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DEVELOPMENT OF EDUCATION MODULES FOR SAFETY CRITICAL RAILWAY OPERATION SYSTEMS

DEM-SaCROS
2023

EDUCATION MODULES FOR RAIL SYSTEM MANAGEMENT

DEM-SaCROS
2023

COURSE CONTENTS

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LEARNING OUTCOMES

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**MATHEMATICS I**

AIMS

1. To be able to do mathematical operations concerning accounting number, natural numbers, integers, rational numbers and irrational numbers.
2. To be able to express the basic identities to solve an equation.
3. To be able to explain the function
4. To be able to explain logarithm
5. To be able to understand and explain trigonometry
6. To be able to calculate the area and volume of different geometries

SPECIAL DEFINITIONS

In order to increase the student's, mathematical skills which would be necessary to improve the analytical and geometrical understanding of them, basic mathematical operations, identities and equations would be introduced. Besides, the further information regardng the geometry and trigononmetry will improve the rational thinking skills of the students.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be considered.

TOPICS	***Ratios of Topics (%)***
A. Mathematical operations concerning accounting number, natural numbers, integers, rational numbers and irrational numbers.	20
B. The basic identities to solve an equation	15
C. Function	20
D. Logarithm	15
E. Trigonometry	15
F. Area and Volume	15

TOPICS

A. Workplace Management & Administration Mathematical operations concerning accounting number, natural numbers, integers, rational numbers and irrational numbers.

AIM: To be able to do mathematical operations concerning accounting number, natural numbers, integers, rational numbers and irrational numbers.

LEARNING OUTCOMES

1. Do arithmetic operations concerned rational and irrational numbers .
2. Recognize exponentiation numbers that come out and practice operations.
3. Recognize arithmetic operations with radical numbers
4. Recognize absolute value.

B. The basic identities to solve an equation

AIM: To be able to express the basic identities to solve an equation.

LEARNING OUTCOMES

1. factorize quadratic equation.
2. Solve rational statement.
3. Solve equation
4. Recognize absolute value.

C. Function

AIM: To be able to explain function

LEARNING OUTCOMES

1. Define function concept.
2. Find out domain.
3. Find out inverse of function.
4. Plot function.

D. Logartihm

AIM: To be able to explain logarithm

LEARNING OUTCOMES

1. Define exponential functions and graph.
2. Define logarithm function.
3. Define natural logarithm.
4. express features of logarithm.

E. Trigonometry

AIM: To be able to understand and explain trigonometry

LEARNING OUTCOMES

1. Recognize an angle measure unity.
2. Set ratios of sine, cosine and tangent for acute angle.
3. Know inverse trigonometric ratios.
4. Graph trigonometry function.

F. Area and Volume

AIM: To be able to calculate the area and volume of different geometries

LEARNING OUTCOMES

1. calculate area and volume of geometric figure.
2. Apply euclidean and Pythagorous' theorems.
3. Calculate areas of irregular geometric figures.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**MATHEMATICS II**

AIMS

1. To be able to do matrices and determinants
2. To be able to do solutions of linear systems of equations
3. To be able to explain the integral
4. To be able to explain definition of derivative
5. To be able to understand and explain exponential and logarithmic functions
6. To be able to understand solutions of linear systems of equations

SPECIAL DEFINITIONS

In order to increase the student's, mathematical skills which would be necessary to improve the analytical and geometrical understanding of them matrices and determinants, solutions of linear systems of equations, the integral, definition of derivative, exponential and logarithmic functions and linear systems of equations.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be considered.

TOPICS	***Ratios of Topics (%)***
A. Matrices and Determinants	20
B. Solutions of Linear Systems of Equations	15
C. Integral	20
D. Derivative, Definition of derivative	15
E. Exponential and Logarithmic Functions	15
F. Solutions of Linear Systems of Equations	15

TOPICS

A. Mathematical operations concerning matrices and determinants.

AIM: To be able to do mathematical operations concerning matrices and determinants.

LEARNING OUTCOMES

1. Do arithmetic operations concerning matrices.
2. Do arithmetic operations concerning determinants.

B. Solutions of Linear Systems of Equations

AIM: To be able to do the solutions of linear systems of equations.

LEARNING OUTCOMES

1. Solve equations.

C. Integral

AIM: To be able to understand integral

LEARNING OUTCOMES

1. Define integral.
2. Find out definite integral.
3. Find out indefinite integral.
4. Understand properties of integral.

D. Derivative

AIM: To be able to explain definition of derivative

LEARNING OUTCOMES

1. Define tangent line, properties of the derivative.
2. Define chain rule.
3. Define derivatives of polynomial, rational, exponential and logarithmic functions.

E.Exponential and Logarithmic Functions

AIM: To be able to understand and explain exponential and logarithmic functions

LEARNING OUTCOMES

1. Find out exponential and logarithmic functions.

F. Solutions of Linear Systems of Equations

AIM: To be able to understand solutions of linear systems of equations.

LEARNING OUTCOMES

1. Find out linear systems of equations.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM ELECTRIC ELECTRONICS**
COURSE SEMESTER	**RAIL SYSTEM CONSTRUCTION**
WEEKLY COURSE PERIOD	
COURSE DURATION	**TECHNICAL DRAWING**

AIMS

1. Teach students the basic principles of technical drawing, such as line types, lettering, and dimensioning.
2. Help students develop their skills in sketching and drafting.
3. Enable students to communicate their ideas clearly and concisely through technical drawings.
4. Prepare students for careers in engineering and other fields where technical drawing is a necessary skill.

SPECIAL DEFINITION

Problem-solving: Technical drawing requires the ability to solve problems and think critically. Students will learn how to use their technical drawing skills to solve problems and come up with creative solutions. Communication: Technical drawings are a form of communication. Students will learn how to use their technical drawing skills to communicate their ideas clearly and concisely to others. Teamwork: Technical drawings are often created by teams of people. Students will learn how to work effectively as part of a team to create technical drawings.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Engineering Drawing and Tools	30
B. Geometric Projection and Drawing Views	30
C. Scaling and Measuring	40

TOPICS

A. Engineering Drawing and Tools

AIM: Students know details of engineering drawing and tools.

LEARNING OUTCOMES

1. Knows papers used at drawing and other tools.
2. Know measurements of paper standards.

B. Geometric Projection and Drawing Views

AIM: Knows scaling and measuring, cross section views, perspective, roughness of surfaces and surface processing signs, tolerance and exercises.

LEARNING OUTCOMES

1. Students can draw cross section views, perspective and tolerance.
2. Students can define roughness of surfaces and surface processing signs.

C. Scaling and Measuring

AIM: To know scalling and measuring of parts.

LEARNING OUTCOMES

1. Students can understand and draw scaling and measuring tools.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**INTRODUCTION TO RAILWAY**
COURSE DURATION	**TRANSPORTATION**

AIMS

1. Provide students with a basic understanding of the history, components, and operation of railway transportation systems.
2. Help students develop an appreciation for the importance of railway transportation in the global economy.
3. Encourage students to consider careers in the railway transportation industry.

SPECIAL DEFINITION

By learning about railway transportation, students can gain a better understanding of this important mode of transportation. They can also develop an appreciation for the challenges and opportunities facing the railway transportation industry. This knowledge can help students make informed decisions about their future careers.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Importance, role and classification of railroad transportation, features of trains, locomotives and wagoons	30
B. Operations of trains, safety and communications systems	30
C. Infrastructure and superstructure on railways	40

TOPICS

A. Understands the importance, role and classification of railroad transportation, features of trains, locomotives and wagoons

AIM: To be able to understand importance, role and classification of railroad transportation, features of trains, locomotives and wagoons

LEARNING OUTCOMES

1. Define the importance of different types of rail road vehicles.

2. Knows the features of trains, locomotives and wagoons

B. Operations of trains, safety and communications systems

AIM: To be able to know operations of trains, safety and communications systems

LEARNING OUTCOMES

1. Understands operations of rail vehicles.
2. Knows abot safety and communications systems.

C. Infrastructure and superstructure on railways

AIM: To able to understand infrastructure and superstructure on railways

LEARNING OUTCOMES

1. Understands the infrastructure and superstructure especially switches, basics of railroad projects and track maintenance.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**INTRODUCTION TO BUSINESS**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Get to know different classifications of business.
2. Get insight into the concept and characteristics of a business activity.
3. Get to know the basic objectives of a business.
4. Get insight into basic success factors for a business.
5. Know the importance of suppliers and customers for the company.
6. Get to know essential business skills.

SPECIAL DEFINITION

In this module a short introduction to business is included. The sutdents learn about business classification, concepts and characteristics for business, basic objectives of business.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Classification of business activities	10
B. Concept and characteristics of a business	20
C. Objectives of a business	25
D. Supply chain management and customer relationship management	20
E. Business Skills	25

TOPICS

A. *Classification of business activities*

AIM: Get to know different classifications of business.

LEARNING OUTCOMES

1. Know international company classifications.

B. Concept and characteristics of a business

AIM: Insight into the concept and characteristics of a business activity.

LEARNING OUTCOMES

1. Get to know characteristics in business classification.
2. Develop a basic understanding of how business works.
3. Know different criteria used in drafting the concept of a business.

C. Objectives of a business

AIM: Get to know the basic objectives of a business.

LEARNING OUTCOMES

1. Insight into the basic objectives of business.
2. Know traditional and potential new business success factors (inispired by economic, social and ecologic values).
3. Get to know basic performance indicators (e.g. productivity, profitability, return on sales, return on investment, etc.).

D. Supply chain management and customer relationship management

AIM: Know and value the importance of suppliers and customers for the company

LEARNING OUTCOMES

1. Develop a basic understanding of supplier and customer management.
2. Insight into new business models addressing supply chain management.
3. Know important elements of customer relationship management.

E. Business Skills

AIM: Get essential business skills.

LEARNING OUTCOMES

1. Insight into basic business skills and entrepreneurial skills.
2. Know about financial management, marketing, sales, customer service, project management, planning and the role in the company.
3. Be able to apply basic business soft skills (related to communication, negotiation, networking etc.).

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**INTRODUCTION TO ACCOUNTING**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Have a basic understanding of accounting in companies.
2. Get acquainted with basic criteria of accounting obligations for companies.
3. Become familiar with basic regulations and elements of proper accounting.
4. Insight into basic elements of double-entry accounting.
5. Develop a basic understanding of the wide range of tasks that need to be handled within the accounting function.
6. Become familiar with different areas of accounting as well as accounting software.

