МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
НАЦІОНАЛЬНИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
«ДНІПРОВСЬКА ПОЛІТЕХНІКА»

ПРАКТИКУМ З ІНОЗЕМНОЇ МОВИ ПРОФЕСІЙНОГО СПРЯМУВАННЯ (АНГЛІЙСЬКОЇ)

Навчальний посібник

Дніпро
НТУ «ДП»
2025

УДК 811.111(076.5)
П69

Рекомендовано вченою радою НТУ «Дніпровська політехніка»
як навчальний посібник для здобувачів ступеня бакалавра спеціальності
J8 Автомобільний транспорт
(протокол №____ від XX.XX.XXXX)

Рецензенти:
І. П. Суїма – канд. філол. наук, доцент (Дніпровський національний університет імені Олеся Гончара);
О. О. Конопелькіна – канд. філол. наук, доцент (Дніпровський національний університет імені Олеся Гончара).

Автори: Н. І. Білан, В. В. Губкіна, І. А. Іванченко, С. І. Левицька.

Практикум з іноземної мови професійного спрямування
П69 (англійської) [Електронний ресурс] : навч. посіб. / Н. І. Білан, В. В. Губкіна, І. А. Іванченко, С. І. Левицька ; М-во освіти і науки України, Нац. техн. ун-т «Дніпровська політехніка». – Дніпро : НТУ «ДП», 2025. – 86 с.

Пропонований практикум з іноземної мови професійного спрямування призначений допомогти студентам спеціальності J8 Автомобільний транспорт здобути знання, вміння, компетентнісні характеристики та гнучкі навички, засвоївши чинну Робочу програму навчальної дисципліни «Іноземна мова професійного спрямування (англійська / німецька / французька)». Вивчення матеріалу базується на англомовних текстах і відеоматеріалах, у яких описано сучасні транспортні технології. Видання містить практичні завдання, виконання яких сприяє активному й творчому використанню концептуального і мовленнєвого матеріалу та реалізації потенціалу самостійної дослідницької навчальної діяльності здобувачів.

УДК 811.111(076.5)

ЗМІСТ

ПЕРЕДМОВА

Сучасні вимоги до підготовки фахівців транспортної галузі передбачають не тільки засвоєння ґрунтовних професійних знань, а й володіння іноземною мовою як інструментом міжкультурної та професійної комунікації. Особливо актуальним є розвиток іншомовної компетентності в умовах глобалізації, інтеграції та цифровізації транспортних систем, логістики мультимодальних перевезень і посилення міжнародної співпраці в галузі автомобільного транспорту.

Доцільність видання цього практикуму з іноземної мови професійного спрямування зумовлена потребою надати студентам спеціальності J8 Автомобільний транспорт ефективний інструмент для здобуття саме тих знань, умінь, компетентнісних характеристик і гнучких навичок, якими вони повинні оволодіти на першому (бакалаврському) рівні вищої освіти як результату засвоєння чинної Робочої програми навчальної дисципліни «Іноземна мова професійного спрямування (англійська / німецька / французька)».

У практикумі запропоновано автентичні англомовні тексти й відеоматеріали з актуальних аспектів транспортних технологій, тенденцій і викликів транспортної сфери. Важлива частина посібника – комплекс практичних завдань, що спрямовані на інтегрований розвиток усіх основних видів іншомовної мовленнєвої діяльності студентів ЗВО – читання, аудіювання, говоріння та письма.

Метою практикуму є розвиток іншомовної комунікативної компетентності в професійному контексті, зокрема таких умінь:

- оперувати сучасною термінологією транспортної галузі;
- аналізувати, інтерпретувати й критично оцінювати професійні тексти й відеоінформацію;
- ефективно спілкуватися іноземною мовою в типових ситуаціях професійного середовища;
- презентувати інформацію, брати участь у дискусіях, вести ділове листування тощо.

Систему практичних завдань у посібнику розраховано на формування **гнучких навичок (soft skills)**, зокрема комунікативних, уміння працювати в команді, критичного мислення, міжкультурної взаємодії, здатності вирішувати проблеми. Усе це сприяє розвитку в здобувачів креативності, адаптивності, менеджменту особистості, вміння навчатися протягом життя, емоційного інтелекту, лідерських якостей, що важливо для фахівців нової генерації.

Запропонований практикум поєднує мовну підготовку з фаховим змістом, що забезпечує інтеграцію мовної, мовленнєвої та професійної компетентності відповідно до сучасних освітніх підходів. Змістові модулі сприяють формуванню комунікативної активності студентів, формуванню навичок самостійної роботи з інформаційними ресурсами, а також стимулюванню

мотивації до безперервного професійного вдосконалення в умовах динамічного розвитку транспортної галузі.

У виданні міститься дидактичний матеріал для практичних занять з навчальної дисципліни «Іноземна мова професійного спрямування» та організації самостійної роботи студентів першого рівня вищої освіти (бакалаврського) спеціальності J8 Автомобільний транспорт.

Практикум підготували:

Передмова та Unit 1 Transportation Modes – доцент кафедри іноземних мов Н. І. Білан;

Unit 2 Automotive Transportation – старший викладач кафедри іноземних мов І. А. Іванченко;

Unit 3 Logistics – викладач кафедри іноземних мов С. І. Левицька;

Unit 4 Intelligent Transportation Systems – старший викладач кафедри іноземних мов В. В. Губкіна.

