

# **DIPLOMA COURSE IN TWO WHEELER MECHANISM AND MAINTENANCE**

## **SYLLABUS**



### **COMMUNITY COLLEGE**

[Funded by UGC, New Delhi]

The Gandhigram Rural Institute – Deemed University  
Gandhigram – 624 302 Tamil Nadu

**GANDHIGRAM RURAL INSTITUTE-DEEMED UNIVERSITY**  
**Gandhigram – 624 302, Dindigul District, Tamil Nadu**

**COMMUNITY COLLEGE**

[Funded by UGC, New Delhi]

**Structure and Content of the**  
**Diploma Course in Two Wheeler Mechanism and Maintenance**  
**[With effect from 2016-17]**

**1. Introduction:**

The Gandhigram Rural Institute (GRI) - Deemed University, Gandhigram is one of the pioneering institutions working for rural development and preparing human resources for managing rural development during last six decades. The GRI has a Department of Lifelong Learning and Extension which is mainly working for the vocational education and training for skill development within the framework of University system. In the light of strengthening Teaching, Training and Research in the area of Lifelong Learning, attempts are being made to revisit and revise the existing curriculum of different academic courses and developing new curricula for offering courses at various levels. In this context, focus is on the “skills and knowledge” needed to work with people in various employment settings, in the rural and semi-urban areas, particularly in the unorganized sector and also in the Non-governmental organizations. The Lifelong Learning has become a fundamental goal of recent educational policies as a way to achieve socio-economic development and as a tool for promoting knowledge based society.

The UGC has been emphasizing the efforts by the Universities which are at the top of the Institutional framework available for the non-formal education, vocational education and skill training which would suit the changing needs of the society and sustain the development. In this background, the Gandhigram Rural Institute has established a Community College (CC) with the support of the UGC, New Delhi, to create employment and to provide qualified manpower for motorcycle repairing and maintenance in rural areas.

The Community College aims at increased accessibility to quality higher education to a large number of individuals in the rural community who are not able to move to traditional courses offered by colleges and universities. It offers vocational skill development in the form of traditional coursework with a large emphasis on hands on training with state of the art facilities. These advantages enable the trained manpower to move directly to the employment sector.

The Community College (CC) is offering a Diploma in Two Wheeler Mechanism and Maintenance.

## 2. Objectives:

The main aim of the Diploma programme is

1. to make available qualified and skilled man power for the two wheeler service sector in rural areas
2. to create an opportunity for the rural students to have higher education and increase their employability

## 3. Structure of the Programme:

Semester	Course Code	Name of the Course	Theory	Practical	Total Credits	Duration of Exam (Hours)	Evaluation in Percentage		Total Marks	Pass Mark [Combined of 40% Theory and 60% Practical]
							Theory	Practical		
FIRST	16TWMV0101	Basic of Two Wheelers	3	3	6	2	40	60	100	50
	16TWMV0102	Major Systems in Two Wheelers	3	3	6	2	40	60	100	50
	16TWMV0103	General checkup for two wheelers	3	3	6	2	40	60	100	50
	16TWMV0104	Assemblies and Auto-Electrical	3	3	6	2	40	60	100	50
	16TWMV0105	Customer Relationship Management	4	2	6	2	60	40	100	50
			<b>16</b>	<b>14</b>	<b>30</b>					
SECOND	16TWMV0206	Industrial Placement for Hands-On-Experience**	0	30	30	3	0	100	100	50
		<b>Total</b>	<b>16</b>	<b>44</b>	<b>60</b>		<b>220</b>	<b>380</b>	<b>600</b>	

\*\* - Practical Examination will be conducted by GRI

## 4. Methodology:

The Diploma programme is of two semester duration and follows the credit system. In the first semester the students are introduced to the essential elements of two wheelers and appropriate practice in the form of practical training is provided in the first semester. There are five courses in the first semester. Each of these courses have both Theory and Practical components. The evaluation and Grading will be done as per GRI pattern. Each course will be evaluated for a maximum of 100 marks – Combining both Theory and Practical components as suggested by UGC for vocational courses in Community Colleges. Being a skill based programme, the passing minimum will be 50%.