SPECIAL DEFINITION

In this module, basic elements and objectives of accounting are explained. The distinction between bookkeeping and accounting, the importance and necessity of the bookkeeping obligations defined by various criteria for companies allow to develop a basic understanding of the importance and necessity of bookkeeping in companies. A first introduction to double-entry bookkeeping, criteria of proper bookkeeping and various elements and tasks of bookkeeping as well as possible uses of accounting software represent further content.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Accounting	10
B. Accounting obligations for companies	15
C. Double-entry accounting (Doppik)	15
D. Principles of proper accounting	20
E. Accounting tasks	20
F. Areas of accounting and accounting software	20

TOPICS

A. Introduction to Accounting

AIM: Development of a basic understanding regarding the importance and necessity of accounting in companies.

LEARNING OUTCOMES

1. Know the meaning and distinction between accounting and bookkeeping.
2. Insight into basic elements and objectives of accounting.
3. Understand accounting shows the company's earnings, assets and liquidity.

B. Accounting obligations for companies

AIM: Get acquainted with basic criteria of accounting obligations for companies.

LEARNING OUTCOMES

1. Know different criteria (legal form, entry in the Commercial Register, annual turnover/ surplus) which determine the method of accounting is used in companies.
2. Get acquainted with basic methods of profit determination in companies (income-expenditure accounting and double-entry bookkeeping).
3. Know criteria which are decisive for companies to carry out double-entry bookkeeping.

C. Double-entry accounting (Doppik)

AIM: Insight into basics of double-entry accounting.

LEARNING OUTCOMES

1. Know about the importance and necessity of double-entry accounting in companies and its objectives.
2. Insight into the advantages and disadvantages of double-entry accounting or cash accounting.
3. Become familiar with basic elements of double-entry accounting and learn to read the balance sheet and profit and loss account.

D. Principles of proper accounting

***AIM*:** Become familiar with basic regulations and elements of proper accounting.

LEARNING OUTCOMES

1. Developing a basic understanding of which regulations and criteria condition proper accounting.
2. Get acquainted with different books in accounting (ledger/ journal, general ledger, subsidiary ledgers).
3. Get to know different accounts in accounting and the meaning of debit and credit.

E. Accounting tasks

AIM: Develop a basic understanding of the wide range of tasks that need to be handled within the accounting function.

LEARNING OUTCOMES

1. Know business transaction recording and accordance in accounting.
2. Insight into basic accounting tasks (e.g. document organisation, sales/pre-tax, income taxes, etc.).
3. Get to know other areas of accounting (such as inventory, asset management and cost and activity accounting).

F. Areas of accounting and accounting software

AIM: Become familiar with different areas of accounting as well as uses of accounting software.

LEARNING OUTCOMES

1. Develop a basic understanding of the areas of accounting (e.g. financial accounting, accounts receivable, asset accounting, etc.).
2. Insight into task areas accounting software are used for.
3. Getting to know advantages of digitalisation in accounting (know e.g. about cloud solutions).

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**RAILWAY SYSTEM TRAFFIC**

AIMS

1. To introduce students to the basics of railway traffic management. This includes topics such as train signaling, train dispatching, and railway safety.
2. To help students develop the skills needed to analyze and solve railway traffic problems. This includes the ability to identify and assess risks, develop and implement safety procedures, and manage train traffic in a safe and efficient manner.
3. To encourage students to consider careers in the railway industry. The railway industry is a growing sector with a wide range of career opportunities. By learning about railway traffic management, students can gain the skills and knowledge needed to pursue a rewarding career in this field.

SPECIAL DEFINITION

Train signaling: This includes the different types of train signals, how they work, and how they are used to control train movements. Train dispatching: This includes the process of planning and coordinating train movements, as well as the role of the train dispatcher. Railway safety: This includes topics such as railway signaling, train dispatching, and railway operations. Problem-solving: This includes the ability to identify and assess risks, develop and implement safety procedures, and manage train traffic in a safe and efficient manner.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Information about trains and other railway vehicles, signs and signals in railways	30
B. Regulations and crisis management in breakdowns and disorders	30
C. Classification of railway vehicles, preparation of trains for departures and regulations for railway traffic	40

TOPICS

D. Understands information about trains and other railway vehicles, signs and signals in railways

AIM: To understand information about trains and other railway vehicles, signs and signals in railways

LEARNING OUTCOMES

1. To be able to understand information about trains and other railway vehicles.
2. To know about signs and signals in railways.

E. Regulations and crisis management in breakdowns and disorders

AIM: To know regulations and crisis management in breakdowns and disorders

LEARNING OUTCOMES

1. Understand and know regulations and crisis management in breakdowns and disorders

F. Classification of railway vehicles, preparation of trains for departures and regulations for railway traffic

AIM: To recognize classification of railway vehicles, preparation of trains for departures and regulations for railway traffic

LEARNING OUTCOMES

1. Understands the classification of railway vehicles, preparation of trains for departures and regulations for railway traffic

PROGRAM TITLE	**RSM**
COURSE CODE AND TITLE	**TRAIN MECHANICS**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To recognize the features of the rail system vehicles.
2. To understand the resistances that the rail system vehicles encounter during their journey.
3. To calculate the power of rail system vehicles.
4. To calculate the travel times of the rail system vehicles.

SPECIAL DEFINITION

With the TRAIN MECHANICS course, students will be able to know the features of rail system vehicles and comprehend the resistances they encounter during their journeys. Students will be able to calculate the power of rail system vehicles and their travel times. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Rail System Vehicles	25
B. Running Resistance	25
C. Calculation of Power	25
D. Calculation of Travel Time	25

TOPICS

A. Rail System Vehicles

AIM: To recognize the features of the rail system vehicles.

LEARNING OUTCOMES

1. Classifies the rail system vehicles.
2. Defines the combinations of rolling stock.
3. Explains the specifications of rail system vehicles regarding their types.

A. Running Resistance

AIM: To comprehend the resistances that rail system vehicles encounter during their journey.

LEARNING OUTCOMES

1. Explains the running resistances according to the hauling vehicle types.
2. Explains the running resistances according to the types of hauled vehicle types.

3. Explains ramp and curve resistances according to the geometric structure of the railway.

B. Calculation of Power

AIM: To calculate the power of rail system vehicles.

LEARNING OUTCOMES

1. Calculates the hauling vehicle powers according to different train systems.
2. Explains the factors limiting power.
3. Calculates the load to be hauled in different railway conditions according to the type and power of the vehicles.

C. Calculation of Travel Time

AIM: To calculate the travel times of the rail system vehicles.

LEARNING OUTCOMES

1. Defines the speeds of hauling vehicles.
2. Defines the speeds of urban rail systems.
3. Calculates the travel time according to the power and speed of the vehicles.
4. Explains the factors affecting speed and travel time.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**Commercial Law**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**2+2; 4,0**
COURSE DURATION	

AIMS

1. To be able to explain the concept of Commercial Law
2. To know how the information flow occurs related to Commercial business
3. Utilization of information related to Commercial Law

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Commercial Law	25
B. Sale of Goods principles; Contractual Terms / Limitation; Passing of Property; Retention of Title	25
C. Service Contracts; Performance and Remedies; Agency; Consumer Protection	25
D. Introduction to International Commercial Law; The International Sale of Goods; Carriage of Goods by Sea and other means; ADR	25

TOPICS

A. Introduction to Commercial Law

AIMS: To be able to explain the concept of Commercial Law

LEARNING OUTCOMES

1. To explain the concept of fundamental Rights on Commercials
2. To know the principles of Commercial Law

B. Sale of Goods principles; Contractual Terms / Limitation; Passing of Property; Retention of Title

AIMS: To be able to know what Commercial Law is and its terms, limitations, titles

LEARNING OUTCOMES

1. To know the principles of saling goods
2. To know its terms/limitation
3. To know the main idea of passing of property
4. To know retention of title

C. Service Contracts; Performance and Remedies; Agency; Consumer Protection

AIMS: To be able to know what service contracts, performace, remedies, agencies, consumer protection are

LEARNING OUTCOMES

1. To know service contracts
2. To know performance and remedies
3. To know agency and its functions
4. To know consumer protection

D. Introduction to International Commercial Law; The International Sale of Goods; Carriage of Goods by Sea and other means; ADR

AIMS: To be able to know and use information related international commercial law

LEARNING OUTCOMES

1. To understand the principles of international commercial law
2. To know the principles of international sale of goods
3. To know scarriage of goods by sea and other means
4. To know the principles and functions of ADR

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**TRANSPORTATIONAL ECONOMICS**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Get to know basic objectives and sub-areas of transport economics.
2. Get to know different companies in the transport sector.
3. Get to know different transport services (incl. green-environmental friendly services).
4. Get to know different professions in the transport industry and other sub-sectors of transport.
5. Introduction to the thematic focus on rail transport.
6. Learn the basic uses and general modalities of rail transport.

SPECIAL DEFINITION

This module provides an introduction to the topic transportational economics/ transport industry. After an initial definition of terms, basic objectives and sub-areas of the transport industry, various transport companies, transport services and their importance and necessity for a functioning transport industry are presented. The railway as an important component of the transport industry is presented in more detail in order to enable a better basic understanding of the main topic of the DEM-SaCROS-project.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Transport Economics	15
B. Transport companies in the transport sector	15
C. Transport services	15
D. Professions in the transport industry and other sub-sectors of the transport industry	15
E. Rail transport	20
F. Uses of rail transport	20

TOPICS

A. *Introduction to Transport Economics*

AIM: Get to know basic objectives and sub-areas of economics in the transport sector.

LEARNING OUTCOMES

1. Understand what transport economics means.
2. Knowledge of the basic objectives of the transport industry/ transport economics.
3. Get to know the basic sub-areas of transport economics.

B. Transport companies in the transport sector

AIM: Get to know different companies in the transport sector.

LEARNING OUTCOMES

1. Develop a basic understanding of which companies are classified as transport companies.
2. Insight into different transport services provided by transport companies.
3. Knowledge of the objectives of the transport companies.

C. Transport services

AIM: Get to know different transport services.

LEARNING OUTCOMES

1. Get to know the area of passenger transportation.
2. Insight into the areas of freight transport, animal transport and intelligence services.
3. Developing a basic understanding of different transport services in the transport industry (incl. environmental-friendly options).