UNIT 1
TRANSPORTATION MODES

Focus on:

- reading and listening for detail;
- making notes when reading or watching audio and visual materials to engage with the information sources actively.

By the end of UNIT 1 you will have:

- enlarged your general as well as transportation vocabulary;
- enriched your sentence structure stock;
- gained or honed the soft skills that are essential for personal growth including communication, teamwork, problem-solving, active listening, active reading, critical thinking, adaptability, time management, leadership, creativity, emotional intelligence;
- acquired an awareness of and skill in dealing with interpersonal conflicts;
- increased student responsibility for learning in the class;
- developed delivery skills suitable to the presentation's objectives;
- improved discussion and presentation skills that facilitate both personal and group progress.

be able to:

- research, analyse, evaluate data on the modern transportation system;
- determine a suitable purpose and focus for a presentation;
- develop arguments to support the points of your talk;
- listen to and critically evaluate oral messages.

Lead-in assignments

Task 1. Critical Thinking: Express your opinion or thoughts on the following statement: "The development of national highway systems has been the most significant factor in shaping road transportation".

Task 2. Visualisation of a complex system: Create your own mind-map of the modern transportation system on the basis of the example given below:

Reading comprehension assignments

Task 3. Read the article focusing on:

A. Main Passenger Modal Options
B. Main Freight Modal Options
C. Performance Comparison for Selected Freight Modes

Transportation Modes, Modal Competition and Modal Shift

Transport modes are the means supporting the mobility of passengers and freight. They are mobile transport assets and fall into three basic types; land (road, rail, pipelines), water (shipping), and air.

A Diversity of Modes

Transport modes are designed to either carry passengers or freight, but most modes can carry a combination of both. Each mode is characterized by technical, operational, and commercial characteristics defining its market opportunities. Technical characteristics relate to attributes such as speed, capacity, and motive technology, while operational characteristics involve the context in which modes are operated, including speed limits, safety conditions, or operating hours. The demand for transport and the ownership of modes are dominant commercial characteristics, as transportation modes are used to support economic activities and generate income.

Road transportation

Road infrastructures are large consumers of space with the lowest level of physical constraints among transportation modes. However, physiographical constraints are significant in road construction with substantial additional costs to overcome features such as rivers or rugged terrain.

Road transportation has average operational flexibility as vehicles can serve several purposes but can rarely operate outside roads. Road transport systems have low barriers of entry, but high maintenance costs, both for the vehicles and infrastructures. They are mainly linked to light industries and freight distribution,

where rapid freight movements in small loads are the norm. With containerization, road transportation has become a crucial link in freight distribution between ports and commercial hinterlands.

Rail transportation and pipelines

Railways have an average level of physical constraints, and a low gradient is required, particularly for freight. Heavy industries are traditionally linked with rail transport systems, although containerization has improved the flexibility of rail transportation through its connectivity with road and maritime modes. Rail is the land transportation mode offering the highest capacity, with a 23,000 tons fully loaded coal unit train being the heaviest load ever carried.

Pipeline routes are practically unlimited as they can be laid on land or underwater. Their purpose is to move liquids such as petroleum products over long distances cost-effectively.

Maritime transportation

With physical properties such as buoyancy and limited friction, maritime transportation is the most effective mode to move large quantities of cargo over long distances. Main maritime routes are composed of oceans, coasts, seas, lakes, rivers, and channels.

Maritime transportation has high terminal costs since port infrastructures are among the most expensive to build, maintain, and operate. These high costs also relate to maritime shipping, where the construction, operation, and maintenance of ships are capital intensive. More than any other mode, maritime transportation is linked to heavy industries, such as steel and petrochemical facilities adjacent to port sites. Yet, with containerization, maritime shipping has become the linchpin of globalization, allowing the trading of a wide range of goods and commodities.

Air transportation

The core advantage of air transportation is speed and flexibility in network configuration. Air transport constraints are multidimensional and include the site (a commercial plane needs about 3,300 meters of runway for landing and take-off), the climate, fog, and wind currents.

Task 4. Answer the questions searching for clues in the text:

1. What are transport modes primarily designed to support?
2. How many basic types do transport modes fall into?
3. What are some technical characteristics used to define transport modes?
4. What distinguishes operational characteristics of various transport modes?
5. What role does containerization play in road transportation?
6. How does containerization impact rail transportation?
7. What is the primary purpose of pipeline routes?
8. What distinguishes maritime transportation from other modes?
9. Why are port infrastructures associated with high terminal costs in maritime transportation?
10. What are some constraints of air transportation mentioned in the text?

Task 5. Choose the correct answer to the following questions on the text:

1. What are the three basic types of transport modes mentioned in the text?
   a. Land, water, and air
   b. Road, rail, and air
   c. Land, sea, and air
2. Which of the following is NOT mentioned as a characteristic used to define transport modes?
   a. Environmental impact
   b. Technical characteristics
   c. Commercial characteristics
3. What is the main purpose of pipeline routes mentioned in the text?
   a. To transport gas over long distances
   b. To move liquids such as petroleum products over long distances
   c. To connect different cities
4. Which mode of transportation is highlighted as having the highest capacity?
   a. Road transportation
   b. Rail transportation
   c. Maritime transportation
5. What is mentioned as the core advantage of air transportation?
   a. Affordability
   b. Speed and flexibility in network configuration
   c. High capacity for freight transportation
6. Which mode of transportation is traditionally linked with heavy industries?
   a. Road transportation