Teaching and Training process includes the following:

- Classroom sessions
- Demonstration
- Hands-on-Experience in the industry
- ICT enabled interactive sessions
- Industrial Placement
- Exposure Visit to Industry
- Study Material in English and Tamil (bilingual)

## **5. Admission related matters**

- ♦ The minimum educational qualification for admission in the Diploma is +2 pass or equivalent including NIOS from any recognized board or university.
- ♦ Medium of instruction will be English and Tamil. Question Paper will be in both English and Tamil.
- ♦ Provision is made to enroll students who will come up to this level following the NVEQF / NSQF, thus assuring vertical mobility for students who have completed Level-3 and Level-4.
- ♦ Reservation to SC, ST, OBC, Differently-Abled and Service Personal categories will be made as per the Government of India (GoI) Norms
- ♦ There shall be no age bar for admission in the Community Colleges.
- ♦ The selected students will be paid scholarship as per UGC Guidelines for Community College
- ♦ The selected students have to pay Course Fee as per GRI Norms

## **6. Examination related matters**

- The Controller of Examination, GRI shall conduct the End Semester Examination [ESE] as is being practiced in the case of other Certificate / Diploma Programmes.
- The course teacher will be the examiner.
- The Industry Experts, if required, can be invited for conducting the practical Examinations.
- For theory papers assessment is based End Semester Examination only.
- A student will be declared to have passed in a course when she / he has scored 40% in Theory and 60% in Practical.
- In the Case of student absent / failed in a subject in a semester examination, she / he has to write both Theory and Practical examination for that subject during the subsequent semesters.
- A student has to pass in course with maximum attempts of 5 times [1+4Times]
- The second semester practical examination includes - 40% for Internship Report and 60% for practical examination.

## 7. Industry collaboration:

1. Networking with identified Two-Wheeler Dealers, Workshops, Technical Institutions in and around Dindigul to provide Practical Training and opportunities for hands-on experience.
2. Experts available in these industrial units / Technical Institutions will be invited as Guest Faculty
3. Signing of Memorandum of Understanding [MOU] by the Community College with identified Two Wheeler Dealers and Workshops.
4. During the first semester students are placed in the industrial units / workshops for one month Internship.
5. During the second semester for practical training, students will be placed in the Industry under Industry Placement Programme [IPP].

## 8. Fees Structure in Rs.

1. Per Semester	In Rs.
Tuition fee	600
Examination fee	1000
Library fee	75
Games fee	20
Laboratory fee	1500
<b>Sub Total</b>	<b>3195</b>
<b>2. One Time Fee</b>	
Group Health Insurance	200
Health Service	200
Khadi	300
Calendar	80
Sports Tournament Fund	100
Smart Card	150
TC and CC	50
Student Welfare Fund	100
<b>Sub Total</b>	<b>1180</b>
<b>3. Caution Deposit [Refundable]</b>	<b>1000</b>
<b>Total Fees Payable</b>	<b>5375</b>

## 9. Content of the Course:

### FIRST SEMESTER

#### PAPER -1: BASIC OF TWO WHEELERS

Course Code -16TWMV0101

Credits: Theory – 3; Practicals – 3

Marks-100

**Objectives:** The main purpose of this course is to make acquainted with the Workshop situation and also to provide the students opportunities to get know about the basics of the two wheeler servicing workshop and its environment.

#### Unit I - Introduction

Definition of Automobile - History of Automobile – Short description of Automobile in INDIA – Concept of employability - Major two wheeler companies in INDIA – Types of two wheelers

#### Unit II - Chassis of Two Wheelers

Definition for chassis – Need for chassis – Materials used for frame - Types of chassis used in two wheelers – Under bone – Double cradle – Diamond type – Delta box frame – Components to be mounted on chassis.

#### Unit III - Engine

Introduction – Engine classification - Two stroke Engine – Four stroke Engine - Main Components of Engine – Function of Clutch - gearbox - Constant mesh gearbox – Continuous Variable transmission.

#### Unit IV - Suspension, Brakes and Tyres

Need of suspension - Types of suspension –Working of Conventional suspension - Mono suspension, -Purpose of Brake - Types of Brakes - Wheels and Tires.

#### Unit V - Electrical Systems and Safety Precautions

AC Current – DC Current - Ohm's law - watt's law - Battery – Signaling components – lighting systems- Safety sensors - Safety Precautions - Screening of audio-visuals materials.