D. Professions in the transport industry and other sub-sectors of the transport industry

AIM: Get to know different professions in the transport industry and other sub-sectors of transport.

LEARNING OUTCOMES

1. Insight into the transport sector and the associated professions.
2. Get to know other sub-areas of transport, such as the tourism industry, public transport, etc.
3. Get to know interface areas in transport (e.g. spatial planning, urban planning, transport policy, etc.).

E. Rail transport

AIM: Introduction to the thematic focus on rail transport.

LEARNING OUTCOMES

1. Distinguish between rail transport and other rail-based means of transport (e.g. tram, metro, etc.).
2. Knowledge of advantages of transporting people and goods by rail.
3. Develop a basic understanding of the importance of railways in the transport economy.

F. Uses of rail transport

AIM: Learn the basic uses and general modalities of rail transport.

LEARNING OUTCOMES

1. Know that rail transport is used for public passenger, local/ long-distance and freight transport.
2. Become familiar with basic railway vehicles and railway operations (e.g. timetables, safety, railway facilities, new environmental and digital aspects etc.).
3. Develop a basic understanding of the importance of long-distance, local/ regional transport services in the transport industry.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**MARKETING**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Know what marketing is and its objectives.
2. Get to know basic marketing instruments.
3. Insight into the basics of goal-oriented and efficient marketing.
4. Develop a basic understanding of what needs to be considered when defining marketing objectives.
5. Get to know the importance of a company's corporate identity internally and externally.
6. Get to know different marketing measures for the success of the company.

SPECIAL DEFINITION

In this module, the basics of efficient marketing and its importance for the success of a railway company are taught. Basic objectives of marketing in general, as well as important criteria that must be taken into account when defining company-specific marketing objectives, are the focus, as well as various marketing instruments and concrete marketing measures in the railroad sector in particular.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Marketing	10
B. Marketing mix and other marketing tools	20
C. Basics of successful marketing	15
D. Define marketing objectives	15
E. Corporate identity of a company	20
F. Marketing measures	20

TOPICS

A. *Introduction to Marketing*

AIM: Know what marketing is and know its objectives.

LEARNING OUTCOMES

1. Become familiar with basic elements and objectives of marketing.
2. Know that marketing is aimed at increasing sales figures.
3. Develop of a basic understanding regarding the importance of efficient marketing for the success of a company.

B. Marketing mix and other marketing tools

AIM: Get to know basic marketing instruments.

LEARNING OUTCOMES

1. Develop a basic understanding of what marketing tools are for and how they are used.
2. Get to know the 4 P's of the marketing mix and their importance in marketing.
3. Get to know further marketing instruments, which are especially important in the service sector (e.g. personnel, process and equipment policy).

C. Basics of successful marketing

AIM: Insight into the basics of goal-oriented and efficient marketing.

LEARNING OUTCOMES

1. Know that audience analysis is an important component of marketing.
2. Know about the difference and importance of B2B and B2C for marketing.
3. Insight into basics of Customer Relationsship Management (CRM) as well as possible uses of CRM systems in the sector.

D. Define marketing objectives

AIM: Develop a basic understanding of what needs to be considered when defining marketing objectives.

LEARNING OUTCOMES

1. Know the definition of the unique selling point (USB) and its importance.
2. Know and be able to define marketing objectives applying the SMART approach.
3. Insight into basic qualitative and quantitative marketing objectives in the railroad sector.

E. Corporate identity of a company

AIM: Know the importance of a company's corporate identity.

LEARNING OUTCOMES

1. Insight into basic elements and objectives of corporate identity in companies.
2. Get to know the four pillars of corporate identity (corporate behavior, corporate design, corporate communication, corporate culture).
3. Development of a basic understanding of the importance and necessity of corporate identity in companies.

F. Marketing measures

AIM: Get to know different marketing measures for the success of the company.

LEARNING OUTCOMES

1. Insight into possibilities of offline marketing (e.g. flyers, advertisements, discount campaigns etc.).
2. Get to know different variants of online marketing (social media, newsletters, blogging etc.).
3. Know about the importance of the own website and search engine marketing (SEO and SEA).

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**URBAN RAILWAY TRANSPORTATION**
COURSE DURATION	**SYSTEMS I**

AIMS

1. To introduce students to the basics of urban railway transportation. This includes topics such as the history of urban railways, the different types of urban railways, and the role of urban railways in a city's transportation system.
2. To help students develop an understanding of the challenges and opportunities facing urban railway transportation. This includes topics such as funding, planning, construction, operation, and maintenance of urban railways.

SPECIAL DEFINITION

History of urban railways: This includes the history of urban railways in different parts of the world, as well as the factors that have contributed to the growth of urban railways. Types of urban railways: This includes the different types of urban railways, such as light rail, heavy rail, and metro. Role of urban railways in a city's transportation system: This includes the role of urban railways in providing transportation for commuters, tourists, and other city residents. Challenges and opportunities facing urban railway transportation: This includes topics such as funding, planning, construction, operation, and maintenance of urban railways.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. General definitions and concepts about urban railway transportation systems	30
B. Importance and kinds of urban railway transportation systems and planning of these systems; defining the vehicles used in these systems	30
C. Signs and signals for the information processing system	40

TOPICS

A. General definitions and concepts about urban railway transportation systems

AIM: To understand general definitions and concepts about urban railway transportation systems

LEARNING OUTCOMES

1. Knows general definitions and concepts about urban railway transportation systems.

B. Importance and kinds of urban railway transportation systems and planning of these systems; defining the vehicles used in these systems

AIM: To know importance and kinds of urban railway transportation systems and planning of these systems, defining the vehicles used in these systems.

LEARNING OUTCOMES

1. Understands importance and kinds of urban railway transportation systems and planning of these systems
2. Defines the vehicles used in these systems.

C. Signs and signals for the information processing system

AIM: To recognize and know sign and signals for the information processing system

LEARNING OUTCOMES

1. Understands sign and signals for the information processing system.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**URBAN RAILWAY TRANSPORTATION**
COURSE DURATION	**SYSTEMS II**

AIMS

1. To encourage students to consider careers in the urban railway transportation industry. The urban railway transportation industry is a growing sector with a wide range of career opportunities. By learning about urban railway transportation, students can gain the skills and knowledge needed to pursue a rewarding career in this field. Students can focus on type, class and speed of trains used in urban railway transportation systems and planning of traffic and rules of the regulation.

SPECIAL DEFINITION

Sustainability: Urban railways can be a more sustainable form of transportation than other modes, such as cars and buses. This is because they can carry more people per unit of energy, and they do not produce emissions that contribute to air pollution or climate change. Safety: Urban railways can be made safer for passengers and operators by using a variety of safety measures, such as automatic train control (ATC), positive train control (PTC), and wayside signaling. Technology: The latest technologies that are being used in urban railways include driverless trains and smart ticketing. Driverless trains are controlled by a computer system, which can improve safety and efficiency.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Type, class and speed of trains used in urban railway transportation systems	30
B. Facilities providing the safety of control systems	30
C. Maintenance and repair of these facilities preparing all vehicle	40

TOPICS

A. Type, class and speed of trains used in urban railway transportation systems

AIM: To understand type, class and speed of trains used in urban railway transportation systems

LEARNING OUTCOMES

1. Knows general type, class and speed of trains used in urban railway transportation systems.

B. Facilities providing the safety of control systems

AIM: To know facilities providing the safety of control systems

LEARNING OUTCOMES

1. Understands importance of facilities providing the safety of control systems.

C. Maintenance and repair of these facilities preparing all vehicle

AIM: To know maintenance and repair of these facilities preparing all vehicle

LEARNING OUTCOMES

1. Understands maintenance and repair of these facilities preparing all vehicle.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**RAILWAY SYSTEM MANAGEMENT**

AIMS

1. To be able to explain the definition of transportation in general, the historical development passenger and baggage transportation and the issues related to international transportation irregularities, process of railways and basic concepts
2. To be able to explain and apply the issues related to the provisions of domestic goods transportation
3. To be able to define and apply the issues related to the provisions of international railway goods,

SPECIAL STATEMENTS

In order to increase the student's technical equipment related to rail systems, it should be ensured that students understand the history of rail systems, general definitions, signs used to ensure traffic safety and the definition of traffic systems. Students are expected to reach maneuver communication, passenger and freight transport.

EVALUATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. Final exam questions preparing this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Definition of Transportation, Historical Development Process and Basic Concepts of Railways	30
B. Issues Concerning the Provisions of Domestic Goods Transportation	30
C. Issues relating to the provisions of international railroad goods, passengers and baggage provisions and issues concerning international transport irregularities	40

TOPICS

A. Definition of Transportation, Historical Development Process and Basic Concepts of Railways

AIM: To define the terms used in railways, to comprehend the concept of train and its features; classify trains, explain station concept, characteristics and types.

LEARNING OUTCOMES

1. Defines the terms used in railways.
2. Defines the concept and characteristics of train; classify trains.
3. Defines station concept and properties; categorize stations.

B. Issues Concerning the Provisions of Domestic Goods Transportation

AIM: To be able to define pricing and freight payments with domestic goods transportation documents on railways, to comprehend the regulation of goods transportation documents, to explain pricing and freight payments.

LEARNING OUTCOMES

1. Defines domestic goods transportation documents and pricing and freight payments.
2. It generally issues documents for carrying goods. Apply pricing and freight payments on the document.

C. Issues relating to the provisions of international railroad goods, passengers and baggage provisions and issues concerning international transport irregularities

AIM: To define the provisions of international railway goods transportation, to comprehend international railway passenger and baggage transportation provisions, to explain international transportation irregularities.

LEARNING OUTCOMES

1. Defines and applies the issues related to the provisions of international rail transport of goods (CIM).
2. Identifies and applies the issues related to international railway passenger and baggage transport provisions (CIV).
3. Defines and applies the issues related to international transportation.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**CAPACITY MANAGEMENT**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To explain the importance of train and wagon planning and the factors affecting the planning.
2. To understand capacity management processes and timatables.
3. Get to know the components of the network statement.

SPECIAL DEFINITION

With the CAPACITY MANAGEMENT course, students will be able to comprehend the importance of the capacity management in rail system management and gain basic knowledge and skills about train and wagon planning. It is aimed that students get to know the capacity management process, network statement, and associate them with the planning function. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Train and Wagon Planning	40
B. Capacity Management	30
C. Network Statement	30

TOPICS

A. Train and Wagon Planning

AIM: To explain the importance of train and wagon planning and the factors affecting planning

LEARNING OUTCOMES

1. Understands the importance of vehicle planning in rail systems.
2. Defines the combinations of rolling stock.
3. Investigates the characteristics of hauling vehicles used in the national network.
4. Investigates the characteristics of hauled vehicles used in the national network.
5. Explains the factors affecting planning.
6. Understands the importance of utilization and rotation in railway transportation.
7. Makes capacity and personnel calculations.

