TECHNICAL ENGINEER DIPLOMA IN AUTOMOTIVE ENGINEERING

COURSE SYNOPSIS

This course provides students with the skills and knowledge in analysing and resolving complex technical problems associated with motor vehicles, managing workshop maintenance and repair services, and rendering technical advice and providing workshop services to motorists.

Acquire knowledge and gain skills which are highly relevant to the industry:

- Workshop Management
- Automotive Test and Diagnostics
- Business and Project Management
- Production Technology
- Quality Management
- Computer-Aided Design

Gain valuable first-hand experience:

- Opportunity for real-work exposure through industry attachment

JOB OPPORTUNITIES

Technical Engineer Diploma in Automotive Engineering graduates are employed by companies in the automotive industry. Some of the job titles held by graduates include Service Advisor, Automotive Technical Executive and Automotive Workshop Manager.

CERTIFICATION

Credits required for certification:

Core Modules	:	117
Elective Modules	:	16
Total	:	133

COURSE STRUCTURE

Module Title	Credits
CORE MODULE	
Business Management and Communication I	10
Technical Mathematics	8
Information Technology	4
Technical Physics I	4
Quality Management	4
Design	6
Manufacturing Technology I	4
Automation Technology	4
Production and Operations Management I	4
Automotive Technology I	4
Automotive Electrics/Electronics I	4
Vehicle Management Systems I	4
Business Management and Communication II	12
Technical Physics II	6
Manufacturing Technology II	4
Production and Operations Management II	6
Automotive Technology II	6
Automotive Electrics/Electronics II	4
Vehicle Management Systems II	6
Final Year Project	13
ELECTIVE MODULES	
Training Company	8
Automotive Assessing	4
Pedagogy	4
Conversational German	4
Lean Manufacturing	4

Note: To obtain the Technical Engineer Diploma in Automotive Engineering certification, you need to fulfil all the institutional requirements stipulated for the course. The offer of electives is subject to the training schedule of respective ITE Colleges. Students are advised to check with their Class Advisors on the availability of the elective modules they intend to pursue.

MODULE OBJECTIVES

Core Modules

Business Management and Communication I
On completion of the module, students should be able to Create and analyse the requirements and contents of an annual financial statement. The students have the ability to apply full or marginal costing on a case-by-case basis, and can derive production and sales decisions from this information. They can determine capital requirements, differentiate between types of finance and their alternatives, and both execute and evaluate case-related financing.

The students are able to act responsibly and empathetically, and to develop an understanding of the motivation and communication processes in professional situations.

Technical Mathematics
On completion of the module, students should be able to model physical, electrical engineering, information technology, mechanical and economic problems mathematically. They can apply the techniques of problem solving to present results and to interpret and cope confidently with application-related tasks.

Information Technology
On completion of the module, students should be able to explain the structure of a computer system and describe the functions of the operating system. They are able to use industry-standard software for modeling technical problems.

Technical Physics I
On completion of the module, students should be able to analyse and calculate the occupation-specific tasks in the subject area of vehicle-specific applications, properties of mechanics of liquids and gases, and apply the laws of statics. They can recognise, understand and evaluate the physical relationships.

Quality Management
On completion of the module, students should be able to comprehend the structure and operation of quality management systems. They are capable of capturing, compressing and evaluating measurement values so that optimisation approaches can be developed. They are able to carry out and evaluate capability studies. The students should be able to monitor and evaluate processes using control charts, and have the competence to use the appropriate tools for process optimization.

Design
On completion of the module, students should be able to design tasks and to solve them on their own. They are able to apply the acquired problem-solving strategies and the principles of methodological constructing in a targeted manner. The principles of different design types such as supplementary, modification, variant and new designs are developed in various practical examples. They can control a 3D CAD system for the implementation of these tasks, and are able to utilise the resources effectively.

The students are, in addition to creating simple sketches, skilled in dealing with 3D CAD programme, and can create 3D models and 3D assemblies.

They are capable of using standard part databases and data sets of purchased parts and creating design variants by parameter controlled components and assemblies.

The students are able to select appropriate machine elements based on the particular case of application, and to dimension the machine elements in relation to their application. The students are proficient in the use of vendor-specific information and calculation programmes. Acquired knowledge of the technical physics and technical mathematics can be applied.