b. Rail transportation
c. Air transportation

7. What has become a crucial link in freight distribution between ports and commercial hinterlands?

a. Maritime transportation
b. Air transportation
c. Road transportation

8. What are the significant physiographical constraints mentioned in road construction?

a. Mountains and valleys
b. Dense forests
c. Rivers and rugged terrain

9. What is described as the most effective mode to move large quantities of cargo over long distances?

a. Rail transportation
b. Road transportation
c. Maritime transportation

10. Which transportation mode has the highest terminal costs according to the text?

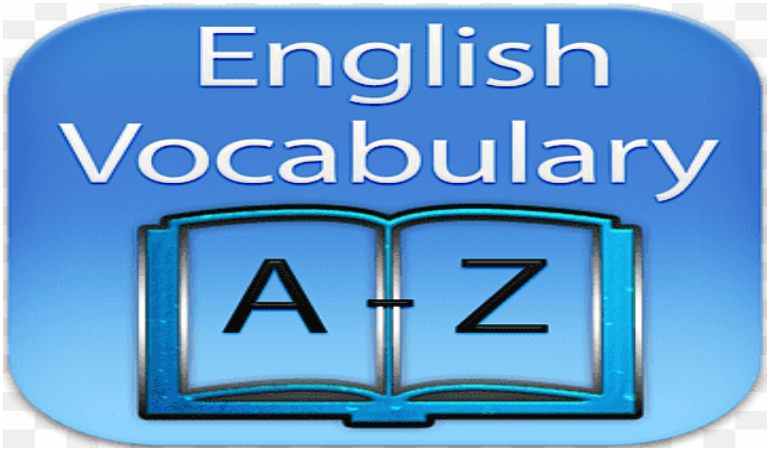
a. Rail transportation
b. Air transportation
c. Maritime transportation

Task 6. Read the following statements and decide if they are true or false:

№	Statements	True	False
1	Transport modes primarily support the mobility of passengers only		
2	Road transportation has the highest level of physical constraints among transportation modes.		
3	Rail transportation offers the highest capacity among land transportation modes.		
4	Pipeline routes are limited in their deployment as they can only be laid on land.		
5	Maritime transportation is the most effective mode for short-distance cargo movements.		
6	Air transportation constraints include factors such as site requirements, climate, fog, and wind currents.		
7	Road transport systems have high barriers of entry due to extensive regulatory requirements.		
8	Containerization has no impact on improving the flexibility of rail transportation.		
9	Maritime transportation terminal costs are among the lowest in the transportation industry.		
10	Air transportation networks are denser over the South Atlantic and South Pacific regions.		

Task 7. Fill in the following table (columns 1 and 2) with the information from the article. Add your own ideas to the column describing the transportation mode advantages and disadvantages.

Transportation Modes	The transportation mode advantages	The transportation mode disadvantages
Road transportation		
Rail transportation		
Pipeline transportation		
Maritime transportation		
Air transportation		



Vocabulary assignments

Task 8. Write a synonym to the words on the left. Look at the example:

mobility	movement
basic	
average	
property	
effective	
advantage	
constraint	
flexibility	

Task 9. Write an antonym to the words on the left. Look at the example:

significant	unimportant
dense	
crucial	
to link	
to relate	

Task 10. Match the following words with their meanings.

1. Mobility	a) the quality of being able to float
2. Mode	b) a typical or obvious quality that makes one person or thing different from others
3. Freight	c) something that prevents people from doing what they want to do; obstacles that prevent movement or access
4. Characteristic	d) a way of doing something: a way of operating, living, or behaving
5. Capacity	e) something that a person or company owns that has a value
6. Asset	f) the total amount that can be contained or produced: the largest amount or number that a container, building, etc can hold; the amount that a factory or machine can produce
7. Barrier	g) goods that are carried in large quantities by ship, train, or aircraft, and the system of moving these goods
8. Buoyancy	h) the ability to move freely or be easily moved
9. Transit	i) the movement of goods or people from one place to another

Task 11. Complete the sentences with the appropriate words from the box:

A. diversity	B. mobility	C. generate	D. operational	E. ownership
F. outside	G. capacity	H. freight	I. configuration	J. modes
K. distances	L. underwater	M. wind	N.opportunities	O. maintain

1. The _____ of transport modes contributes to a well-connected and efficient transportation network.
2. _____ is a key factor in the success of various transportation modes.
3. The _____ characteristics of a mode provide insights into its functionality and limitations.
4. The _____ of modes play a significant role in supporting economic activities.

5. Efficient transportation modes can _____ income and facilitate economic growth.

6. Transport modes are the means supporting the mobility of passengers and _____.

7. Each mode is characterized by technical, operational, and commercial characteristics defining its market _____.

8. Road infrastructures are large consumers of space with the lowest level of physical constraints among transportation _____.

9. Road transportation has average operational flexibility as vehicles can serve several purposes but can rarely operate _____ roads.

10. Rail is the land transportation mode offering the highest _____.

11. Pipeline routes are practically unlimited as they can be laid on land or _____.

12. Maritime transportation is the most effective mode to move large quantities of cargo over long _____.

13. Maritime transportation has high terminal costs since port infrastructures are among the most expensive to build, _____, and operate.

14. Air transport constraints include the site, the climate, _____ currents, and fog.

15. The core advantage of air transportation is speed and flexibility in network _____.

Task 12. Make the derivatives from the words given in the table. Look at the example:

Noun	**Verb**	**Adjective**	**Adverb**
operation	***operate***	***operational***	***operationally***
	demand		
			connectedly
transport			
	substantiate		
		normal	

Task 13. Complete the sentences with the correct word form.