B. Capacity Management

AIM: To understand capacity management processes and graphics of timetables.

LEARNING OUTCOMES

1. Explains capacity management processes.
2. Explains the capacity allocation process.
3. Explains the relationship between capacity demand, capacity allocation, track access contract and pricing.
4. Comprehends timetables graphics.
5. Evaluates the basic information about train mechanics in the operation of trains and the preparatory work of the timetables.

C. Network Statement

AIM: To get to know the components of network statement.

LEARNING OUTCOMES

1. Knows the national and international regulations regarding railway management.
2. Explains the relationship between the Railway Infrastructure Manager and the Railway Train Operator.
3. Explains the concept of Network Statement.
4. Lists the basic elements that should be in the network statement.
5. Examines and evaluates the national network statement document.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAILWAY TRANSPORTATION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To comprehen the definition of transportation and evaluate its conceptual aspect.
2. To recognize, organize and control the model forms used in rail systems management
3. To recognize and apply goods and fare tariffs carried by passengers.
4. To recognize transportation and railway systems.
5. To recognize all divisions of railway systems.
6. To recognize safety systems in railway systems.

SPECIAL DEFINITION

It would be ensured that the concept of transportation and its all aspects should be taught as a whole by RAIL TRANSPORTATION course. Students should be able to recognize, regulate and supervise the chancellery used in rail systems management and model forms. They should learn about the fee recipes and they should experience it on-site. Information about all parts of the rail systems and safety systems should be obtained. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Transportation and its conceptual aspects	10
B. Chance, model forms used in rail systems management	20
C. Goods carried by passengers and tariffs	15
D. Transportation and associated railway systems	15
E. All parts of the railway system	20
F. Safety systems in railway systems	20

TOPICS

A. Transportation and its conceptual aspects

AIM: To comprehend the definition of transportation and evaluate its conceptual aspect.

LEARNING OUTCOMES

1. Makes necessary operations in cases that occur in railway systems management.
2. Knows the duties and responsibilities of the parties in railway systems management. Makes supervision of officials.
3. Understands and applies the tariff and provisions of commuter and outline passenger transport

B. Model forms used in rail systems management

AIM: To recognize, organize and control the chances, model forms used in rail systems management

LEARNING OUTCOMES

1. Understands and expresses train codes.
2. Applies fare collection systems in subway and light rail systems

C. Goods carried by passengers and tariffs

AIM: To recognize and apply goods and fare tariffs carried by passengers.

LEARNING OUTCOMES

1. Understands the transport irregularities of TCDD and makes necessary operations.

D. Transportation and associated railway systems

AIM: To recognize transportation and railway systems.

LEARNING OUTCOMES

1. Evaluates the situation of railway systems in the national economy.
2. Compares railway systems with other transportation systems.
3. Calculates the economic aspects of railway systems with other systems.

E. All parts of the railway system

AIM: To recognize all divisions of railway systems.

LEARNING OUTCOMES

1. Defines the track infrastructure and superstructure of railway systems.
2. Defines the vehicles used in railway systems and the types of energy used in these vehicles.
3. Describes loading and unloading facilities in rail systems.

F. Safety systems in railway systems

AIM: To recognize safety systems in railway systems.

LEARNING OUTCOMES

1. Explains the importance of traffic.
2. Defines traffic systems in railway systems.
3. Defines special safety systems used in rail systems.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**PUBLIC RELATIONS**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Clarify the difference between advertising and Public Relations (PR) and to present basic PR characteristics, as well as advantages that PR brings to a railroad company.
2. Raising awareness of underlying objectives and target groups of PR
3. Get to know the basic tasks of PR
4. Get to know different PR communication tools and possible applications
5. Be able to develop PR strategies
6. Create PR concepts

SPECIAL DEFINITION

In this module 'Public relations' (PR), the difference between PR and advertising is explained and basic characteristics, goals and fields of activities in PR are presented. Furthermore, it explains what a PR strategy and a PR concept are and which measures and instruments one can use to optimise public relations.

EVALUATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Difference between advertising and public relations, characteristics and advantages of PR	10
B. Public Relations: Objectives and target groups	15
C. Public Relations: Fields of activity	15
D. PR instruments - Communication tools	20
E. PR strategies	20
F. PR concepts	20

TOPICS

A. Difference between advertising and public relations, characteristics and advantages of PR

AIM: Clarify the difference between advertising and PR and present basic PR characteristics as well as advantages that PR brings to companies.

LEARNING OUTCOMES

1. Understand the difference between advertising and PR
2. Know the basic characteristics of good PR
3. Develop a basic understanding of the need for and benefits of good PR for the company

B. Public Relations: Objectives and target groups

AIM: Raising awareness of underlying objectives and target groups of PR

LEARNING OUTCOMES

1. Learn about basic and long-term PR objectives
2. Develop a basic understanding of what PR is supposed to achieve
3. Knowledge about reference groups of organisations that are addressed by PR

C. Public Relations: Fields of activity

AIM: Get to know the basic tasks of PR

LEARNING OUTCOMES

1. Insight into five basic PR areas (human relations, media relations, public affairs, financial relations, product PR)
2. Develop a basic understanding of which target groups are addressed by which PR activities
3. Get to know fields of activity and basic application possibilities

D. PR instruments - Communication tools

AIM: Get to know different PR communication tools and possible applications

LEARNING OUTCOMES

1. Get to know a variety of basic communication tools
2. Develop a basic understanding of what communication tools are used for in PR
3. Know that PR actvities can take place written, oral and electronic

E. PR strategies

AIM: Developing PR strategies

LEARNING OUTCOMES

1. Know, that a PR strategy underlies every successful PR performance
2. Insight into underlying issues that need to be considered when developing a PR strategy
3. Develop a basic understanding of how PR strategies are developed

F. PR concepts

AIM: Creating PR concepts

LEARNING OUTCOMES

1. Know, that every successful PR strategy is based on a PR concept
2. Getting to know basic steps that need to be realised for the preparation and implementation of PR activities
3. Develop a basic understanding of how PR concepts are developed

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**INTERNATIONAL RAILWAY TRANSPORTATION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To comprehend intermodal transportation technologies and intermodal transportation system by analyzing the strengths and weaknesses of transportation modes.
2. To recognize the basic concepts of international transportation and logistics management, related organizations and regulations.
3. To understand the international rail transport corridors, regulations and tariffs.

SPECIAL DEFINITION

With the INTERNATIONAL RAILWAY TRANSPORTATION course, students will be able to compare transportation modes, gain knowledge and skills about the basic concepts, establishments and regulations of international transportation, and international rail transportation. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Intermodal Transportation	20
B. International Transportation	40
C. International Rail Freight Transportation	40

TOPICS

A. Intermodal Transportation

AIM: To comprehend intermodal transport technologies and intermodal transport system by analyzing the strengths and weaknesses of transport modes.

LEARNING OUTCOMES

1. Explains the basic elements and concepts of transportation.
2. Explains the strengths and weaknesses of transportation modes.
3. Knows new trends and developments in the transportation sector.
4. Evaluates intermodal transportation conceptually.

B. International Transportation

AIM: To recognize the basic concepts of international transportation and logistics management, related organizations and regulations.

LEARNING OUTCOMES

1. Explains the basic concepts of international transportation and logistics management.
2. Knows the organizations regulating international freight and passenger transportation.
3. Explains the transport agreements and regulations regarding international freight and passenger transport.
4. Knows the international transport corridors.

C. *International Rail Freight Transportation*

AIM: To understand international rail transport corridors, regulations and tariffs.

LEARNING OUTCOMES

1. Knows the international rail transport corridors.
2. Evaluates the share of railways in international freight and passenger transportation.
3. Explains the tariffs for international freight and passenger transportation.
4. Explains border crossings and customs practices.
5. Compares international railway technical/safety standards and railway operating rules.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAILWAY SYSTEM COST ANALYSIS**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Insight into the principles and objectives of cost accounting
2. Get to know main groups of costs
3. Knowledge of basic capital and operating costs
4. Knowledge of interruption and capacity costs incurred
5. Knowledge of environmental and accident costs incurred in the railway system
6. Knowledge of cost drivers and their effects in the railway system

SPECIAL DEFINITION

In this module, basic elements of cost analysis in rail transport are taught. Different types of costs, such as capital and operating costs, interruption and capacity costs as well as costs for environmental elements and accidents are presented. The importance of cost drivers for the determination of assessment bases or performance figures are explained in order to be able to understand the basic interrelationships of cost analysis in rail transport.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Areas and objectives of cost accounting	10
B. Main groups of Cost elements	20
C. Capital and operating costs in the railway system	20
D. Costs due to interruption and capacity costs	20
E. Environmental and accident costs	20
F. Cost drivers for the determination of assessment bases	10

TOPICS

A. *Areas and objectives of cost accounting*

AIM: Insight into the principles and objectives of cost accounting

LEARNING OUTCOMES

1. Develop a basic understanding of what areas determine cost accounting.
2. Understand what a cost element is.
3. Basic knowledge of cost-type accounting.

B. Main groups of Cost elements

AIM: Get to know cost element main groups

LEARNING OUTCOMES

1. Knowledge of personnel costs and social costs in the railway system.
2. Develop a basic understanding of the material costs, capital costs and costs of services in the railway system.
3. Become familiar with other cost factors in the railway system, such as insurance costs, costs for foreign rights and public charges.

C. Capital and operating costs in the railway system

AIM: Knowledge of basic capital and operating costs

LEARNING OUTCOMES

1. Know that capital costs are spent on new construction, expansion and maintenance.
2. Know that operating costs correspond to the expenditure/ expenses of a period.
3. Knowing other general costs, such as general administration, as well as costs for supervision, control and planning tasks.

D. Interruption and capacity costs

AIM: Knowledge of interruption and capacity costs incurred

LEARNING OUTCOMES

1. Development of a basic understanding that obstructions and conflicts of use in the use of railway infrastructure are associated with costs.
2. Knowledge of which factors determine interruption costs (e.g. delays, train cancellations etc.).
3. Knowledge about factors that are reflected in capacity costs (e.g. congestion, scarcity costs).