Manufacturing Technology I
On completion of the module, students should be able to analyse production sequences by reference to the corresponding manufacturing method, in accordance with the design aspects, the economic aspects and with respect to the achievable production quality and schedule.

They are confident in the evaluation and selection of competing manufacturing processes for production planning.

Automation Technology
This module provides students with the principles of electrical engineering and electronics - covering layout and building of basic electric circuit, analysing test circuits, and explaining the functionality and use of electronic devices. It also provides students with the application knowledge of automation fundamentals, with topics including description of open control loops and closed-loops, components of a control system, and hard-wired programmed controls. In general, this module aims to equip students with the essential knowledge on organization of production processes. Topics include modern business strategies and management tools, components of a computer-aided production, working process and time studies such as workplace design, observation and time recording, and arranging workplace evaluation.

Production and Operations Management I
On completion of the module, students should be able to classify a manufacturing company. They have the expertise to use the planning system as a scheme for the development of alternative solutions. The students can analyse, design and optimise work systems.

Automotive Technology I
On completion of the module, students should be able to analyse overall systems, system components and sub-components of a vehicle.

Automotive Electrics/Electronics I
On completion of the module, students should be able to establish the processes and interaction of individual components and systems on the basis of electrical engineering.

By selecting and applying appropriate measurement technology, the students are able to provide quantitative information.

Vehicle Management Systems I
On completion of the module, students should be able to analyse processes and relationships in the mechatronic systems of the motor vehicle and to record their measurements. They can apply physical and mathematical laws to the behaviour of systems for energy conversion of vehicle propulsion, vehicle safety and other systems.

Business Management and Communication II
On completion of the module, students should be capable of formulating marketing goals, and have at their disposal the know-how and the abilities to assign marketing instruments in the Marketing-Mix. They are in a position to describe the completion and fulfilment of contracts and to present the legal consequences of contractual anomalies on the basis of case studies.

They are able to judge the legal consequences of the actions. The students are capable of presenting the essential stipulations of individual and collective employment law, and to apply this on a case-by-case basis. Furthermore, they have a command of payroll accounting.

The students are capable of relating regional and current economic-political topics.

They are able to analyse their work tasks, to evaluate the findings reflectively and to note them in writing and to present appropriately.

Technical Physics II
On completion of the module, students should be able to analyse and calculate the occupation-specific tasks in the subject area of laws of strengths of materials, laws of kinematics and dynamics and distinguish work power and energy. They recognise, understand and evaluate the physical relationships.

Manufacturing Technology II
On completion of the module, students should be able to analyse production sequences by reference to the corresponding manufacturing method, in accordance with the design aspects, the economic aspects and with respect to the achievable production quality and schedule.

They are confident in the evaluation and selection of competing manufacturing processes for production planning.

They are capable of optimising the manufacturing process with the associated resources, taking into account ecological and economic aspects.

Production and Operations Management II
On completion of the module, students should be able to describe basic mechanisms involved in production planning and control. They are able to plan the manufacturing process for selected manufacturing tasks.

The students have the skills to select and use methods to optimise production.

They are able to work on projects according to the methodology of project management.

Automotive Technology II
On completion of the module, students should be able to select and justify the meaningful use of individual systems.

Automotive Electrics/Electronics II
On completion of the module, students should be able to establish the processes and interaction of individual components and systems on the basis of electrical engineering.

By selecting and applying appropriate measurement technology, the students are able to provide quantitative information.

Vehicle Management Systems II
On completion of the module, students should be able to make the selection of different systems on the basis of those procedures. They have the knowledge to compare subsystems.

Final Year Project
On completion of the module, students should be able to plan, implement, document and present projects independently, and in a self-organising manner.

They are able to draw up a project plan, including time management and milestones, procurement materials the necessary time to organise and, where appropriate, create the necessary organisational and technical interfaces in the course of operations. The students have the ability to seek professional help in a timely manner, and to solve problems in group work or in contact with specialists. They have the necessary methods at their disposal to present and document their work to the desired target audience in an understandable and professional manner.

Elective Modules

Training Company
On completion of the module, students should be able to apply the knowledge and skills in role playing an automotive servicing company.