1. Efficient transportation modes can _____ income and facilitate economic growth.

A. generate B. generating C. generated D. generates

2. Each mode is characterized by technical, operational, and commercial _____.

A. characteristic B. characteristics C. characteristically D. characteristically

3. _____ facilitates international trade by connecting global markets, fostering economic growth, and ensuring a smooth transportation of goods.

A. ships B. shipping C. ship D. shipped

4. The demand for transport and the _____ of modes are essential for market analysis.

A. ownerships B. owning C. owns D. ownership

5. Transportation modes _____ connect various regions and contribute to economic development.

A. has to B. have to C. have D. has

Audio-visual assignments

Task 14. Watch the video "Revolutionizing Transportation: The Future of Super Train -High Speed Hyperloop" on YouTube (*https://www.youtube.com/watch?v=Y1AWOs84oNU*) and fill in the gaps in the sentences 1 – 10 with the following words and word combinations:

A	vision of high-speed trains	**F**	eliminating the need
B	reducing air resistance	**G**	the boundaries of train travel
C	a visionary concept	**H**	mode of travel
D	on the cusp of	**I**	near-vacuum environment
E	infinitely	**J**	futuristic concepts

Revolutionizing Transportation

1. The Future of Super Train is _____a high-speed revolution.
2. As technology continues to advance, engineers and visionaries are pushing _____, striving to create the fastest trains the world has ever seen.

3. In this video, we explore the 5 exciting developments and _____ that are paving the way for the next generation of high-speed trains.

No. 1 Hyperloop

4. The Hyperloop, _____ proposed by entrepreneur Elon Musk, has captured the world's imagination with its promise of transforming transportation. 5. It is a revolutionary _____ that combines magnetic levitation, low-pressure tubes, and electric propulsion to create a system capable of reaching incredible speeds. 6. At its core, the Hyperloop envisions pods or capsules traveling through a network of tubes with most of the air removed, drastically _____. 7. This _____ allows the pods to achieve remarkable speeds, potentially exceeding 700 mph (1126 km/h). 8. By harnessing the principles of magnetic levitation, the pods are suspended and propelled forward using electromagnetic forces, _____ for wheels or traditional friction-based propulsion systems. 9. But Elon Musk cancelled in 2022 _____. 10. Hyperloop One, the start-up aiming to realize Elon Musk's **vision of high-speed trains**, has recently undergone a name change.

Task 15. Watch the video "Revolutionizing Transportation: The Future of Super Train -High Speed Hyperloop" on YouTube (*https://www.youtube.com/watch?v=Y1AWOs84oNU*) and complete the sentences 1 – 12 with the appropriate phrases A – L.

1. The company quietly reverted its name back _____.
2. _____they made the decision to remove the Virgin brand from the business and collaborate with Hyperloop One's management team.
3. This change was prompted by Virgin Hyperloop shift in short-term priorities,

_____.

4. The hyperloop system utilizes a near-vacuum environment in a tube enabling high speeds and low power consumption by _____.
5. Battery-powered pods glide at speeds up to 670 miles per hour _____.
6. The design focuses on simplicity, modularity and efficiency _____.
7. Hyperloop's proprietary levitation engines using arrays of electromagnets _____.
8. Pods travel in convoys allowing for _____.
9. The absence of moving parts on the track enables _____.
10. These innovations provide ultra-fast speeds, on-demand direct service and zero direct emissions _____.

11. Hyperloop opens up new possibilities _____.

12. Virgin Hyperloop, whose partners include Richard Branson's Virgin Group, is developing the technology for passenger pods that will hurdle at speeds of up to 750 miles an hour – 1200 kilometers per hour through _____.

A. eliminating aerodynamic drag.

B. to Hyperloop One, the brand it used from 2016 to 2017 in the past few weeks.

C. with levitation power and propulsion integrated into the pod itself.

D. almost air-free vacuum tunnels using magnetic levitation.

E. specifically transitioning from passenger transport to focusing on a cargo only service.

F. According to a statement from Virgin Group,

G. on-demand service and individualized destinations.

H. offering a comfortable safe and quiet travel experience.

I. accommodating tens of thousands of passengers per hour per direction.

J. lift and guide the pod within the track.

K. seamless high-speed switching.

L. for fast and effortless journeys.

Critical Thinking

Task 16. Discussion.

Discussion Questions:

1. What are the advantages and disadvantages of maritime transportation compared to air transportation?
2. How does containerization impact the efficiency of transportation modes?

Discuss the statement: "Transportation modes are essential for economic development". Provide examples to support your argument.

Discussion Topics:

1. Discuss with your partner the advantages and disadvantages of each transportation mode mentioned in the text. Consider factors such as speed, capacity, and environmental impact.

2. Reflect on the statement "Transportation is the backbone of modern society". Discuss with your partner the significance of transportation modes in supporting economic activities and facilitating global connectivity. Share your insights with the class.

Task 17. Role Play: You are a logistics manager for a company. Role play a conversation with a colleague discussing the most suitable transportation mode for shipping a large quantity of goods internationally. Consider factors like cost, time, and reliability.

Task 18. Debate: Divide the class into two groups. One group argues that maritime transportation is the best mode for global trade, while the other group argues that air transportation is superior. Prepare your arguments and present them to the class.

Task 19. Scenario Analysis: Imagine you are planning a vacation with friends. Discuss which transportation mode would be the best option considering factors like distance, cost, and convenience. Present your decision to the class.