E. Environmental and accident costs

AIM: Knowledge of environmental and accident costs incurred in the railway system

LEARNING OUTCOMES

1. Develop a basic understanding of why there are environmental and accident costs in the rail system.
2. Knowledge that environmental costs have to be spent on air, soil, water pollution, etc.
3. Knowledge that accident costs come into play in material as well as immaterial form.

F. Cost drivers for the determination of assessment bases

AIM: Knowledge of cost drivers and their effects in the railway system

LEARNING OUTCOMES

1. Become familiar with basic cost drivers in the railway system (e.g. construction, provision of infrastructure, maintenance/renewal, timetabling, train path allocation etc.).
2. Develop a basic understanding of how cost drivers impact on the assessment basis in the railway system.
3. Knowing that cost bases are differentiated by route-specific, train-specific, user-specific and time-specific.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**LABOR LAW**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**2+2; 4,0**
COURSE DURATION	

AIMS

1. To be able to explain the concept of Labor Law
2. To know how the information flow occurs related to Labors
3. Utilization of information related to Labor Law

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Constitutional Law, Covenant and Regulation Concepts;	25
B. Labor Law in History; The Aim and Scope of Labor Law;	25
C. Labor Agreement Types and Regulations Related to The Annulment of Labor Agreements; Wages in Labor Law;	25
D. Organization of Occupation; Regulations Related to Occupational Health and Occupational Safety; Social Insurance and Universal Health Insurance Law; The Trade Unions Act; Strike and Lockout Law; Legislation Related to Civil Servants; Working Principles for Civil Servants.	25

TOPICS

A. Constitutional Law, Covenant and Regulation Concepts;

AIMS: To be able to explain the concept of Constitutional Law

LEARNING OUTCOMES

1. To explain the concept of Constitutional Rights on Labors
2. To know the principles of Labor Rights

B. Labor Law in History; The Aim and Scope of Labor Law;

AIMS: To be able to know what Labor Law is and its history.

LEARNING OUTCOMES

1. To know the history of labor law
2. To know its aim and scope of labor law.

C. Labor Agreement Types and Regulations Related to The Annulment of Labor Agreements; Wages in Labor Law;

AIMS: To be able to know what labor agreement types and wages

LEARNING OUTCOMES

1. To know labor agreement types and regulations
2. To know the annulment of labor agreements and wages in labor law.

D. Organization of Occupation; Regulations Related to Occupational Health and Occupational Safety; Social Insurance and Universal Health Insurance Law; The Trade Unions Act; Strike and Lockout Law; Legislation Related to Civil Servants; Working Principles for Civil Servants.

AIMS: To be able to know and use information related organization of occupations and health and safety regulations, and other labor rights

LEARNING OUTCOMES

1. To understand the organization of occupation.
2. To know regulations related to occupational health and occupational safety
3. To know social insurance and universal health insurance law
4. To know the Trade Unions Act
5. To understand the Strike and Lockout Law
6. To understand legislation related to civil servants
7. To know the working principles for civil servants.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION** **RAIL SYSTEM ELECTRIC ELECTTRONICS** **LOGISTIC MANAGEMENT**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	**2+2; 4,0**

AIMS

1. To be able to explain the concept of logistic management
2. To know how the information flow occurs related to logistic management
3. Utilization of information related to logistic management

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Introduction to logistic management	25
B. Logistic Management and its elements; Modern Concepts in Logistics	25
C. Role of logistics in strategy; Inbound and outbound supply chain management	25
D. Container – types; Different types of cargo; Packaging and Material Handling	25

TOPICS

A. Introduction to logistic management

AIMS: To be able to explain the concept of logistic management

LEARNING OUTCOMES

1. To explain the concept of logistic management
2. To know the principles of logictic managemet and its history

B. Logistic Management and its elements; Modern Concepts in Logistics

AIMS: To be able to know what logistic management is and its elements and concepts.

LEARNING OUTCOMES

1. To know the elements of logistic management
2. To know its concepts in logistics

C. ***Role of logistics in strategy; Inbound and outbound supply chain management***

AIMS: To be able to know what role of logistics and inbound/outbound supply chain management

LEARNING OUTCOMES

1. To know the role of strategic logistics
2. To know the inbound and outbound supply chain management

D.Container – types; Different types of cargo; Packaging and Material Handling

AIMS: To be able to know and use information related container types; cargo types, packaging and material handling

LEARNING OUTCOMES

1. To understand Containe types;
2. To know different types of cargo;
3. To know packaging
4. To know material handling

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**SERVICES MARKETING**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**2+2; 4,0**
COURSE DURATION	

AIMS

1. Discuss how the services sector operates in developed economies.
2. Define and illustrate the main components of services marketing theory.
3. Critically appraise the way in which this theory can be practically applied in the service sector.
4. Develop and justify alternative marketing approaches that can be used by service managers.
5. Present material relating to the topics both verbally and in written form.

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Services Marketing	25
B. Marketing strategies	
C. Distinctive characteristics of services and service image dimensions	25
D. Management of the service process, management of service encounters, customer behaviour in service settings	25
	25

TOPICS

A. Introduction to Services Marketing

AIMS: To explore particular challenges, opportunities and strategies which are encountered by different types of service business.

LEARNING OUTCOMES

1. To explain the challenges, opportunities and strategies
2. To know the types of service business

B. Marketing Strategies

AIMS: To be able to know what marketing strategies is.

LEARNING OUTCOMES

1. To know the marketing strategies
2. To know its development and execution

C. ***Distinctive characteristics of services and service image dimensions***

AIMS: To be able to know what charaterictis of services and their dimensions are

LEARNING OUTCOMES

1. To examine the distinctive characteristics of services (intangibility, perishability, inseparability and heterogeneity),
2. To understand service image dimensions, and how these impact on the marketing approaches used by firms - including the difficulties of synchronising demand and supply and of controlling quality

D. Management of the service process, management of service encounters, customer behaviour in service settings

AIMS: To be able to know what the management of the service process, service encounters, customer behaviour are

LEARNING OUTCOMES

1. To examine management of the service process, management of service encounters, customer behaviour in service settings, approaches to the design and creation of effective service delivery systems,
2. To understand the positioning, communication and pricing of services.
3. To understand service quality issues (including the Gaps Model) and complaint handling and service recovery.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	
COURSE SEMESTER	**TRANSPORTAION OF DANGEROUS SUBSTANCE**
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To be able to explain the definition of dangerous substances transportation concept
2. To be able to define the types of dangerous substances and storage of them in railway transportation
3. To be able to understand the documentation and regulations related to dangerous substances

SPECIAL STATEMENTS

In order to increase the student's knowledge on dangeraous substance tansportation, the definitions, classifications should be understood. The storage methods, regulations regarding the transportation of the dangerous substance should be given

EVALUATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. Final exam questions preparing this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Definition of dangerous substances transportation concept	30
B. Types of dangerous substances and storage of them in railway transportation	30
C. The documentation and regulations related to dangerous substances	40

TOPICS

A. Definition of dangerous substances transportation concept

AIM: To define dangerous substances transportation concept

LEARNING OUTCOMES

1. Defines the Hazardous Substances.
2. Identify the Necessity of Transportation of Hazardous Substances.
3. Defines the Classification of Hazardous Substances.

B. Types of dangerous substances and storage of them in railway transportation

AIM: To be able to define the types of dangerous substances and storage of them in railway transportation

LEARNING OUTCOMES

1. Defines Major Types of Hazards.
2. Recognition of Inspection of Hazardous Substance Transportation and Environmental Protection.

C. The documentation and regulations related to dangerous substances

AIM: To be able to understand the documentation and regulations related to dangerous substances.

LEARNING OUTCOMES

1. Defines Documentation of Hazardous Substances.
2. Identifies Emergency Procedures about Hazardous Substances.
3. Defines Regulations Related to Transportation of Hazardous Substances by Sea, Airline, Railroad.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**MAINTENANCE OF RAILWAY VEHICLES AND CERTIFICATION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To understand the basic concepts and application areas of Management Systems and their impact on maintenance management and productivity.
2. To comprehend the basic concepts, organizations and ECM regulations of railway vehicle maintenance management system and certification.
3. Associating the Entity in Charge of Maintenance and its responsibilities with the ECM functions.
4. To understand the ECM certification process.

SPECIAL DEFINITION

With the MAINTENANCE OF RAILWAY VEHICLES AND CERTIFICATION course, students will be provided with knowledge and skills regarding the maintenance management and certification processes of railway vehicles. It is intended that students comprehend the duties of a maintenance organization regarding ECM regulations and practices. A technical visit will be organized to an Entity in charge of Maintenance and they will be informed on the job about the ECM functions and certification process. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Maintenance Management	10
B. Vehicle Maintenance Management	30
C. ECM Functions	40
D. ECM Certification Process	20

TOPICS

A. Maintenance Management

AIM: To understand the basic concepts and application areas of Management Systems and their impact on maintenance management and efficiency.

LEARNING OUTCOMES

1. Recognizes management systems and application areas.

2. Interprets the basic concepts such as accreditation, certification, system, process, procedure, function, qualification etc.
3. Explains the relationship between quality management system, maintenance management and productivity.

B. Vehicle Maintenance Management

AIM: To comprehend the basic concepts, organizations and ECM regulations of railway vehicle maintenance management system and certification.

LEARNING OUTCOMES

1. Explains the national and international institutions and regulations regarding the maintenance and certification of railway vehicles.
2. Explains certification of entities in charge of maintenance (ECM) certification and requirements.
3. Explains the main actors, responsibilities and relationships in the ECM certification process.

C. ECM Functions

AIM: To link the Entity in charge of Maintenance and its responsibilities with ECM functions.

LEARNING OUTCOMES

1. Evaluates the entitiy in charge of maintenance and its responsibilities.
2. Explains the management function.
3. Explains the maintenance development function.
4. Explains the fleet management function.
5. Explains the maintenance delivery function.
6. Evaluates the relationship between ECM functions.

D. ECM Certification Process

AIM: To understand the ECM certification process.