Automotive Assessing
On completion of the module, students should be able to apply the applications of the basic principles of insurance, general principles of automotive assessing and vehicle theft/attempted theft claims. It also provides students with the knowledge and skills to identify repair methods for plastics on vehicles, defects for refinishing on vehicles, and perform costing, estimating and motor insurance administration and claims.

Pedagogy
On completion of the module, students should be able to apply the skills and knowledge to conduct lessons and coaching sessions, plan training and assessment schedule, develop an assessment checklist, and assess the performance of trainees.

Conversational German
On completion of the module, students should be able to apply the knowledge and skills to converse in German by covering German phonetics and phonology, grammatical rules, cultural appreciation, and daily phrases.

Lean Manufacturing
On completion of the module, students should be able to apply the applications of various quality assurance systems such as Kanban, Kaizen, Total Quality Management, Six Sigma and others in managing and controlling quality in manufacturing.

TECHNICAL ENGINEER DIPLOMA IN MACHINE TECHNOLOGY

COURSE SYNOPSIS

This course provides students with the skills and knowledge in the area of machine / equipment design and building, including making, assembly, testing and commissioning.

Acquire knowledge and skills gained which are highly relevant to the industry:

- Modern precision technology addressing higher precision
- Advanced automation for manufacturing industry
- Business and production quality management
- Digital application for managing production
- Business communication techniques and business economics
- Engineering IT and design

JOB OPPORTUNITIES

Technical Engineer Diploma in Machine Technology graduates are employed by companies in the high-growth machinery and systems industry. Some of the job titles held by graduates include Assistant Engineer and Supervisor.

There are excellent opportunities for career development and advancements to supervisory positions and beyond.

CERTIFICATION

Credits required for certification:

Core Modules	:	117
Elective Modules	:	16
Total	:	133

COURSE STRUCTURE

Module Title	Credits
CORE MODULE	
Technical Mathematics	10
Technical Physics	10
Design I	6
Information Technology	4
Quality Management	4
Business Management and Communication I	10
Automation Technology I	4
Production Management I	4
Production Technology I	8
Design II	12
Business Management and Communication II	12
Automation Technology II	6
Production Management II	6
Production Technology II	8
Final Year Project	13
ELECTIVE MODULES	
Training Company	8
Equipment Diagnostics	4
Lean Manufacturing	4
Robotics	4
German Language	4

Note: To obtain the Technical Engineer Diploma in Machine Technology certification, you need to fulfil all the institutional requirements stipulated for the course. The offer of electives is subject to the training schedule of respective ITE College. Students are advised to check with their Class Advisors on the availability of the elective modules they intend to pursue.

MODULE OBJECTIVES

Core Modules

Technical Mathematics
On completion of the module, students should be able to solve physical, electrical engineering, information technology, mechanical and economic problems mathematically through application-related teaching. They should also be able to master the techniques of problems solving, present results, interpret and cope confidently with professionally related, application-related tasks.

Technical Physics
On completion of the module, students should be able to analyse, calculate the occupation-specific tasks, recognise, understand and evaluate the physical relationships through experiments.

Design I
On completion of the module, students should be able to create 3D models and 3D assemblies with a 3D CAD programme, control the processing of the records for use in different areas of production, perform error and/or functional analyses in their solutions and also with the integration of the possibilities of a 3D CAD programme.

Information Technology
On completion of the module, students should be able to explain the structure of a computer system and describe the functions of the operating system. They should be able to plan and conceive a computer network, taking into account system security and to use industry-standard software for modeling engineering problems.

Quality Management
On completion of the module, students should be able to analyse the structure and operation of quality management systems. They should be able to capture, compress, and evaluate measurement values using control charts and appropriate tools for process optimisation.

Business Management and Communication I
On completion of the module, students should be able to create, analyse the requirements and contents of an annual financial statement, apply full or marginal costing on a case-by-case basis, and can derive production and sales decisions. They should be able to determine capital requirements, differentiate between types of finance and their alternatives, and both execute and evaluate case-related financing. They should be able to develop an understanding of the motivation and communication processes in professional situations. It also includes leading themselves and others, successfully form operational processes and solve problems that arise in a creative and goal-oriented fashion.

