

Curriculum For Level-V Certificate Course
AUTOMOBILES SPECILIZATION IN AUTOELECTRICALS AND ELECTRONICS

SYLLABUS FOR
ONE YEAR – FULL TIME
LEVEL-V CERTIFICATE COURSE IN AUTOELECTRICALS AND ELECTRONICS

Effective From

Under Development

Prepared By

Curriculum Development Cell

Institute of Research, Development & Training, U.P.,

Kanpur

TEACHING AND EXAMINATION SCHEME																			
COURSE NAME : AUTOELECTRICALS AND ELECTRONICS (SECTOR – AUTOMOBILE)																			
COURSE CODE : AU -LEVEL V																			
DURATION OF COURSE : ONE YEAR																			
WITH EFFECT FROM																			
Sr. No.	Subject	ST. Code	Teaching Scheme						Examination Scheme										
			T h.	TU	Pr./ WS	D R G	Total	Hrs	Theory			Th. Total		PR. Total				Grand Total	
									Max	Min	Sl Test	Max	Min	Hrs.	Marks	Sl. Test	Total marks		
1	CAN Bus System	AU 5.1	4	-	4		8	2.5	50	17	20	70	24	03	20	10	30	100	
2	Safety System & Crash System, Electronic Stability Control (ECS) System	AU 5.2	5	-	3		8	2.5	50	17	20	70	24	03	20	10	30	100	
3	Integration of All ECU and Diagnosis	AU 5.3	5	-	3		8	2.5	50	17	20	70	24	03	20	10	30	100	
4	Informatics	AU 5.4	5	-	3		8	2.5	50	17	20	70	24	03	20	10	30	100	
5	EMPLOYABLE SKILLS	GEN 5.5	4	-	4		8	2.5	50	17	20	70	24	03	20	10	30	100	
							40												500

Student Disciplines (20)

20

OBREVIATIONS: TH-THEORY, TU-TUTORIAL, SL-SESSIONAL, PR-PRACTICALS, WS-WORKSHOP, DRG-DRAWING

NOTE:

1. Each period will be 50 minutes duration.
2. Each session will be 32 weeks.
3. Effective teaching will be at least 25 weeks.
4. Remaining periods will be utilized for revision etc.
5. SI system of units shall be used in each subject
6. Student centered activities will comprise of various co-curricular activities like seminar, extension lectures, field visits, NCC, NSS, Hobby, clubs, Games and cultural activities

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II- MAIN FEATURES OF THE CURRICULUM

Title of the course : **Level V Certificate Course in AUTOMOBILES SPECILIZATION
IN AUTOELECTRICALS AND ELECTRONICS**

Duration : One Year

Pattern of the course : Annual System

Intake : 100

Type of course : Full Time

III-LIST OF EXPERTS

S.No.	Name & Designation	Name Of Organization/Institution	Date	Workshop Place
1	Sri Rituraj Mishra DGM	Tata Motors Ltd , Lucknow	26/09/18	G.P.Lucknow
2	Sri Sanjay srivastava	Tata Motors Ltd , Lucknow	26/09/18	G.P.Lucknow
3	Sri Prakash Chandra	Tata Motors Ltd , Lucknow	26/09/18	G.P.Lucknow
4	Sri Rajesh Kumar Sharma	Tata Motors Ltd , Lucknow	26/09/18	G.P.Lucknow
5	Smt Meenu Drivedi	Lecturer, Mechanical G.P.Lucknow	26/09/18	G.P.Lucknow
6	Sri Tushar Kiran	Lecturer, Mechanical G.P.Lucknow	26/09/18	G.P.Lucknow
7	Sri Himanshu Bhaskar	Lecturer, Mechanical G.P.Lucknow	26/09/18	G.P.Lucknow
8	Smt Deepshikha	Lecturer, English G.G.P.Lucknow	26/09/18	G.P.Lucknow
9	Sri Janbeag Loni	Principal, G.P.Lucknow	26/09/18	G.P.Lucknow
10	Sri Sanjeev Kumar Singh	Secretary, Board Of Technical Education, U.P	26/09/18	G.P.Lucknow
11	Sri Ashok Kushwaha	Text Book Officer, IRDT Kanpur	26/09/18	G.P.Lucknow

5.1 CAN BUS SYSTEM

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1. **Introduction of Multiplexing System : (20 Hours)**

Advantages of Multiplexing over normal wiring system, Difference between Traditional electronics harness and data package transfer bidirectional Harness. Circuit diagram of above.

2. **Fitment Method of Multiplexing Components : (20 Hours)**

Master and Slave Concept- CBCU & Mux2-B. Describe and operation of Different Types of CAN such as P-CAN, I-CAN , M-CAN.CAN Implementation layers.

3. **Introduction & Details of CAN: (20 Hours)**

History of CAN. CAN Controllers. CAN Arbitration. Microcontroller device. Analog Devices offers CAN transceivers for various applications.