Task 20. Problem Solving: You are a city planner faced with the challenge of reducing traffic congestion. Brainstorm with your partner potential solutions that involve improving existing road infrastructure or promoting alternative transportation modes like public transit or cycling.

Task 21. Comparative Analysis: Compare and contrast the technical characteristics of road transportation and rail transportation. Discuss their respective advantages and disadvantages in terms of capacity, speed, and environmental impact.

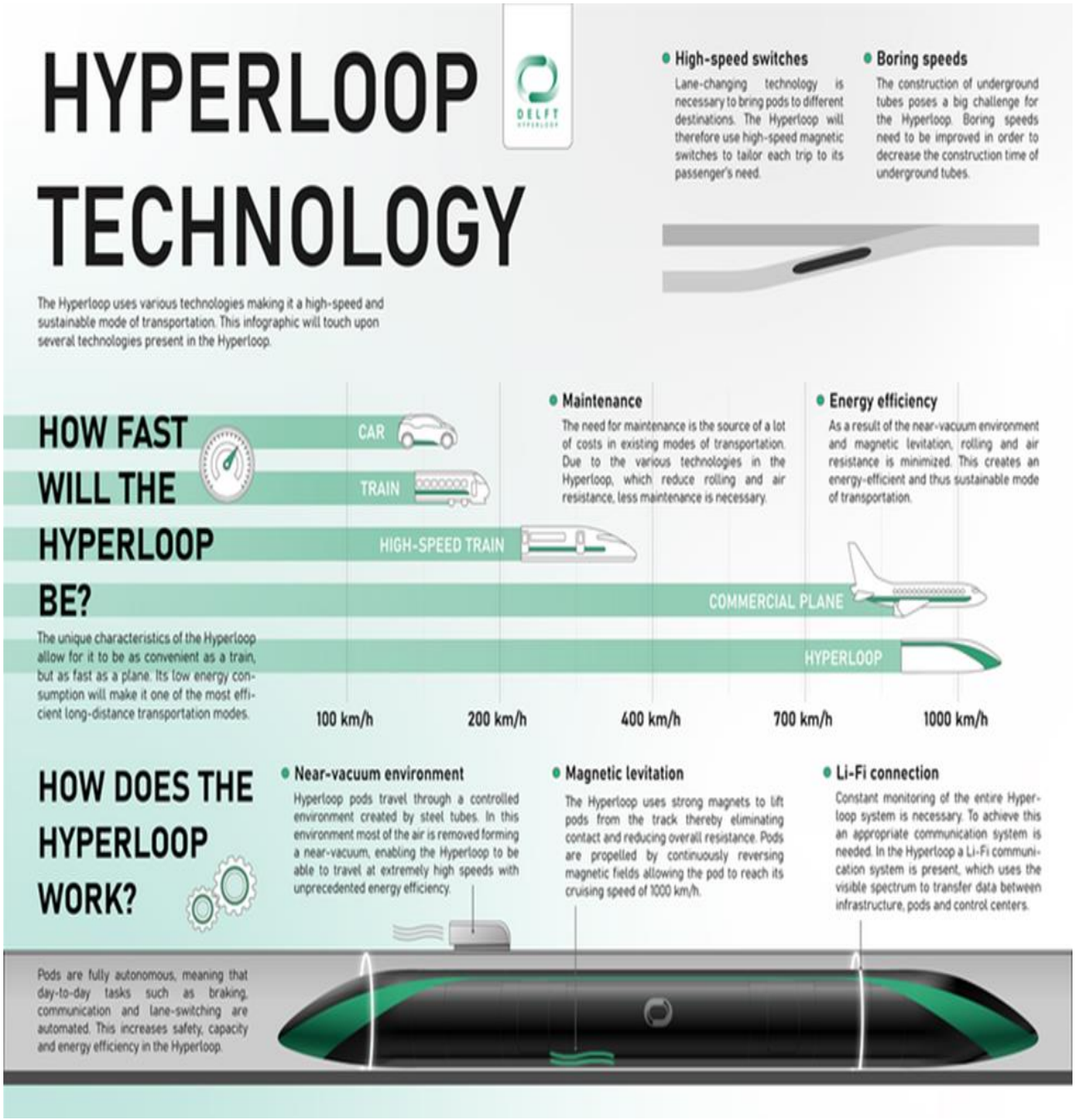
Task 22. Opinion Sharing: Share your opinion on whether you believe containerization has had a positive or negative impact on global trade. Support your opinion with examples and discuss containerization technologies with your partner.

PROJECT WORK

Task 23. Future Trends Envisioning:

1. As a team predict how transportation modes might evolve in the future addressing such issues as environmental sustainability and technological advancements. Discuss the transportation types prospect development and share your ideas with the class giving an interactive presentation.

2. Study the HYPERLOOP TECHNOLOGY as a team, create your team presentation and deliver it as a team drawing on the DELFT HYPERLOOP infographics (*https://www.facebook.com/photo/?fbid=3077160612341807&set=a.937542322970324*):



Supplementary reading

Intermodal Transportation and Containerization

Authors: Dr. Jean-Paul Rodrigue and Dr. Brian Slack

Intermodal transportation concerns the movements of passengers or freight from an origin to a destination relying on several modes of transportation. The container has become the dominant intermodal transport unit.