Automation Technology I
On completion of the module, students should be able to analyse, implement modern automation systems and to test, configure, dimension and evaluate application-specific circuits and controls, regulations and drives from different technologies to understand the system.

Production Management I
On completion of the module, students should be able to classify a manufacturing company, to use a planning system to develop alternative solutions. They should be able to describe basic mechanisms involved in production planning and control, plan the manufacturing process for selected manufacturing tasks and to control and monitor these while using ERP/PPS software. Topics include volume, scheduling and capacity planning.

Production Technology I
On completion of the module, students should be able to analyse production sequences in accordance with the design aspects, the economic aspects and with respect to the achievable production quality and schedule. They should also be able to evaluate, select the manufacturing processes for production planning, integrate computer-aided CNC programming with CAD/CAM system.

Design II
On completion of the module, students should be able to select appropriate machine elements based on an application, dimension and evaluate their solution. They should also be able to use vendor-specific information and calculation programmes.

Business Management and Communication II
On completion of the module, students should be able to formulate marketing goals, assign marketing instruments, describe the completion and fulfillment of contracts and present the legal consequences of contractual anomalies on the basis of case studies. They should be competence in personal, social, emotional, methodological and equip with cognitive skills, priority management and presentation skills to enable them to motivate others.

Automation Technology II
On completion of the module, students should be able to create programmes, have the necessary knowledge, standards, regulations, rules and safety guidelines to apply in the analysis, selection and testing of equipment and assemblies.

Production Management II
On completion of the module, students should be able to select, use methods to optimize production and work on projects according to the methodology of project management.

Production Technology II
On completion of the module, students should be able to optimize the manufacturing process with associated resources, taking into account ecological and economic aspects.

Final Year Project
On completion of the module, students should be able to apply the skills and knowledge acquired from the course into practice. The assigned or selected project will be guided and monitored by a Project Supervisor. Students are expected to plan, execute, evaluate, monitor the progress and exercise time management on their group project within the project time. This will include the purchasing of required material. A format presentation, with proper documentation and a completed written report are expected from the students.

Elective Modules

Training Company
On completion of the module, students should be able to apply the skills and knowledge in carrying out a company project.

Equipment Diagnostics
On completion of the module, students should be able to apply the skills and knowledge to troubleshoot hardware and software faults of machine/equipment at system level.

Lean Manufacturing
On completion of the module, students should be able to apply the applications of various quality assurance systems such as Kanban, Kaizen, Total Quality Management, Six Sigma and others in managing and controlling quality in manufacturing.

Robotics
On completion of the module, students should be able to apply the skills and knowledge to operate, program, troubleshoot and maintain an industrial robotic system used in a manufacturing plant.

German Language
On completion of the module, students should be able to apply the basic language proficiency to speak and understand conversational German so as to facilitate interaction with German-speaking people.

TECHNICAL DIPLOMA IN CULINARY ARTS

COURSE SYNOPSIS

This course provides students with the skills and knowledge to set up and operate a restaurant and manage its culinary operations, dinner events, purchasing and sales, F&B budget, staff as well as conduct research and development to introduce new menu and concepts for a French restaurant (non-halal).

On completion of the course, students should be able to:

- Apply techniques used in classical cookery in the preparation, cooking and garnishing of food.
- Develop restaurant menus and concepts.
- Perform menu planning, pricing and budgeting.
- Create a wine list.
- Control purchases and storage.
- Carry out a culinary production.
- Manage sales and promotion.
- Manage F&B events, restaurant operations and staff.

JOB OPPORTUNITIES

Technical Diploma in Culinary Arts graduates can be employed by restaurants and food & beverage establishments in hotels. Some of the job titles held by graduates may include Chef De Partie, Assistant Chef, Restaurant Supervisor and Assistant Manager.