4. **Usages and Controls of CAN System : (20 Hours)**

CAN messages: how the message structure is fundamental to error checking/recovery and arbitration, Integrated Signal and power isolated CAN transceivers. Stress Protection: Miswire and short circuit, Transient Over voltage

5. **Major Changes From BS III To BS IV : (30 Hours)**

Engine internal System , Engine Fan, Exhaust manifold, Water pump, Air compressor, Turbocharger, Injector, Common rail, FuelInjection pump, Sensors, Combo oil filter , Water seperator, EGR ,Engine internal System, etc.

6. **SCR System Fundamentals : (15 Hours)**

Components: Description of Doser unit , Injector ,Thermistors , Nox Sensor , Decompose Pipe , EGP , DEF tank. Used in SCR and their function DEF (Diesel exhaust Fluid) preparation

7. **Doser Unit Work Cycle: (15 Hours)**

DEF Storage handling Refractometer Maintenance parts in SCR System

List of Practicals

1. Practical for layouting of CAN on vehicle. (10 Hours)
2. To make conventional circuit diagram of vehicle. }
3. Practical of CAN protection on vehicle. (10 Hours)
4. Visual inspection of all CAN and their connectors. }
5. To make circuit diagram of multiplexing wiring (20 Hours.) }
6. Practical on HMI switch function. }
7. Connection of harness of P-CAN, I-CAN, M-CAN. (20 Hours)
8. Execute software for flashing in four wheel vehicle. }
9. Practical on communication of all types of CAN. (10 Hours)
10. Visual inspection & identification given major changes from BS III to BS IV in Vehicle. }
11. Visual inspection of Doser Unit, Injector, Thermistors, Nox Sensor, Decomp Pipe, EGP and DFT Tank etc. (10 Hours)
12. Connection of Dosing Pump. (10 Hours)

5.2 SAFETY SYSTEM AND CRASH SYSTEM AND ELECTRONIC STABILITY CONTROL(ESC) SYSTEM

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1. **Safety system use in vehicle : (20 Hours)**

Safety Features in car. Active and Passive Feature in Car. Car Safety Check List.

2. **Detail description of Safety Devices used in vehicle: (30 Hours)**

Air Bags, Antilock Breaks(ABS), Traction Control, Shatter Resistant Glass, Lights, Mirrors, Bumper, Safety Belt Features,etc

3. **Crash System : (30 Hours)**

Describe the Car Crash Test, Rollover Test, Crash Test Dummies, Ideal Impact Test, Spring Driving Tips, Intelligent Speed Assist, Crash Test Dummies etc.

4. **Crumble Zone : (20 Hours)**

Describe the Crump Zone. How the crump Zone work, Barrier to absorb the impact, Redistributes the force of impact away from occupant.

5. **Electronic Stability Control (ESC) : (20 Hours)**

Introduction of Electronic stability program (ESP) or dynamic stability control (DSC). Integrated Chassis Control System (ICCS). Directional stability. Effectiveness of ESC Components and design and work Antilock Braking System ABS & Traction Control System TCS Future of ESC & TCS & Vehicle Regulation of above.

List of Practical's

1. Prepare Safety check list of car Vehicle and inspect. (10 Hours)
2. Visual inspection and connection of ABS, Shatter resistant glass. } (20 Hours)
3. Connection of Lights, Mirror, Bumpers, Safety belts etc. }
4. Fitment of Airbag in Car. (10 Hours)
5. Fitment and connection of ABS system in vehicle. (10 Hours)
6. Identify Crumple zone simulation. (10 Hours)

5.3 INTEGRATION OF ALL ECU AND DIAGNOSIS

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1. **Introduction of Integration of vehicle hardware with software : (30 Hours)**

Schematic, Architecture of a Multiplexed wiring system, Information like engine oil, air pressure, coolant temperature, engine rpm, vehicle speed, current gear and requested gear signal are available on the network. Open loop and close loop circuit diagram, advantage and disadvantage.

2. **Integration of Vehicle Sensors & ECU : (30 Hours)**

(engine ECU, ABS ECU, transmission ECU etc) and sensors to CBCU .Details of Bus Function Input to CBCU, Output from CBCU.

3. **Diagnostics : (30 Hours)**

Describe the latest diagnostics system used in Vehicle. Advantage of diagnostics system . Describe of various Fault code and service description. Corrective action of fault code and fault. Human machine Interface (HMI) for Diagnostics. HMI Switch, HMI Screen and their function.

4. **Trouble shooting steps: (30 Hours)**

Follow trouble shooting steps to clear the fault codes, Test method and reset for test. Do & don't for trouble shooting. HMI Screen Code and Error, Various Circuit diagram of trouble shooting.

List of Practicals

1. Visual and Function test of Following :- (30 Hours)

- A. Piston of Cam Sensor.
- B. Crank speed sensor.
- C. Coolant temperature sensor
- D. Common rail pressure sensor.
- E. Barometric pressure sensor.
- F. Intake manifold pressure and temperature sensor.
- G. Accelerator pedal sensor
- H. Solenoid injectors and M-prop.