#### Reference Books

1. G.B.S. Narang, 2003, Automobile Engineering", 10th Reprint, Khanna Publishers, New Delhi.
2. Basic Automotive Service [2&3 wheeler], 2010, NIMI, Government of India, Chennai
3. B. Kumaran, 2010, Motor Mechanic, Kumaran Publishers, Chennai
4. Ganesan, 2005, Internal Combustion Engines, Laxmi Publications [P] Limited, New Delhi
5. Dennis Bailey and Keith Gates, 2009, Bike Repair & Maintenance [For Dummies], Wiley Publishing, Canada
6. Barry Hollembeak, 2011, Automotive Electricity and Electronics Classroom and Shop Manual, Pack Today Technician Publishing, USA
7. Tony Foale, 2001, Two Wheeler Motorcycle Handling and Chassis, Tonbridge, Spain

## **PAPER – 2 : MAJOR SYSTEMS IN TWO WHEELERS**

**Course Code -16TWMV0102    Credits: Theory – 3; Practicals – 3**

**Marks-100**

**Objectives:** The course aims to provide knowledge on the major systems in Two-Wheelers and also its functions, break-down and trouble shooting.

### **Unit I: Types of Two wheelers**

Types -mopeds – scooters – motorcycle – race vehicle – parts – main components –Case study of different types of two Wheelers – Motor Cycles – Scooter - Moped – race vehicle - trouble shooting causes and remedies.

### **Unit II - Components of Power System**

Two stroke engine and Four Stroke Engine-Electronic ignition system-Ignition system –Battery coil – Magneto coil ignition system -Lubrication System--Scavenging Pumps.

### **Unit III -Chassis& Sub systems**

Chassis& its types-clutches and its types-Gear box-constant mesh gear box-Shock absorber-Suspension system-Front suspension-Rear Suspension.

### **Unit IV - Brakes & Wheels**

Brakes and its types- sources for brakes- mechanical brakes- pneumatic brakes- hydraulic brakes- Disk brake-Drum brake-Wheel-Tire.

### **Unit V: Two Wheeler workshop structure**

Importance of maintenance – general maintenance schedule –Servicing of two wheeler – periodic checkups - structure of servicing and maintenance workshop- first aid-management of two wheeler workshop.

### **Reference Books**

1. G.B.S. Narang, 2003, "Automobile Engineering", 5th Edition, Khanna Publishers, Delhi.
2. Basic Automotive Service [2&3 wheeler], 2010, NIMI, Government of India Chennai
3. B. Kumaran, 2010, Motor Mechanic, Kumaran Publishers, Chennai
4. SRI N. R. Hema Kumar, Automobile Chassis and Body Engineering [Unpublished Manual Prepared in Government Junior College, Palamaner, Andhra Pradesh - 2009]
5. David A Crolla, 2009, "Automotive Engineering-Power Train, Chassis System and Vehicle Body", Butterworth - Heinemann Publishers, New York.
6. Maintenance & Repair of Two Wheelers & Three Wheelers -II by State Council Of Educational Research & Training (SCERT), Government of Kerala, 2006.

### **PAPER – 3: GENERAL CHECKUP FOR TWO WHEELERS**

**Course Code -16TWMV0103 Credits: Theory – 3; Practical -3**

**Marks-100**

**Objectives:** The course aims to provide knowledge repairing and servicing Two-Wheelers and also its functions, break-down, overhauling and trouble shooting.

#### **Unit I – Basic Checkup**

Identify the parts & General servicing of Two Wheeler- washing- cleaning- oiling- greasing and lubricating- Tracing the A.C /D.C electrical circuit in a two wheeler- checking horn- head light- indicator and replacing if necessary.

#### **Unit II – Inlet problems**

Dismantling the air cleaner- cleaning- inspecting- cleaning fuel tank- servicing carburetor- rectifying causes for engine not starting- high fuel consumption- Description of carburetor- fuel system type and location- Fuel tank.

#### **Unit III – Starting Problems**

Starting engine- tuning for slow speed- checking smoke and setting for exhaust gas emission measurement as per norms. Used by Tachometer.

#### **Unit IV – Engine Assembly**

Dismantling the unserviceable engine- cleaning and inspecting the parts- checking engine bore piston rings- connecting rod- bearings- crankshaft- assembling all the parts and measures the gaps. Engine Timing setting and Valve Timing setting of Engine.

#### **Unit V - Clutch Assembly**

Adjusting clutch lever free play- removing clutch assembly from Two-wheeler- cleaning and inspecting parts. Replacing defective parts. Fitting clutch assembly. Repair work of Automatic clutch and automatic transmission used in motor rakes.