LEARNING OUTCOMES

1. Describes the ECM certification process in general.
2. Knows the special requirements of the authority or approver.
3. Comprehends ECM documentation and application applications.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	**NEW TECHNOLOGIES IN RAIL SYSTEMS**
COURSE DURATION	

AIMS

1. To introduce students to the latest technologies being used in rail systems.
2. To help students understand the benefits of these new technologies. This includes topics such as improved safety, increased efficiency, and reduced environmental impact.
3. To encourage students to consider careers in the rail industry. The rail industry is a growing sector with a wide range of career opportunities. By learning about new technologies in rail systems, students can gain the skills and knowledge needed to pursue a rewarding career in this field.

SPECIAL DEFINITION

The history of new technologies in rail systems: This includes the history of new technologies in rail systems in different parts of the world, as well as the factors that have contributed to the development of new technologies in rail systems. The different types of new technologies in rail systems: This includes the different types of new technologies in rail systems, such as driverless trains, and smart ticketing. The challenges and opportunities facing new technologies in rail systems: This includes topics such as funding, planning, construction, operation, and maintenance of new technologies in rail systems.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Train control system with radio communication	30
B. The standardization of railway systems for fostering interoperability	40
C. Staff and customer friendly train designs	30

TOPICS

A. Understands the train control system with radio communication

AIM: To know the train control system with radio communication

LEARNING OUTCOMES

1. To understand the train control system with radio communication.

B. The standardization of railway systems for fostering interoperability

AIM: To know standardization of railway systems for fostering interoperability in international railway corridors.

LEARNING OUTCOMES

1. Understands standardization of railway systems for fostering interoperability

C. Staff and customer friendly train designs

AIM: To understand and customer friendly train designs

LEARNING OUTCOMES

1. To know and understand and customer friendly train designs, modular approach based on plug and play, energy consumption by rail sub-systems and components.

PROGRAM TITLE **COURSE CODE AND TITLE** **COURSE SEMESTER** **WEEKLY COURSE PERIOD** **COURSE DURATION**	**RAIL SYSTEM MANAGEMENT** **RAIL SYSTEM CONSTRUCTION** **RAIL SYSTEM ELECTRIC ELECTTRONICS** **TRANSPORTATION MANAGEMENT** **2+2; 4,0**

AIMS

1. To be able to understand the key transportation concepts and objective;
2. To understand freight movements, intermodal transportation, modal characteristics, transportation policy, pricing and costing;
3. To know the changes occurring in the industry such as the emergence of third-party transportation providers, security, globalization, use of technology, and supply chain management.

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	*Ratios of Topics (%)*
A. Introduction to Transportation Management	25
B. Significance of transportation and effect on economic development and global trade;	25
C. Transportation economics; Transportation regulation and deregulation; Transportation public policy and promotion; Transportation and logistics	25
D. Modal characteristics and operations; Principles of transportation & logistics; Transportation costing and pricing; Transportation risk management and security; International transportation; Third-party transportation providers; Private transportation; Future transportation challenges	25

TOPICS

A. Introduction to Transportation Management

AIMS: To be able to explain the concept of transportation management

LEARNING OUTCOMES

1. To explain the concept of transportation management
2. To know the principles of transportation management

B. Significance of transportation and effect on economic development and global trade

AIMS: To be able to know what transportation management is

LEARNING OUTCOMES

1. To know the significance of transportation
2. To know its effect on economic development and global trade

C. Transportation economics; Transportation regulation and deregulation; Transportation public policy and promotion; Transportation and logistics

AIMS: To be able to know what transportation economics are.

LEARNING OUTCOMES

1. To know what transportation economics including its regulation and deregulation;
2. To know the transportation public policy and promotion;
3. To know transportation and logistics

D. Modal characteristics and operations; Principles of transportation & logistics; Transportation costing and pricing; Transportation risk management and security; International transportation; Third-party transportation providers; Private transportation; Future transportation challenges

AIMS: To be able to know and use information related transportation management, its characteristics.

LEARNING OUTCOMES

1. To understand the transportation management and its characteristics/operations;
2. To know principles of transportation and logistics
3. To know its costing and pricing;
4. To know the risk management and security related to transportation management;
5. To understand the principles of international transportation;
6. To understand the third-party transportation providers and private transportation;
7. To know the future of transportation and its challenges.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION** **RAIL SYSTEM ELECTRIC ELECTTRONICS**
COURSE SEMESTER	**NEW APPROACHES IN RAILWAY TRAFFIC MANAGEMENT**
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To evaluate the historical and technological development of rail systems traffic management systems.
2. To comprehend the general structures and characteristics of today's rail systems traffic management systems and their effects on railway management.
3. To comprehend the general structures and characteristics of train protection and control systems and their effects on railway management.
4. To recognize the global and national development process of high-speed train management.

SPECIAL DEFINITION

With the NEW APPROACHES IN RAILWAY TRAFFIC MANAGEMENT course, students will be able to evaluate the development process of rail system traffic management systems, get to know today's and future traffic management systems, comprehend their effects on railway management, and gain basic knowledge and skills on traffic management systems and train protection and control systems. Technical trips will be organized for the students to get to know the national high speed train management closely. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Historical Development of Traffic Management Systems	10
B. Traffic Management Systems	30
C. European Railway Traffic Management System (ERTMS)	30
D. Train Protection and Control Systems	20
E. High Speed Train Management	10

TOPICS

A. Development of Traffic Management Systems

AIM: To evaluate the historical and technological development of rail systems traffic management systems.

LEARNING OUTCOMES

1. Explains the historical development of rail systems traffic management systems.
2. Explains the technological development of rail systems traffic management systems.

B. *Traffic Management Systems*

AIM: To comprehend the general structures and characteristics of today's rail systems traffic management systems and their effects on railway management.

LEARNING OUTCOMES

1. Knows the types and general characteristics of national railway traffic management systems.
2. Evaluates the effects of railway traffic management systems on railway management.
3. Explains the integration of railway operation processes and procedures.

C. *European Railway Traffic Management System (ERTMS)*

AIM: To comprehend the general structures and characteristics of today's rail systems traffic management systems and their effects on railway management.

LEARNING OUTCOMES

1. Understands the concept of interoperability and its effects.
2. Explains the ERTMS/ETCS development process.
3. Knows ETCS levels and operating modes.
4. Recognizes ETCS trackside and on-board components.
5. Knows Global System for Mobile Communications for Railways (GSM-R)
6. Knows Future Railway Mobile Communications System (FRMCS)

D. *Train Protection and Control Systems*

AIM: To comprehend the general structures and features of train protection and control systems and their effects on railway management.

LEARNING OUTCOMES

1. Evaluates the effects of train protection and control systems on railway operation and safety.
2. Explains ATS, ATP and ATC systems and working principles.
3. Explains CBTC system and working principle.

E. *High Speed Train Operation*

AIM: To recognize the global and national development process of high-speed train management.

LEARNING OUTCOMES

1. Explains the global development process of high speed train management.
2. Knows the national high-speed train lines in opeartion and management features.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	**WORK SAFETY**
COURSE DURATION	**2+2; 4,0**

AIMS

1. To understand their health and safety responsibilities and why it's important to work safely.
2. To understand the difference between hazards and risks.
3. To be able to identify common workplace hazards.
4. To appreciate and improve upon safety performance within the workplace.

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Introducing Working Safely	25
B. Defining hazard and risk	25
C. Identifying common hazards	25
D. Improving safety performance	25

TOPICS

A. Introducing Working Safely

AIMS: To be able to explain the concept of work safely

LEARNING OUTCOMES

1. To explain the concept of healtha and safety
2. To know the principles of accident theory
3. To know the moral, legal and financial reasons to work safely

B. Defining hazard and risk

AIMS: To be able to define hazards and risks

LEARNING OUTCOMES

1. To know the concept of hazard and risk
2. To know the 5-step risk assessment process

C. Identifying common hazards

AIMS: To be able to identify common hazars

LEARNING OUTCOMES

1. To know how to identift common hazards
2. To know how to prevent and control a range of workplace hazards

D. Improving safety performance

AIMS: To be able to know and use information on how to improve safety perfomance

LEARNING OUTCOMES

1. To understand Health and Safety Management System: Plan - Do - Check – Act
2. To know the health and safety responsibilities of: individuals, safety representatives, contractors and enforcement officers
3. To know systems and Procedures including: emergency procedures, Safe Systems of Work, PPE, Permit-to-Work, safety signs, first aid arrangements and accident reporting

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	**SAFETY CRITICAL COMMUNICATION**
COURSE DURATION	

AIMS

1. To evaluate the concept and conceptual aspect of safety critical communication.
2. To know the basic elements of safety critical communication and to associate it with the profession.
3. To comprehend the importance of speech rules and patterns in safety critical communication.
4. To communicate using effective communication skills.
5. To apprehend the basic communication errors and barriers.
6. To be able to work in accordance with team communication and teamwork and to manage work stress.

SPECIAL DEFINITION

With the SAFETY CRITICAL COMMUNICATION course, students' awareness of safe working, effective communication, team communication and teamwork and corporate culture will be raised. At the same time, it is aimed to increase their morale and motivation towards the profession with exemplary practices they may encounter in their working life. In order to practice, the course should be supported by homework, practices and knowledge.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Safety Critical Communication and Its Importance	10
B. Key Elements of Safety Critical Communication	20
C. Speech Rules and Patterns	20
D. Effective Communication Skills	20
E. Communication Barriers	15
F. Collaboration in Communication and Managing Work Stress	15

TOPICS

A. Safety Critical Communication and Its Importance

AIM: To evaluate the concept of safety critical communication and its conceptual aspect.

LEARNING OUTCOMES

1. Defines safety critical tasks.
2. Explains the impact of safety critical communication on safety.
3. Evaluates the effect of safety critical communication on safety during the task.
4. Distinguishes between safety critical communication and everyday communication.

B. Key Elements of Safety Critical Communication

AIM: To know the key elements of safety critical communication and to associate it with the profession.

LEARNING OUTCOMES

1. Lists the stages of safety critical communication.
2. Carries out the profession in accordance with the key elements of safety critical communication.
3. Explains the necessity of individual responsibility and leadership responsibility in communication.
4. Embraces individual responsibility falls on him/her in safety critical communication.

C. Speech Rules and Patterns

AIM: To understand the importance of speech rules and patterns in safety critical communication.

LEARNING OUTCOMES

1. Knows the national speech rules and patterns related to the profession.
2. Explains the importance of speech rules and patterns in safety critical communication.
3. Gives importance to work by following the rules and patterns of speech.

D. Effective Communication Skills

AIM: To communicate using effective communication skills.