2. Visual Inspection of all ECU sensors fitted on vehicle. (10 Hours)

3. Connecting Data Link Connector and USB cable with laptop for trouble shooting and clear the fault code. (10 Hours)
4. Trouble shooting of open circuit fault. } (20 Hours)
5. Trouble shooting of communication error. }

5.4 INFORMATICS

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1. **Basic Vehicle Information: (30 Hours)**

Make , Model ,Year ,Color ,License Plate/Registration Number, State of Registration , VIN number/Serial number, Location of Vehicle. Location Based Vehicle Tracking System.

2. **Intrduction of Informatics : (30 Hours)**

Connecting INSITE with Vehicle. Control on data on-Board diagnostics system (OBD System). Data feeding , Flashing and reflashing. Interchange of digital information on electrical connections between towing and towed vehicles .

3. **Vehicle Information and Communication System (VICS): (30 Hours)**

Details of Vehicle Information and Communication System (VICS).

The VICS information & navigation levels.

Level-1: Simple text data.

Level-2: In form of simple diagrams.

Level-3: Data superimposed on the map displayed on navigation unit (e.g., traffic congestion data).

Intelligent transport systems.

Active transport management

Advance transport management.

4. **Circuit diagram and Layout diagram reading and logic: (30 Hours)**

Wiring & lay out diagram and information of Tail Harness,

Wiring & lay out diagram and information of Main Harness

Wiring & lay out diagram and information of Engine harness

Wiring & lay out diagram and information of EMS and other wiring & lay out diagram and information's.

List of Practical's

1. Interaction of data with signals.
 2. Practical's on data feeding and reading.
 3. Practical's on Flashing and re flashing in circuit
 4. Connection of data link connector and USB with Laptop. (20 Hours)
 5. Practice of circuit diagram and layout diagram reading.
 6. Practice color coding of wire harness in circuit diagram.
 7. Make circuit diagram and connection of main harness, Tall harness and other harness
 8. Connection of GPS tracker for car and trucks. (10 Hours)
- } (20 Hours)
- } (30 Hours)

5.4 EMPLOYABLE SKILLS

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RATIONALE

Diploma holders are required to not only possess subject related knowledge but also soft skills to get good jobs and to rise steadily at their workplace. This subject is included to develop employability skills amongst the students.

DETAILED CONTENTS

1-Industrial Scenario Engineering Education and Expectations of competences from an engineer by employer .

2- Personality types characteristics and features for a successful engineer.

3-Professional Engineer desirable values and ethics and their development. Relation between engineering profession society and environment.

4- Managing project

- Leadership
- Motivation
- Time management
- Computer Software
- Interpersonal Relationship
- Engineer economics and fundamentals

5- Effective communication

- Listening
- Speaking
- Writing
- Presentation Technique/ Seminar
- Group discussion

6-Preparing for Employment

- Searching for job/job hunting
- Resume writing

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- Interview technique in personal interview telephonic interview, panel interview, group interview. Video conference.

7- Managing Self

- Managers body, mind motion & spirit
- Stress management
- Conflict resolution

8- Continuing professional development

- Organizing learning and knowledge
- Use of computer for organizing knowledge resources

9- Creativity, Innovation and Intellectual property right.

- Concept and need in present time for an engineer

10- Basic rules, laws and norms to be adhered by engineers during their working

List of Equipments

S No.	Description	Quantites (nos)
1	BS-IV Two Wheeler	2
2	BS-IV Four Wheeler , (Two LCV)	2
3	BS-IV Four Wheele (Two Car)	2
4	Multiplexing Harness Kit for Four wheeler Truck	4
5	Harness of P-CAN, I-CAN , M-CAN	6
6	Visual and Function test of Following-	
	6.1. Piston of Cam sensor,	2
	6.2 .Crank speed sensor,	2
	6.3. Coolant temperature sensor ,	2
	6.4 .Common Rail Pressur sensor ,	2
	6.5 .Barometric pressure sensor ,	2
	6.6 .Intake manifold Pressure & Temperature sensor ,	2
	6.7 .accelerator Pedal sensor ,	2
	6.8 .solenoid Injectors and M-Prop.; and other sensors used in BS-IV Vehicle.	2
7	Softwere for Flashing in Vehicle	2
8	ECU, Mux 2B withTesting Kit,	2
9	Lap top for fault display	2
10	Lead acid Battery 12 Volt 180 amp. Hours	4
11	Battery Charger 12 Volt 20 Amps.	2
12	DC Series Motors with Starter	2
13	DC Shunt Motors with Starter	2
14	DC Compound Motors with Starter	2
15	Battery operated Car	2
16	Hydrometer , Cell Tester	2 Each

Kindly mail the suggestion and comments for improvement of syllabus

Ashok Kushwaha

H.O.D.(Computer Science & Engineering)

Test Book Officer

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(Please note that all information in this survey is confidential for the use of curriculum design only)