1. The Nature of Intermodalism

Most transportation modes are developed independently. Competition between modes tended to produce transportation systems that were segmented and un-integrated; in their own "silos". Each mode, particularly the carriers that operated them, has sought to exploit its advantages in cost, service, reliability, and safety.

Carriers try to gain market share and increase revenue by maximizing the line haul under their control. All the modes saw the other modes as competitors, often because of different regulatory regimes and competitive rules. The lack of integration between the modes was also accentuated by public policy that has frequently prevented companies from owning firms in other modes (as in the United States before deregulation) or has placed a mode under direct state monopoly control (as in Europe and East Asia). Modalism was also favored because of the technical difficulties of transferring goods from one mode to another, thereby incurring additional terminal costs and delays, mainly because the load unit needed to be changed, which is typical for bulk transportation.

Since the 1960s, major efforts have been made to integrate separate transport systems through intermodalism, which took place in several stages. The transformation first took place with the setting of maritime networks, which were then better connected with inland networks. From a functional and operational perspective, three components are involved in intermodalism:

Intermodal transportation. The movements of passengers or freight from an origin to a destination relying on a sequence of transportation modes. Each carrier is issuing its own ticket (passengers) or contract (freight). Transfers from one mode of transport to another are commonly taking place at a specifically designed terminal.

Multi-modal transportation. The movements of passengers or freight from an origin to a destination relying on several modes of transportation using one ticket (passengers) or contract (freight). Technically the same as intermodal transportation, but represents an evolution requiring a higher level of integration between the actors involved such as carriers and terminal operators.

Transmodal transportation. The movements of passengers or freight within the same mode of transportation. Although pure transmodal transportation rarely exists and an intermodal operation is often required (e.g. ship to dockside to ship), the purpose is to ensure continuity within the same modal network.

Intermodal transportation relies on an exchange of passengers or freight between two transportation modes. The term has become more commonly used for freight and container transportation across a sequence of modes. In North America, the term intermodal is also used to refer to containerized rail transportation. With intermodal transportation, what initially began as improving the productivity of shipping evolved into an integrated supply chain management system across modes and the development of multi-modal transportation networks.

Multi-modal transportation network. A logistically linked system using two or more transport modes with a single rate. Modes have common handling characteristics, permitting freight (or people) to be transferred between modes during a movement between an origin and a destination. For freight, it also implies that the cargo does not need to be handled, just the load unit, such as a pallet or a container.

Integrated Transport Systems
Major Steps in Intermodal Integration
Intermodal Transportation as an Integrative Force
Intermodalism, Multimodalism and Transmodalism

Intermodal and Transmodal Connectivity

Intermodalism involves using at least two different modes in a trip from an origin to a destination through an intermodal transport chain, which permits the integration of several transportation networks. Intermodality is expected to enhance the economic performance of a transport chain by using modes in the most productive manner. Thus, the line-haul economies of rail may be exploited for long distances, with the efficiency of trucks providing flexible local pick-up and deliveries. The entire trip is seen as a whole rather than as a series of legs, each marked by an individual operation with separate sets of documentation and rates. This system is organized around the following conditions:

The nature and quantity of the transported cargo usually suitable for intermediate and finished goods are for load units of less than 25 tons. The mode with the lowest capacity usually defines the intermodal load unit. As such, intermodal transportation is constrained by the trucking load unit.

The sequence of transportation modes being used must ensure a modal continuity. Intermodal transportation is organized as a sequence of modes, often known as an intermodal transport chain. The dominant modes supporting intermodalism are trucking, rail, barges, and maritime. Air transportation usually only requires intermodalism (trucking) for its "first and last miles" and is not used in combination with other modes. Additionally, load units used by air transportation are not readily convertible with other modes.

The origins and destinations of the movements where distances play an important role as the longer the distance, the more likely an intermodal transport chain will be used. Distances above 500 km (longer than one day of trucking) usually require intermodal transportation. Shorter distances are usually not suitable for intermodal transportation.

The value of the cargo is of intermediate value as low, and high-value shipments are usually less suitable for intermodal transportation. High-value shipments will tend to use the most direct options (such as air cargo), while low-value shipments are usually point-to-point and rely on one mode, such as rail or maritime.

The frequency of shipments needs to be continuous and in similar quantities.

Intermodal transportation is capital intensive, implying that it requires specialized equipment to transfer cargo from one mode to the other.

Intermodal Transport Chain
Conditions and Outcomes of Intermodal Transport

2. Forms of Intermodalism

Intermodalism originated in maritime transportation, with the development of the container in the late 1960s, and has since spread to integrate other modes. It is not surprising that the maritime sector should have been the first mode to pursue containerization. It was the mode most constrained by the time taken to load and unload vessels. A conventional breakbulk cargo ship could spend as much time in a port as it did at sea. Breakbulk cargoes were handled by stevedores who used ad-hoc

means to load, unload, and move cargoes between the ships, piers, and warehouses. There were no standard forms of cargo handling and equipment. Containerization permits the mechanized handling of cargoes of diverse types and dimensions placed into boxes of standard sizes. In this way, goods that might have taken days to be loaded or unloaded from a ship can now be handled in a matter of minutes.