LEARNING OUTCOMES

1. Explains the key elements of effective communication skills.
2. Lists the differences between hearing and listening.
3. Evaluates the importance of active listening in safety critical communication.
4. Repeats orders while carrying out the duty.
5. Cares about the key rules of effective communication during the duty.

E. Communication Barriers

AIM: To understand basic communication errors and barriers.

LEARNING OUTCOMES

1. Explains common mistakes and communication barriers in communication.
2. Realizes the basic communication mistakes made during communication.

F. Collaboration in Communication and Managing Work Stress

AIM: To work in accordance with team communication and teamwork and to be able to manage work stress.

LEARNING OUTCOMES

1. Explains the benefits of cooperation in communication brought to working life.

2. Takes appropriate measures to manage work stress.
3. Minds cooperating with teammates during the execution of safety critical duties.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	**CRISIS MANAGEMENT**
COURSE DURATION	**2+2; 4,0**

AIMS

1. To be able to explain the concept of crisis management
2. To know how the information flow occurs related to crisis management
3. Utilization of information related to crisis management

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	***Ratios of Topics (%)***
A. Introduction to Crisis Management	25
B. Identifying a Crisis; Crisis Management Basics; Crisis Stages; Establishing a Crisis Management Team; The Role of the Crisis Manager	25
C. Putting Crisis Management Into Action; Crisis Management Decisions; Emergency Response Scenarios	25
D. Common Crisis Management Plan; Weaknesses Contingency Plans; Damage Control; Crisis Management Checklist	25

TOPICS

A. Introduction to Crisis Management

AIMS: To be able to explain the concept of crisis management

LEARNING OUTCOMES

1. To explain the concept of crisis management
2. To know the principles of crisis management

B. Identifying a Crisis; Crisis Management Basics; Crisis Stages; Establishing a Crisis Management Team; The Role of the Crisis Manager

AIMS: To be able to know the basics and stages of crisis management

LEARNING OUTCOMES

1. To know the basics of crisis management
2. To know its stages
3. To know how to establish a crisis management team and the role of the crisis manager

C. Putting Crisis Management Into Action; Crisis Management Decisions; Emergency Response Scenarios

AIMS: To be able to know how to put crisis management into practice.

LEARNING OUTCOMES

1. To know the implementation level of crisis management
2. To know how to make crisis management decisions
3. To know how to deal with emegercy response scenarios.

D. Common Crisis Management Plan; Weaknesses Contingency Plans; Damage Control; Crisis Management Checklist

AIMS: To be able to know and use information related crisis management plans, damage control and checlists…

LEARNING OUTCOMES

1. To understand the common crisis management plans;
2. To know weaknesses plans;
3. To know damage controls;
4. To know crisis management checklists.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**INTRODUCTION TO PROFESSIONAL LIFE**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. Get to know different professions in the field of operation and transport
2. Insight into various commercial and administrative professions in the railway sector
3. Know that the rail transport sector opens up a wide range of career opportunities in the fields of engineering, technology and IT
4. Get to know further professional employment opportunities in public personnel transport
5. Insight into ways of dealing with customers in a purposeful and professional manner
6. Get to know the basic elements of dealing professionally with customers and possible complaints

SPECIAL DEFINITION

In this module, the student learns about different occupational areas with corresponding occupational possibilities in the field of 'rail transport'. A basic short introduction to the topics of business etiquette and complaint management provide employees who work with customers (e.g. at the information/sales counter, train attendants, etc.) important know-how on how to act in a more professional and customer-oriented way.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Professions in the railway operations and transport sector	15
	15
B. Professions in the commercial sector and in administration	15
C. Job opportunities in the field of engineering, technology & IT	15
	20
D. Professions in public transport	
E. Business etiquette when working with customers in rail transportation	20
F. Customer orientation and complaint management	

TOPICS

A. *Professions in the railway operations and transport sector*

AIM: Get to know different professions in the field of operation and transport

LEARNING OUTCOMES

1. Insight into different occupational possibilities in the field of operation and traffic in railway transport.
2. Develop a basic understanding of what tasks railway operations managers, train service providers, locomotive shunting drivers, train drivers, traffic masters, etc. perform.
3. Knowledge about training, earning opportunities and career opportunities as a railway employee in the area of operations and traffic.

B. Professions in the commercial sector and in administration

AIM: Insight into various commercial and administrative professions in the railway sector

LEARNING OUTCOMES

1. Know which commercial and administrative job opportunities are available in the field of rail transport.
2. Development of a basic understanding of the tasks performed by commercial staff for rail and road transport/for freight forwarding and logistics/for transport services, controllers, stewards, train attendants, etc.
3. Knowledge of training, earning opportunities and career opportunities as a railway employee in the commercial area or administration.

C. Job opportunities in the field of engineering, technology & IT

AIM: Know that the rail transport sector opens up a wide range of career opportunities in the fields of engineering, technology and IT

LEARNING OUTCOMES

1. Development of a basic understanding of the importance and necessity of well-qualified employees in the field of engineering, technology and IT in railway transport.
2. Insight into basic fields of activity of industrial-technical specialists in the field of railway transport (e.g. mechatronics engineer, electrical engineer, operating technician in track construction, etc.).
3. Development of a basic understanding of diverse fields of work that are necessary for the holistic functioning of 'railway transport'.

D. Professions in public transport

AIM: Get to know further professional employment opportunities in public personnel transport

LEARNING OUTCOMES

1. Insight into various job opportunities in the field of public personnel transport.
2. Get to know basic tasks of customer service representatives, security workers, transport planners, train attendants, professional drivers, industrial mechanics, consultants etc. in rail transport.
3. Develop a basic understanding of diverse tasks and areas of activity in public personnel transport.

E. Business etiquette when working with customers in rail transportation

AIM: Insight into ways of dealing with customers in a purposeful and professional manner

LEARNING OUTCOMES

1. Development of a basic understanding of the importance and necessity of professional interaction with customers (especially for train attendants, customer service staff, etc.).
2. Know that first impressions, communication style (sound of voice, use of language, etc.), body language and appropriate manners determine the interaction with customers.
3. Know basic elements of goal-oriented and professional business etiquette that are relevant when working with customers in rail transport.

F. Customer orientation and complaint management

AIM: Get to know the basic elements of dealing professionally with customers and possible complaints

LEARNING OUTCOMES

1. Get to know basic elements to increase customer orientation.
2. Develop a basic understanding of how to deal with customer concerns, wishes and complaints.
3. Insight into target-oriented possibilities of satisfactory complaint management in rail transport.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT** **RAIL SYSTEM CONSTRUCTION** **RAIL SYSTEM ELECTRIC ELECTTRONICS**
COURSE CODE AND TITLE	**PROJECT ON RAILWAY TECHNOLOGY**
COURSE SEMESTER	
WEEKLY COURSE PERIOD	
COURSE DURATION	

AIMS

1. To choose a general topic for a railway technology theme, develop it into a research framework with related aims and objectives that can be investigated within various time and resource limits.
2. To gain knowledge of carrying out a systematic search in the library, in scientific and other databases.
3. To interpret and evaluate data and literature critically.
4. To argue, structure the argumentation, and follow good scientific use of references.
5. To identify ethical issues in a research project and register the project for ethical clearance.
6. To define and frame an independent research project under supervision.

SPECIAL DEFINITION

The course helps students to start writing their master thesis in time. Students acquire writing training and practical insights into the research process. The course aims at offering students more insight into the writing process behind a successful master thesis by working with a project proposal for the future master thesis. The project proposal forms the basis for the master thesis and the allocation of a supervisor.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Understanding the research framework	10
B. Good systematic literature review of the chosen topic	20
C. Interpretation and evaluation of data from the literature review	20 20
D. Discussion and argumentation of the outputs from the literature review	10
E. Identification of ethical issues of the chosen topics	20
F. Proposal of an independent research project	

TOPICS

A. Understanding the research framework

AIM: To choose a general topic for a railway technology theme, develop it into a research framework with related aims and objectives that can be investigated within various time and resource limits.

LEARNING OUTCOMES

1. Draft paper (500 – 1000 words) with the aim to theme elaboration, perspective, and argument.
2. Compare the draft paper with other participants.

B. Good systematic literature review of the chosen topic

AIM: To gain knowledge of how to carry out a systematic search in the library, in scientific and other databases.

LEARNING OUTCOMES

1. The paper with literature review.
2. List of references from all databases which have been used.

C. Interpretation and evaluation of data from the literature review

AIM: To interpret and evaluate data and literature critically.

LEARNING OUTCOMES

1. Evaluation of the data from the literature review.
2. Comparison of the data from the literature review.

D. Discussion and argumentation of the outputs from the literature review

AIM: To argue, structure the argumentation, and follow good scientific use of references.

LEARNING OUTCOMES

1. Organized a discussion with the other participants.
2. Made a list of questions for discussion.
3. Evaluation of the discussion.

E. Identification of ethical issues of the chosen topics

AIM: To identify ethical issues in a research project and register the project for ethical clearance.

LEARNING OUTCOMES

1. Defines the ethical problems of research in general.
2. Identification of the ethical issues of the chosen topic.
3. Describes how could potential ethical conflicts be minimized.

F. Proposal of an independent research project

AIM: To define and frame an independent research project under supervision.

LEARNING OUTCOMES

1. Project draft (2 000 – 3 000 words), which seeks to develop the project towards a scientific problem, including essential references.

PROGRAM TITLE **COURSE CODE AND TITLE** **COURSE SEMESTER** **WEEKLY COURSE PERIOD** **COURSE DURATION**	**RAIL SYSTEM MANAGEMENT** **RAIL SYSTEM CONSTRUCTION** **RAIL SYSTEM ELECTRIC ELECTTRONICS** **SOCIAL ENVIRONMENTAL RESPONSIBILITIES** **2+2; 4,0**

AIMS

1. Understand the knowledge, process and practice of sustainability management in an organisation
2. Be able to outline and articulate different approaches to social environmental responsibilities and their relative merits and suitability
3. Effectively argue in favour of an environmental improvement programme
4. Understand and apply the practical implications of waste management, cleaner technology and the circular economy
5. Understand and appreciate the analysis and range of complex issues involved in environmental management
6. Know a range of corporate sustainability management strategies and control mechanisms and be able to develop appropriate action to address a specific set of environmental issues
7. Know the literature and networks with which to support ongoing needs in environmental management.

SPECIAL DEFINITIONS

Course topics will be the presentation of the subject in need of explanation instead of every aspect of the place should be given. On-site observations and practices related to the course subjects can be given.