#### **Reference Books**

1. Basic Automotive Service [2&3 wheeler], 2010, NIMI, Government of India Chennai
2. Tony Foale, 1996, Two wheeler Motorcycle Handling and Chassis Design, Spain.
3. Dennis Bailey and Keith Gates, 2009, Bike Repair & Maintenance [For Dummies], Wiley Publishing, Canada
4. Barry Hollembeak, 2011, Automotive Electricity and Electronics Classroom and Shop Manual, Pack Today Technician Publishing, USA
5. Tom Denton, 2004, Automotive Electrical and Electronic System, ELSEVIER, UK
6. Service Manuals of Manufacturers of Indian Two & Three wheelers.



**PAPER – 4 ASSEMBLIES AND AUTO-ELECTRICAL**

**Course Code -16TWMV0104**

**Credits: Theory – 3; Practicals – 3**

**Marks-100**

**Objectives:** The course aims at introducing the basic knowledge of auto-electrical system. Provide opportunity to learn servicing by hands-on-experience in the industrial setting through electrical instruments.

**Unit I – Basic Electricals**

Electromagnetic force - AC Current – DC Current – Basic Laws regarding electrical – ohms law – watts law – magnetic field – Conductor – Semi Conductor – Insulator.

**Unit II –Battery**

Electrolysis method - Types of battery – lead acid battery - Nickel cadmium battery – Lithium ion Battery –Valve regulated batteries – hydrometer - Battery Testing machine – parallel connection and series connection

**Unit III – Engine Electricals**

Starting System – Alternator – Ignition Coil – Distributor – CDI – Spark plug – Glow plug – Injection System - ignition system – Battery coil ignition system – magneto coil ignition system.

**Unit IV – Sensors**

Working of sensor – Electronic Control Unit – Types of sensor- crank angle position sensor – Camshaft position sensor – throttle sensor – Oxygen sensor – lean angle sensor – manifold air pressure sensor – air temperature sensor.

**Unit 5 - Auxiliary Units**

Horn – head light – testing method – tail light – indicator –parking light – safety precautions – electrical maintenance

**Reference Books**

1. G.B.S. Narang, 2003, "Automobile Engineering", 10th Reprint, Khanna Publishers, New Delhi.
2. Basic Automotive Service [2&3 wheeler], 2010, NIMI, Government of India Chennai
3. B. Kumaran, 2010, Motor Mechanic, Kumaran Publishers, Chennai
4. Richard Stone and Jeffry K. Ball, 2004, Automobile Engineering Fundamentals, SAE International, Warredale.Pa.USA.
5. George Lear and Lynn S. Mosher 1977, Motorcycle Mechanics, PRENTICE-HALL INC. New Jersey

## **PAPER – 5: CUSTOMER RELATIONSHIP MANAGEMENT**

**Course Code -16TWMV0105**

**Credits: Theory – 4; Practicals – 2**

**Marks-100**

**Objective:** To enable the students by providing basic skills required for maintaining good relationship with customers through effective Communication in service sector.

### **Unit I - Introduction to Customer Support**

Importance of Customer - Types of Customers - their needs - Issues in dealing with the customers- Importance of maintaining good relations with customers in Service providing sector.

### **Unit II - Communication Skills for Customer Support**

Intra personal communication and Body Language - Inter personal Communication in Customer Relationships. Features of an effective Communication. Verbal and non-verbal Communication. Barriers and filters. Listening and active listening. Customer satisfaction - Feedback from Customers.

### **Unit III - Customer Relationship Skills**

Leadership Skills - Team work and public speaking with customer - Importance of maintaining good interpersonal relationship with Customer and co-workers - Effective communication in service delivery.

### **Unit IV - Personality Traits in delivering Service**

Self confidence - Attitude - Working in Group - Time Management - Effective Planning in service delivery - Working towards Goal - Meditation and concentration techniques in the stress situation.