CERTIFICATION

Credits required for certification:

Core Modules	:	180
Elective Modules	:	-
Total	:	180

COURSE STRUCTURE

Module Title	Credits
CORE MODULE	
Culinary Apprenticeship 1	12
Pastry Apprenticeship	6
Dining Service Apprenticeship Seminar	1
History of French Gastronomy	1
IT Tools 1	1
Digital Environment	1
Hygiene and Security	1
French 1	2
Oenology and Sommelier	1
Product Knowledge	1
Documentary Research Methods	1
Creative Project 1: E-Magazine	2
Culinary Practice	12
Restaurant Service Practice	9
Commissary Practice	6
Bakery 1	3
Culinary Apprenticeship 2	10
Organisational Behaviour	2
Production Organisation	2
Sensory Analysis	1
Sustainable Development	2
Marketing Fundamentals	2
Operational and Financial Management 1	2
French 2	2
IT Tools 2	1
Food and Beverage Management 1	1
Creative Project 2: Culinary Management Seminar	2

COURSE STRUCTURE

Module Title	Credits
CORE MODULE	
Culinary Apprenticeship 3	6
Bakery 2	2
Concept Creation and Development	2
Marketing Applied to Restaurant Industry	2
Kitchen Design	2
Health and Nutrition	1
Sommelier: Food and Wine Pairing	1
Rules and Standards in Restaurant Industry	1
Food and Beverage Management 2	1
Operational and Financial Management 2	2
Human Resources 1	2
Creative Project 3: Avant Scene	2
Analytical Project 1: Business Game Seminar	2
Analytical Project 2: Architecture and Engineering Seminar	2
Advanced Culinary and Pastry	14
Gastronomic Restaurant Cuisine	14
Creative Project 4: Gastronomic Menu	2
Consumer Behaviour and Analysis	2
General Tools for Chefs Communication	2
Technological Innovations	2
Food Science	1
Operational and Financial Management 3	2
Human Resource 2: Managing People	2
Supply Management	2
Change Management	2
French 3	2
Food Design	2
Concept Creation Project	6
In-Company Internship 1	5
In-Company Internship 2	5

MODULE OBJECTIVES

Core Modules

Culinary Apprenticeship 1
On completion of the modules, students should be able to cut, prepare and cook meat, poultry, fish, seafood, egg and vegetable dishes according to French-style cooking and recipes.

Pastry Apprenticeship
On completion of the modules, students should be able to produce pastries and creams, as well as prepare, assemble, garnish and finish simple desserts.

Dining Service Apprenticeship Seminar
On completion of the module, students should be able to set up the dining room, take orders and serve food to guests in a restaurant.

History of French Gastronomy
On completion of the module, students should be able to describe key events in the history of French gastronomy from prehistory until today.

IT Tools 1 & 2
On completion of the module, students should be able to use MSOffice suite (Word, Excel) for preparation of operational and financial management documents such as letters, resumes and recipe sheets.

Digital Environment
On completion of the module, students should be able to apply analytical and critical skills and knowledge in using different digital platforms such as culinary blogs and social media to develop brand image.

Hygiene and Security
On completion of the module, students should be able to apply the Hazard Analysis and Critical Control Points (HACCP) approach in handling, preserving and storing of food.

French 1, 2 & 3
On completion of the modules, students should be able to communicate, present and write in French using correct grammar, technical vocabulary and expressions used in a restaurant.

Oenology & Sommelier
On completion of the module, students should be able to apply wine tasting techniques to identify the basic flavours and tastes of wine and alcohol, create a wine list and recommend wines to match with dishes.

Product Knowledge
On completion of the module, students should be able to acquire a variation of product knowledge in terms of origin, culture, production methodology.

Documentary Research Methods
On completion of the module, students should be able to apply different research methodologies to obtain information for drafting reports and presentations.

Creative Project 1: E-Magazine
On completion of the module, students should be able to use digital tools to create an E-Magazine.

Culinary Practice
On completion of the module, students should be able to set up, organise and manage all aspects of food production.

Restaurant Service Practice
On completion of the module, students should be able to apply the concepts of service excellence framework in a restaurant environment.

Commissary Practice
On completion of the module, students should be able to have a comprehensive overview of a restaurant operational process such as supply coordination and the use of procurement software.

Bakery 1 & 2
On completion of the modules, students should be able to create and produce a variety of breads and pastries.

Culinary Apprenticeship 2
On completion of this module, students should be able to prepare traditional dishes using different proteins such as beef, veal, seafood and crustaceans.

Organisational Behaviour
On completion of this module, students should be able to acquire an in-depth understanding of human behaviour in an organisation from the psychological, sociological and cultural perspectives.