The emergence of intermodalism has been brought about in part by technology and requires management units for freight, such as containers, swap bodies, pallets, or semi-trailers. In the early 20th century, pallets became a common management unit. Still, their relatively small size and lack of a protective frame made their intermodal handling labor-intensive and prone to damage or theft. Better techniques and management units for transferring freight from one mode to another have facilitated intermodal transfers. Early examples include piggyback (TOFC: Trailers On Flat Cars), where truck trailers are placed on rail cars, and LASH (lighter aboard ship), where river barges are placed directly on board sea-going ships. A unique form of an intermodal unit has been developed in the rail industry, particularly in the United States, where there is sufficient volume. A roadrailer is essentially a road trailer that can also roll on rail tracks. It is unlike the TOFC (piggyback) system that requires the trailer to be lifted onto a rail flatcar. In this case, the rail bogies may be part of the trailer unit or attached at the railway yard. The road unit becomes a rail car, and vice-versa.

While handling technology has influenced the development of intermodalism, another important factor has been changes in public policy. Deregulation in the United States in the early 1980s freed firms from government control and ownership, a policy that was adopted in many transport markets across the world. Carriers were no longer restricted from owning across modes, which developed a strong impetus towards intermodal cooperation. Shipping lines began to offer integrated rail and road services to customers. The advantages of each mode could be exploited in a seamless system, which created multiplying effects. Customers could purchase the service to ship their products from door to door, without being concerned about modal barriers. In many cases, cargo owners were not concerned about the sequence of modes, only that their shipments were carried in a timely and cost-effective fashion.

The most important feature of intermodalism is providing a service with one ticket (for passengers) or one bill of lading (for freight). With one bill of lading, clients can obtain one through rate, despite the transfer of goods from one mode to another. This has necessitated a revolution in organization and information control. At the heart of modern intermodalism, information and distribution systems are essential to ensure the safe, reliable, and cost-effective control of freight and passenger movements being transported by several modes. Electronic Data Interchange (EDI) was initially developed to assist companies and government agencies (customs documentation) in coping with an increasingly complex global transport system. This technology has now evolved, and with digitalization, crucial information can be shared across modes.

Intermodal transport is transforming the medium, and long-haul freight flows across the world. Large integrated transport carriers provide door-to-door services, such as the high degree of integration between maritime and rail transport in North

America. In Europe, intermodal rail services are becoming well-established between the major ports, such as Rotterdam and southern Germany, and between Hamburg and Eastern Europe. Rail shuttles are also making their appearance in China. While intermodal rail transport has been relatively slow to develop in Europe, there are extensive interconnections between barge services and ocean shipping, particularly on the Rhine. Barge shipping offers a low-cost solution to inland distribution where navigable waterways penetrate interior markets. The limits of intermodality are imposed by factors of space, time, form, the network pattern, the number of nodes and linkages, and the type and characteristics of the vehicles and terminals.

References

1. Revolutionizing Transportation: The Future of Super Train-High Speed Hyperloop. 2023. URL: https://www.youtube.com/watch?v=Y1AWOs84oNU&t=366s (accessed: 28.09.2025).

2. Rodrigue J-P. Transportation Modes, Modal Competition and Modal Shift. The Geography of Transport Systems, Sixth Edition, New York : Routledge, 2024. P. 130 – 178. URL: https://transportgeography.org/contents/chapter5/transportation-modes-modal-competition-modal-shift/ (accessed: 16.04.2024).

3. Rodrigue J-P., Slack B. Intermodal Transportation and Containerization. The Geography of Transport Systems, Sixth Edition, New York : Routledge, 2024. URL: https://transportgeography.org/contents/chapter5/intermodal-transportation-containerization/ (accessed: 16.04.2024).

UNIT 2
AUTOMOTIVE TRANSPORTATION

By the end of UNIT 2 students will have:

- got acquainted with the trends in automotive industry;
- developed speaking skills in the issues of the changes the automotive industry is undergoing;
- expanded the vocabulary of interior and exterior parts of a car;
- applied different strategies to the reading articles on the topic.

Lead-in assignments

Task 1

1. Keeping in mind advances in technology, is automobile industry undergoing any changes? If yes, what kind?

2.What factors can influence this process?

Task 2. Read the text, paying attention to:

- What the top automobile trends are.
- Explore how these innovations transform the way we perceive and experience transportation.

Task 3. Match the highlighted words from the text to their synonyms:

1) emissions reduction	a) give preference to
2) braking, adaptive cruise control	b) change the form
3) internal combustion engine vehicles	c) a type of advanced driver-assistance system that automatically speeds up or slows down a car to maintain a following distance that a driver set
4) reshape landscape	d) minimisation of the greenhouse gas (GHG) emissions generated by an individual, organisation, or country.
5) ride-sharing services	e) system which reads lane markings to determine if the car is leaving or has left the lane and keeps a driver in his lane
6) lane-keeping assistance	f) a way of making decisions based on the analysis and interpretation of data stored from digital sources
7) ride-hailing services	g) service when a rider shares a vehicle with other riders
8) data-driven services	h) service when a rider “hails” or hires a personal driver to take them exactly where they need to go.
9)mechanical failures	i) breaks in a mechanical part of a car
10) to be opting for	j) vehicles running due to burning fuel

Trends in the Auto Industry

Electric Mobility

Nowadays, the automobile industry is witnessing a major shift towards electric mobility, with more and more automakers investing in the development of electric vehicles (EVs). With governments around the world setting ambitious targets for **emissions reduction**, consumer interest in EVs has surged, leading to a rapid expansion in their market share Significant advancements in battery technology have led to a decrease in the cost of EVs, making them more accessible to a wider audience and signalling a potential decline in the dominance of traditional **internal combustion engine vehicles**. The shift towards electric mobility is **reshaping** the automotive **landscape**, compelling manufacturers to rethink their strategies and adapt to a future where electric vehicles are becoming the norm.

