cylinder head and valve trains	
	Engine service: connecting rods, rod bearings, pistons and piston rings	
	Engine services; crankshaft, and cylinder blocks	

Reference:  
Toyota Books and Manuals

**Module Description** This module covers automotive drive trains which carry power the engine to the vehicle wheel. It consists of a clutch, transmission ( manual and automatic ), drive line, and drive axle with the final gearing and differential. In addition to front wheel and rear- wheel drive. Some vehicles have four wheel drive.

- Objectives**
- Describe the construction and operation drive train components
  - Identify parts of drive train and define their functions.

- Learning Outcomes** After completing this course, the student will be able to:
- Assemble and disassemble drive train components.
  - Diagnose different troubles appear in drive train.

- Contents**
- Clutches
  - Manual transmissions

### Pacing Schedule

Contact Hours:	Contents	Skills Gained
24	<b>Clutches</b>	Diagnose and Repair
	Clutch components and function	
	Disassembly, inspection and re - assembly	
40	<b>Manual Transmission</b>	Diagnose and Repair
	Manual transmission front wheel drive components and their function	
	Manual transmission assembly and disassembly	
	Manual transaxle – description – components and their function	
	Manual transaxle disassembly and re-assembly	
	Inspection and trouble shooting	

Reference:  
Toyota Books and Manuals

Prerequisite —

Level **3**Contact Hours: **24**

**Module Description** Technical Report Writing 1, is offered to students to improve their English language proficiency in writing short technical reports which is part of their diploma requirement. The module integrates different methods of report writing with the basic mechanics organized writing.

- Objectives**
- To consolidate and extend the writing skills they have learned in ENGC 203.
  - To help technical student write short reports involving technical expression.

- Learning Outcomes** After completing this module the student will be able to:
- use writing as a means of communication in work environments
  - write short reports involving technical expression
  - organize information using the mechanics of writing

- Contents**
- Introduction to Technical Report Writing
  - Precaution Instructions
  - Operational Instructions
  - Progress Reports
  - Accident Reports
  - Industrial Visit Reports

### Pacing Schedule

Contact Hours	Contents	Skills Gained
3	Introduction to Technical Report Writing	Learning the basics of paragraph writing
3	Precaution Instructions	Sequencing precautionary instructions following the rules of writing
<b>Quiz 1</b>		
4	Operational Instructions	Writing operational instructions using the imperative form of verb
<b>Midterm</b>		
5	Progress Reports	Ability to write reports on jobs completed and not completed using present perfect and past simple verb forms
<b>Quiz 2</b>		
5	Accident Reports	Writing short reports on causes and consequences of accidents using past tense verb forms
4	Industrial Visit Reports	Reporting industrial visit experiences using past tense verb forms
<b>Final Examination</b>		

Reference: Technical Report Writing 1 (In-house made)

**Module Description** This module covers automotive drive trains which carry power from the engine to the vehicle wheel. It consists of a clutch, transmission ( manual and automatic ), drive line, and drive axle with the final gearing and differential. In addition to front wheel and rear- wheel drive. Some vehicles have four wheel drive.

- Objectives**
- Describe the construction and operation drive train components
  - Identify parts of drive train and define their functions.

- Learning Outcomes** After completing this course, the student will be able to:
- Assemble and disassemble drive train components.
  - Diagnose different troubles appear in drive train.

- Contents**
- Automatic transmissions
  - Drive lines
  - Differentials

### Pacing Schedule

Contact Hours:	Contents	Skills Gained
16	<b>Automatic Transmission</b>	Diagnose and Repair
	Major parts and their function	
	Torque converter – description, components and how it works	
	Lock up clutch and how it works	
	Disassemble, inspection and re – assemble	
8	Inspection and trouble shooting	Diagnose and Repair
	<b>Drive Lines/Propeller Shaft</b>	
	Description , components and their function	
	Disassembly and re-assembly	
24	Inspection and trouble shooting	Diagnose and Repair
	<b>Differentials</b>	
	Description, components and their function	
	Disassembly and assembly	
	Inspection and trouble shooting	

Reference:  
Toyota Books and Manuals

Prerequisite —

Level **4**

Contact Hours: **72**

**Module Description** This module covers Automotive Chassis which includes the suspension, and braking systems that describe the components, function, disassemble and assemble, trouble shooting and repair of each parts.

- Objectives**
- Develops the student with the necessary skill needed in assembly and disassembly of chassis components.
  - Train the student to diagnose and troubleshooting.

- Learning Outcomes** After completing this course, the student will be able to:
- Assemble and disassemble suspension components.
  - Repair and replace suspension assembly.
  - Assemble and disassemble braking components.
  - Repair and replace braking system parts.