EVAULATION TABLE

The percentages of the studies conducted related to topic and teaching style are given according to their weights in the table below. While final exam questions preparing, this percentage shall be taken into account.

TOPICS	*Ratios of Topics (%)*
A. Introduction to Social Environmental Responsibilities	25
B. Corporate crime and malfeasance; Definitions and evaluation of key concepts, including corporate sustainability, corporate social responsibility (CSR), industrial ecology etc	25
C. Product-based sustainability; Reporting and stakeholder management	25
D. Risk management, risk perception and industrial accidents; Social enterprises, capital markets and corporate strategies.	25

TOPICS

A. Introduction to Social Environmental Responsibilities

AIMS: To be able to explain the concept of social environmental responsibilities

LEARNING OUTCOMES

1. To explain the concept of social environmental responsibilities
2. To know the principles of social environmental responsibilities

B. Corporate crime and malfeasance; Definitions and evaluation of key concepts, including corporate sustainability, corporate social responsibility (CSR), industrial ecology

AIMS: To be able to know what corporate crime and other elements

LEARNING OUTCOMES

1. To know the corporate crime and malfeasance
2. To know its definition and evaluation of key concepts including corporate sustainability
3. To know corporate social responsibility
4. To know industrical ecology

C. Product-based sustainability; Reporting and stakeholder management

AIMS: To be able to know what sustainability/reporting and stakeholder management are

LEARNING OUTCOMES

1. To know the product-based sustainability
2. To know what reporting and stakeholder management is.

D. Risk management, risk perception and industrial accidents; Social enterprises, capital markets and corporate strategies.

AIMS: To be able to know risk managament; social enterprices and its strategies.

LEARNING OUTCOMES

1. To understand the risk management;
2. To know risk perception and industrial accidents;
3. To know social enterprises
4. To know capital markets
5. To understand corporate strategies.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**FOREIGN LANGUAGE**

AIMS

1. Gain knowledge and experience in both oral and written communication in work related situations.
2. Practise and improving job-specific conversation in a foreign language
3. Have appropriate reading, listening, writing and speaking competences
4. Practise and improving job-specific conversation in the foreign language

SPECIAL DEFINITION

Foreign languages are an important competence that should be taught in railway transportation courses. Students should be able to speak, read, write in the foreign language for work related communication situations with customers and clients. They should know the respective vocabulary and grammar to inform them, reply to frequently asked questions and requests. In order to practice, the course should be supported by role-plays of work related situations and homework.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Listening and Speaking skills	30
B. Conversation Training	30
C. Reading skills	20
D. Writing skills	20

TOPICS

A. Listening and Speaking skills

AIM: Have knowledge and competences of understanding texts in typical work related topics that the student listens to; and be able to respond in spoken language in a respective formal manner.

LEARNING OUTCOMES

1. To listen carefully and respond to the content and context of communication in appropriate manner
2. To listen and respond to spoken language, including straightforward information and narratives, and follow straightforward explanations and instructions
3. To speak to communicate information, feelings and opinions on typical work related topics, using appropriate formality

4. To engage in discussion with one or more people in a typical work related situation, making relevant points and responding to what others say to reach an understanding about typical work related topics.
5. To use clear and concise communication to proactively shape the development of a conversation

B. Conversation Training

AIM: Practising and improving job-specific conversation in a foreign language

LEARNING OUTCOMES

1. Practise goal-oriented communication in dealing with customers (e.g. information/ consultation talks with customers, conversations between train attendants and customers, etc.).
2. Improve skills related to 'active listening', responding to customers' wishes, importance of appreciative and empathetic communication design
3. Practise solution-oriented communication in the case of complaints/claims from customers.

C. Reading skills

AIM: Foster the ability to read and understand typical work related texts and respond to respective contents.

LEARNING OUTCOMES

1. Read and understand short, straightforward texts on typical work related topics accurately and independently.
2. Read and obtain information from everyday sources that belong to the work context
3. Respond to the content and context of communication in appropriate manner

D. Writing skills

AIM: To be able to write information and opinions, ideas on work related topics.

LEARNING OUTCOMES

1. Write to communicate information and opinions with some adaptation to the intended audience.
2. Write to communicate information, ideas and opinions clearly using length, format and style appropriate to purpose and audience

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTTRONICS**
WEEKLY COURSE PERIOD	**EFFECTIVE COMMUNICATION SKILLS**
COURSE DURATION	

AIMS

1. Gaining knowledge and experience in both oral and written communication in work related situations.
2. Learn to express and interpret thoughts and feelings in both oral and written form.
3. Learn to listen to the needs, experiences, arguments and demands of others.
4. Learn to respect their views and respond to these in an adequate way.
5. Learn helpful communication strategies to improve communication skills.
6. Knowledge about elements of non-verbal communication as well as their importance in communication design.
7. Learn and practice simple ways to improve verbal communication skills.
8. Introduction to basic elements of written communication design.

SPECIAL DEFINITION

The concept of effective communication and related aspects should be taught in rail transportation courses. Students should be able to communicate to customers, they shall inform, help, support them in an appropriate way in typical work related situations. They should learn about the components that an effective communication builds upon and they should experience it on-site. Information about basic knowledge regarding effective communication should be obtained. In order to practice, the course should be supported by role-plays with peers to experience oral communication situation and by written homework to explore replies to costumer requests, offers to customers on railway travels and trips in particular.

EVAULATION TABLE

The percentages of the conducted studies according per subject are given in the table below. These percentages shall be taken into account during the preparation of final exam.

TOPICS	***Ratios of Topics (%)***
A. Written and oral expression and understanding	15
B. Respect for and understanding of diverse points of view and needs, demands and arguments of other people involved in the communication	15
C. Constructive and goal-oriented communication design	20
D. Nonverbal communication - body language	15
E. Verbal communication skills	20
F. Writing Communication in the workplace	15

TOPICS

A. Written and oral expression and understanding

AIM: Enrich the capacity of passing on knowledge and experience by communicating facts as well as expressing and interpreting thoughts and feelings in both oral and written form in work related communication situations.

LEARNING OUTCOMES

1. To know about communication channels of humans (visual, auditive and kinaesthetic/tactile).
2. To be able to reason and respond to requests when necessary and to be able to express agreement or disagreement in a constructive manner.
3. To use clear and concise communication to proactively shape the development of a conversation.
4. To know the 7 Cs in communication.

B. Respect for and understanding diverse points of view and needs, demands and arguments of other people involved in the communication

AIM: Foster the ability to listen to the needs, experiences, arguments and demands of others, to respect their views and respond to these in an adequate way.

LEARNING OUTCOMES

1. To know about “respect” as a basic value.
2. To be able to behave according to the code of conduct within certain settings.
3. To be able to listen carefully and to respond to the content and context of communication in an appropriate manner.
4. To be able to check attention and reception of information conveyed with the audience (people receiving the information).

C. *Constructive and goal-oriented communication design*

AIM: Learn helpful communication strategies to improve communication skills.

LEARNING OUTCOMES

1. Sensitise one self towards counter-productive elements/ barriers in communication.
2. Practise goal-oriented ways of shaping communication in sensitive and difficult conversations (e.g. disagreements, misunderstandings, conflicts).
3. Get to know basic feedback rules and be able to apply constructive feedback.

D. Nonverbal communication - body language

AIM: Knowledge about elements of non-verbal communication as well as their importance in communication design.

LEARNING OUTCOMES

1. Know different types of nonverbal communication.
2. Develop a basic understanding of how nonverbal communication can and should be used in the workplace.
3. Be able to read, interpret and use body language.

E. Verbal communication skills

AIM: Learn and practice simple ways to improve verbal communication skills.

LEARNING OUTCOMES

1. Reflect upon/ be sensitised regarding one's own communication behavior.
2. Know that by listening attentively, reading body language, asking questions, etc., communication can be improved.
3. Be able to apply simple rhetorical and argumentation techniques.

F. Writing Communication in the workplace

AIM: Introduction to basic elements of written communication design.

LEARNING OUTCOMES

1. Know what to consider when writing emails, letters, reports, or presentations.
2. Become familiar with and practice effective writing strategies for written communication.
3. Develop goal-oriented strategies for optimising and routinising written communication in the workplace.

PROGRAM TITLE	**RAIL SYSTEM MANAGEMENT**
COURSE CODE AND TITLE	**RAIL SYSTEM CONSTRUCTION**
COURSE SEMESTER	**RAIL SYSTEM ELECTRIC ELECTRONICS**
WEEKLY COURSE PERIOD	
COURSE DURATION	**BASIC COMPUTER SKILLS**

AIMS

1. To introduce students to the basics of computer hardware and software. This includes topics such as the different components of a computer, how to use a computer, and how to install and use software.
2. To help students develop the skills needed to use computers for everyday tasks, such as word processing, spreadsheeting, and internet browsing. This includes topics such as how to create and edit documents, how to create and use spreadsheets, and how to search for information on the internet.
3. To encourage students to use computers to learn new things and to be more productive in their lives. Computers can be a powerful tool for learning and productivity. By learning basic computer skills, students can gain the ability to use computers to improve their lives.

SPECIAL DEFINITION

Hands-on lab exercises: These exercises will give students a chance to practice the skills they have learned in the lecture. Online tutorials: These tutorials can provide students with additional information on the topics covered in the lecture. Discussion forums: These forums can provide students with a chance to ask questions and get help from their classmates and the instructor.

EVAULATION TABLE

The percentages of the studies conducted according to the subject and teaching style according to the subject areas are given in the table below. These percentages shall be taken into account during the preparation of final exam questions.

TOPICS	***Ratios of Topics (%)***
A. Introduction to computer, history of computer, operating systems, introduction to operating systems	30
B. Office software	40
C. Effective use of the Internet	30

TOPICS

A. *Introduction to computer, history of computer, operating systems, introduction to operating systems*

AIM: To know ıntroduction to computer, history of computer, operating systems, introduction to operating systems

LEARNING OUTCOMES

1. To know and use ıntroduction to computer, history of computer, operating systems, introduction to operating systems

B. *Office software*

AIM: Using office software effectively

LEARNING OUTCOMES

1. To use word processors, spreadsheets programs, presentation programs.

C. *Effective use of internet*

AIM: To use of internet effectively

LEARNING OUTCOMES

1. To use effective use of the internet, computer and network security, latest strategic technologies of informatics, factors affecting technological developments, internet and technology addiction and prevention.