Production Organisation
On completion of the module, students should be able to plan and organise work activities for kitchen staff in the production of food. in compliance with food safety and hygiene guidelines.

Sensory Analysis
On completion of the module, students should be able to analyse dishes using their five senses and describe their characteristics in terms of aspect, smell, texture, savour and aroma using the appropriate vocabulary.

Sustainable Development
On completion of the module, students should be able to apply the concept of sustainable development and propose sustainable initiatives to reduce the economical, societal and environmental impacts on the industry.

Marketing Fundamentals
On completion of the modules, students should be able to apply analytical marketing concepts and strategies to promote a restaurant.

Operational and Financial Management 1, 2 & 3
On completion of the module, students should be able prepare basic financial documents using operational and financial tools in accordance to local accounting standards.

Food and Beverage Management 1 & 2
On completion of the modules, students should be able to develop a restaurant menu, compute costing, determine pricing, develop a budget for operating a restaurant and develop policies for the management of purchases and stock control.

Creative Project 2: Culinary Management Seminar
On completion of the module, students should be able to work in teams to produce a 3-course menu.

Culinary Apprenticeship 3
On completion of the module, students should be able to prepare traditional French dishes.

Concept Creation and Development
On completion of the module, students should be able to apply the principles of concept creation and development to enhance the restaurant business.

Marketing Applied to Restaurant Industry
On completion of the module, students should be able to apply the concept and principles of of marketing in the restaurant industry.

Kitchen Design
On completion of the module, students should be able to plan and design an efficient kitchen layout with a functional cooking area that is equipped with energy-saving cooking and food storage equipment.

Health and Nutrition
On completion of the module, students should be able to apply knowledge of food nutrition to create balanced menus.

Sommelier: Food and Wine Pairing
On completion of the module, students should be able to apply their skills and knowledge in wine tasting, and distinguish the different subdivisions, main grape varietals, appellations and different types of European and International wines. They should also be able to speak about the wine using appropriate vocabulary and apply knowledge in food and wine pairing.

Rules and Standards in Restaurant Industry
On completion of the module, students should be able to apply the rules and regulations for starting and running a restaurant.

Human Resource 1
On completion of the module, students should be able to apply legal principles and administrative aspects of personnel management which includes hiring, training and evaluation.

Creative Project 3: Avant Scene
On completion of the module, students should be able to design and set up a "pop-up" restaurant.

Analytical Project 1: Business Game Seminar
On completion of the module, students should be able to apply strategic and analytical concepts to design, create and price menu items for their proposed restaurant in a competitive setting.

Analytical Project 2: Architecture & Engineering Seminar
On completion of the module, students should be able to apply the concepts of architectural and engineering innovations to design kitchen and restaurant set-ups.

Advanced Culinary and Pastry
On completion of the module, students should be able to apply advanced cooking techniques such as low temperature cooking and vacuum cooking.

Gastronomic Restaurant Cuisine
On completion of the module, students should be able to apply culinary techniques to produce a variety of dishes in a gastronomic restaurant and supervise a section in the kitchen.

Creative Project 4: Gastronomic Menu
On completion of the module, students should be able to develop a gastronomic menu.

Consumer Behaviour and Analysis
On completion of the modules, students should be able to apply their knowledge of Customer Relationship Management (CRM) and adapt it to the restaurant industry.

General Tools for Chefs Communication
On completion of this module, students should be able to communicate professionally at different platforms.

Technological Innovations
On completion of the module, students should be able to apply knowledge of new culinary technologies for operational efficiency.

Food Science
On completion of the module, students should be able to apply knowledge in biochemistry in food preparation and cooking.

Human Resource 2: Managing People
On completion of the module, students should be able to apply new management approaches to manage team, resolve conflicts and discipline staff.

Supply Management
On completion of the module, students should be able to apply specific tools and techniques to optimise supply management.

Change Management
On completion of the module, students should be able to apply the principles of change management in operating a restaurant.

Food Design
On completion of the module, students should be able to apply knowledge in the different aspects of food design.

Concept Creation Project
On completion of the module, students should be able to apply knowledge and managerial competence acquired during training to develop a innovative and realistic restaurant for dining on-site.

In-Company Internship 1 & 2
On completion of the module, students should be able to integrate their skills and knowledge in a real work environment.