- Contents**
- Suspension system
  - Braking system

**Pacing Schedule**

Contact Hours:	Contents	Skills Gained
48	<b>Suspension System</b>	Identify different types of suspension, components and their function. Develop knowledge and ability to overhaul shock absorber.
	Types of suspension system – description	
	Rigid and independent suspension spring oscillation	
	Spiral leaf ( coil spring ) & torsion bar	
	Shock absorber – Description and how it works	
	Shock absorber overhauling	
24	<b>Braking system</b>	Learn the principles of operation of braking system components and develop skill in trouble shooting
	Brakes system components	
	Master cylinder and sub cylinder	
	Brake drum operation	
	Brake booster ( single and tandem )	
	Proportional valve, hand brake, disc and rear brakes	
	Dual proportional and Linear valves, and sensing load and deceleration	
Trouble shooting		

Reference:  
Toyota Books and Manuals

**Module Description**

This module covers the important role of steering system in ensuring easy comfortable driving all the way from the low speed range to the high speed ranges. The steering system steers the car in the desire direction. And it also covers wheel alignment and inspection.

**Objectives**

- Describe to the student construction and operation and function of each parts.
- Train student with the skill needed in assemble and disassemble of steering components.
- Develops the student with the proper methods of repairs and trouble shooting.

**Learning Outcomes**

After completing this Module the student will be able to:

- Identify all parts of steering system.
- Describe wheel alignment and inspection.
- Apply trouble shooting and services.

**Contents**

- Steering Mechanism System
- Wheel Alignment

Prerequisite **AUMT 125**

Level **4**

Contact Hours: **72**

**Pacing Schedule**

Contact Hours:	Contents	Skills Gained
24	<b>Steering Mechanism System</b>	Steering Mechanism Service and Trouble Shooting
	Steering system – shock absorbing mechanism, tilt, extending and lock up mechanism.	
	Manual steering – rack and pinion and recirculating ball type	
	Steering linkages and manual steering failure	
	Removal and installation of steering linkages and servicing precaution	
	Overhauling rack and pinion steering type	
	Steering gearbox – rotary, linear and reversible valves	
	On vehicle inspection – drive belts, steering oil level and air bleeding	
	Overhauling steering pump	
48	<b>Wheel alignment</b>	Wheel Alignment Service and Inspection
	Angle of camber	
	Angle of caster	
	Angle of axle inclination & toe in & toe out	
	Turning radius angle	
	Wheel alignment service	
	Tire uniformity	
	Ground clearance	
	Wheel alignment measurement	
	Camber, caster, axle inclination & toe in – toe out	

Reference:  
Toyota Books and Manuals

**Module Description** This module covers Air Conditioning System principle of operation function of each components, servicing and trouble shooting.

- Objectives**
- Describe the working principle of Air Conditioning.
  - Identify A/C components function and operating principles.
  - Train the student to discharge and charge A/C system refrigerant.
  - Teach student the correct procedure of A/C trouble shooting and inspection.

- Learning Outcomes** After completing this Module, the student will be able to:
- Disassemble and assemble components A/C system.
  - Service A/C system and diagnose trouble, inspection and maintenance.

- Contents**
- Air Conditioning System components and their function.
  - A/C System diagnose and trouble shooting.

### Pacing Schedule

Contact Hours:	Contents	Skills Gained
16	<b>Air Conditioning System components and their function</b>	Basic knowledge of Air Conditioning System principles of operations and function of each components
	What is Air Conditioning?	
	Basic cooling theory	
	Auto A/C components function and operating principles	
32	<b>A/C system diagnose and Trouble shooting</b>	Develop skill in Air Conditioning Diagnosis and Trouble Shooting
	Discharging and charging A/C system with refrigerant	
	Inspection and servicing	
	Diagnose and trouble shooting	

Reference:  
Toyota Books and Manuals

Prerequisite **TRWT 304**Level **4**Contact Hours: **24**

**Module Description** Technical Report Writing 2, is offered to students to enhance and build on their proficiency in writing short technical reports which they learnt at level 3. The module integrates less- controlled methods of report writing with practicing the skill of filling out various forms required at workplace.

- Objectives**
- To consolidate and extend the report writing skills they have learned in TRWT 304.
  - To help technical student write resumes, more work related reports, and fill out forms involving technical and general vocabulary.

- Learning Outcomes** After completing this module the student will be able to:
- use writing as a means of communication in work environments
  - fill out forms and write short reports involving technical expression
  - write resumes and work related reports

- Contents**
- Making Descriptive Requisitions
  - Curriculum Vitae
  - Letter Writing
  - Cooperative Training Report
  - Filling out Requisition Forms
  - Filling Work -Related and General Forms

### Pacing Schedule

Contact Hours	Contents	Skills Gained
4	Making Descriptive Requisitions	Making official requests in writing for materials needed at work.
3	Curriculum Vitae	Writing CV's in response to job ads
<b>Quiz 1</b>		
4	Letter Writing	Writing formal cover letters for different jobs
<b>Midterm</b>		
4	Cooperative Training Report	Writing relevant reports on cooperative training to department heads
<b>Quiz 2</b>		
5	Filling out Requisition Forms	Ability to make different requisitions by filling out specific forms
4	Filling out Work-related and General Forms	Ability to fill out different forms - an ability required in real life situations
<b>Final Examination</b>		

Reference: Technical Report Writing 2 (In-house made)