### **Unit V - Practical Exercise:**

Role playing in Workshop - Public speaking- Interview - work in a Team - Group Discussion - Discussion on Case Studies from shop Floor and Industry situation

### **Reference Books**

1. Stephen P. Robbins and Mary Coulter, 2012, Management [Eleventh Edition], Pearson Education, New Jersey
2. Balasubramanian. K, 2005, Essence of Customer Relationship Management, GIGO Publishing
3. Balaji , 2002, Service Marketing and Management, S.Chand Publishing
4. A. Sagadevan and H. Peeru Mohamed, 2002, Customer Relationship Management - A Step-By-Step Approach, Vikas Publishing, New Delhi
5. Kaushik Mukerjee, 2007, Customer Relationship Management, PHI Learning Private Limited, New Delhi.
6. Jill Dyche, 2001, The CRM Handbook: A Business Guide to Customer Relationship Management 1st Edition, Addison-Wesley, New York

## SECOND SEMESTER

### PAPER – 6: INDUSTRIAL PLACEMENT FOR HANDS-ON-EXPERIENCE

Course Code -16TWMV0206

Credit - 30

Marks-100

#### Objective

To provide practical training in the industrial environment to the students and create opportunity to gain Hands-on-Experience.

#### Strategies and Process

1. Record Work- Laboratory Work – Attending Practical Training
2. The students will be placed in the identified two wheeler workshop for practical training and Hands-on-Experience
3. Attendance will be jointly maintained by Community College and particular industrial unit
4. Daily Dairy has to be prepared by the students
5. Final Report has be submitted along with Record Work Book
6. Examination will be based on these documents
7. Jointly assessed by Community College and particular industrial unit

#### The students should get exposed to the following:

- Two wheeler chassis frame.
- Two wheeler SI Engine
- Two wheeler CI Engine.
- Valve timing and port timing diagram
- Brake and Clutch adjustment as per specification.
- Dismantling and assembling of two wheeler engine.
- Dismantling and assembling of two wheeler gear box.
- Two wheeler chain test.
- Two wheeler electrical systems.

## 10. Panel of Experts

Er. V. Ganesh Khanna, Engineer  
Ram Automobiles  
9-A New Agraharam, Palani Road  
Dindigul  
[ganeshkhanna2010@gmail.com](mailto:ganeshkhanna2010@gmail.com)

Mr. S. Lakshmana prasad  
Director  
V. V. R. Motors Private Limited  
34-A, New Agraharam, Palani Road  
Dindigul  
[vvrmotorspvtltd@gmail.com](mailto:vvrmotorspvtltd@gmail.com)

Mr. D. Vetriselvan, Branch Manager  
Sree Kanna Yamaha Motors  
Karur Road, Dindigul  
[sreekannayamahamotors@gmail.com](mailto:sreekannayamahamotors@gmail.com)  
[gm8kymotors@gmail.com](mailto:gm8kymotors@gmail.com)

Mr B. S. Murugesan  
SORNAM MOTORS  
23, New Agraharam,  
Palani Road, Dindigul  
[bmsomam@yahoo.co.in](mailto:bmsomam@yahoo.co.in)  
[bmsomam@gmail.com](mailto:bmsomam@gmail.com)  
0451 2422112      98421 31856

Mr. V. Balasubramanian, Director  
Avinashilingam Jan Shikshan Sansthan  
Alagesan Road Coimbatore– 641043  
Tamil Nadu  
Mobile 9443304056  
[director@avinashilingamjss.com](mailto:director@avinashilingamjss.com)

Mr.Subash , B.E Mech Engg  
System Engineer  
Gates Unitta Asia  
13, Rajiv Gandhi Nagar, Sriperumbudur -  
602105  
Chennai 9597529376

Mr. K. Jayachandran, Principal  
Siva Industrial Training Institute  
12, Muruga Bhavanam, Palani Road,  
Dindigul, Tamil Nadu  
Mobile 9443051045

Mr. N.Venkatesh Babu  
Managing Director  
Sree Kanna Yamaha Motors  
Old Karur Road, Dindigul  
0451 3207003, cell – 93447 07464  
[gm8kymotors@gmail.com](mailto:gm8kymotors@gmail.com)

Dr. R. Palanisamy  
Professor and Principal  
SSM Institute of Engineering & Technology  
Dindigul 73737 07003

Dr. R. Sivakumar, Head  
Department of Automobile Engineering  
SSM Institute of Engineering & Technology  
Dindigul  
96296 82606

Mr.Kamaraj    Master Trainer  
Govt ITI  
Govt. I.T.I, Mosur Road, Arakkonam, Vellore  
district. 9443434381

Mr.Thiruvengadam B.E Mech Engg)  
Engineer, NVH India Pvt Ltd  
Plot No. B-68, SIPCOT Industrial Park,  
Sriperumbudur, Irungattukottai,  
Chennai - 602105, Tamil Nadu, IndiaChennai  
9500499026

\*\*\*\*\*