

# TECHNICAL ENGINEER DIPLOMA IN AUTOMOTIVE ENGINEERING

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## MODULE OBJECTIVES

### Core Modules

#### **Business Management & Communication I**

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

### **Automotive Electrics/Electronics I**

On completion of this 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 this 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 & Communication II**

On completion of this module, students should be able to formulate 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 this 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 this 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 this 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 this module, students should be able to select and justify the meaningful use of individual systems.

### **Automotive Electrics/Electronics II**

On completion of this 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 this 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 this 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.