Advanced Driver Assistance Systems (ADAS)

Autonomous driving is one of the major automotive industry trends that are shaping the future of the automotive industry. Advanced Driver Assistance Systems (ADAS) provide features such as automatic **braking, adaptive cruise control**, and **lane-keeping assistanc**e that not only enhance driver safety but also lay the groundwork for the transition to complete autonomy. On a larger scale, the integration of autonomous vehicles into urban mobility systems could lead to more efficient traffic management and a reduction in congestion, thereby transforming urban living spaces.

Connected Cars and the Internet of Things (IoT)

Connected cars are changing the way we interact with our vehicles, as the Internet of Things (IoT) allows seamless communication between cars, infrastructure and other devices. IoT enables a host of **data-driven services**, ranging from to remote diagnostics, **over-the-air software** updates and advanced **infotainment systems**, thereby increasing the convenience and efficiency of vehicle use. Additionally, the generated and collected data open up unprecedented opportunities for personalized experiences and **predictive** maintenance. Vehicle systems can learn individual drivers' preferences real-time traffic updates and habits, adjusting settings such as seat positioning, climate control, and entertainment options. Predictive maintenance uses data analytics to predict mechanical failures before they occur, ensuring that vehicles are serviced in a timely manner and reducing the likelihood of breakdowns.

Shared Mobility

With more and more people living in cities and traffic getting worse, sharing rides is becoming a popular way to solve the problem. **Ride-hailing** services, car-**sharing** platforms and even **vehicle subscription** models are changing the way we think about owning and using cars. More people **are opting for** the convenience and flexibility of ride-sharing services over the costs and responsibilities associated with owning a vehicle. The trend of shared transportation is expected to grow in urban

areas, where parking is expensive and public transport can fill in the mobility gaps left by ride -sharing.

Lightweight and Sustainable Materials

Sustainable and environmentally friendly initiatives are rapidly becoming a central focus in the automotive industry, with manufacturers increasingly adopting green manufacturing processes and lightweight and sustainable materials to reduce vehicle weight, enhance fuel efficiency and lower emissions. From advanced high-strength steel and aluminium to carbon fibre and composites, automakers are exploring innovative materials such as recycled plastics, bio-based fabrics, and non-toxic paints to meet stringent regulatory requirements and cater to the growing consumer demand for eco-friendly vehicles.

Task 4. Answer the questions:

1. What factors made electrical vehicles dominant in automotive transport?
2. What opportunities does the introducing of Internet of Things provide for drivers and passengers?
3. How can predictive maintenance help avoid breakdowns?
4. What transportation services demonstrated a change in the way of our perception and usage of mobility?
5. Why do people prefer to share a car- riding rather than having their own cars?
6. What initiatives are in the focus of automotive industry?
7. What eco-friendly materials are used in the manufacturing of modern vehicles?
8. Do the top trends prove that car industry is getting better and better?

Task 5. Read the following statements and decide if they are true or false:

	Statements	**True**	**False**
1.	The market share of electrical vehicles (EV) expanded very fast due to the tasks of emissions reduction and consumers' interest in EV.		
2.	It was significant advancement in battery technology that made EV more efficient and reliable.		
3.	Because of technological advancements, the price of EV increased dramatically, making it unaffordable for most people.		
4.	The only target of ADAS is a driver's safety.		
5.	Autonomous vehicles, integrated into city mobility systems, will improve its transport management, reducing congestions.		
6.	Vehicles, connected with each other and infrastructure, improve safety on the roads.		
7.	Automakers, exploring innovative materials for producing cars, aim only at meeting regulatory		

	requirements.		

Task 6. Find the definitions for the following terms:

1. carbon fibre	a) ability to download applications, services, and configurations over mobile or cellular work without the need of a physical access to a vehicle.
2. environmentally friendly (green)	b) material made from thin filaments of carbon atoms bonded together in a crystalline structure
3. vehicle subscription models	c) sustainability and marketing terms refers to goods, services, laws, guidelines and policies that claim reduced, minimal, or no harm upon ecosystems or the environment
4. in a timely manner	d) uses data analysis to identify operational anomalies and potential equipment defects, enabling timely repairs before failures occur
5.predictive maintenance	e) something finished quickly, on time.
6. real-time traffic updates	f) a central digital system that allows you to control a wide variety of vehicle functions.
7. infotainment systems	g) an ability to update data on monitoring traffic flow via cameras scanning number plates or road sensors in a certain period of time
8. over-the-air-software service	h) widely used approach whereby customers pay a monthly fee for the use of a vehicle alongside additional elements such as servicing, insurance, or roadside assistance

Task 7. Complete the sentences with the words from Task 6:

1. _____ are extremely stiff, strong, and light, and are used in many processes to create excellent structural materials.

2. Car manufacturers try to cater growing consumer demand for _____ cars.

3. With _____ the back-end system of a mobile operator can push a firmware update to the end user's device.

4. Condition based monitoring is a type of _____ that relies on sensor data, such as vibration monitoring systems, to measure the condition of equipment over time while it is in operation.

5. Your own needs and preferences will usually determine which _____is right for you.

6. Rather than owning a car, subscribers essentially "rent" one and can swap vehicles on demand due to _____.

7. Growing urban populations, coupled with increasing vehicle ownership, have prompted the necessity of _____ to counter congestion and ensure road safety.

8. Data analytics help to predict mechanical breakdowns and ensures that cars are services _____.

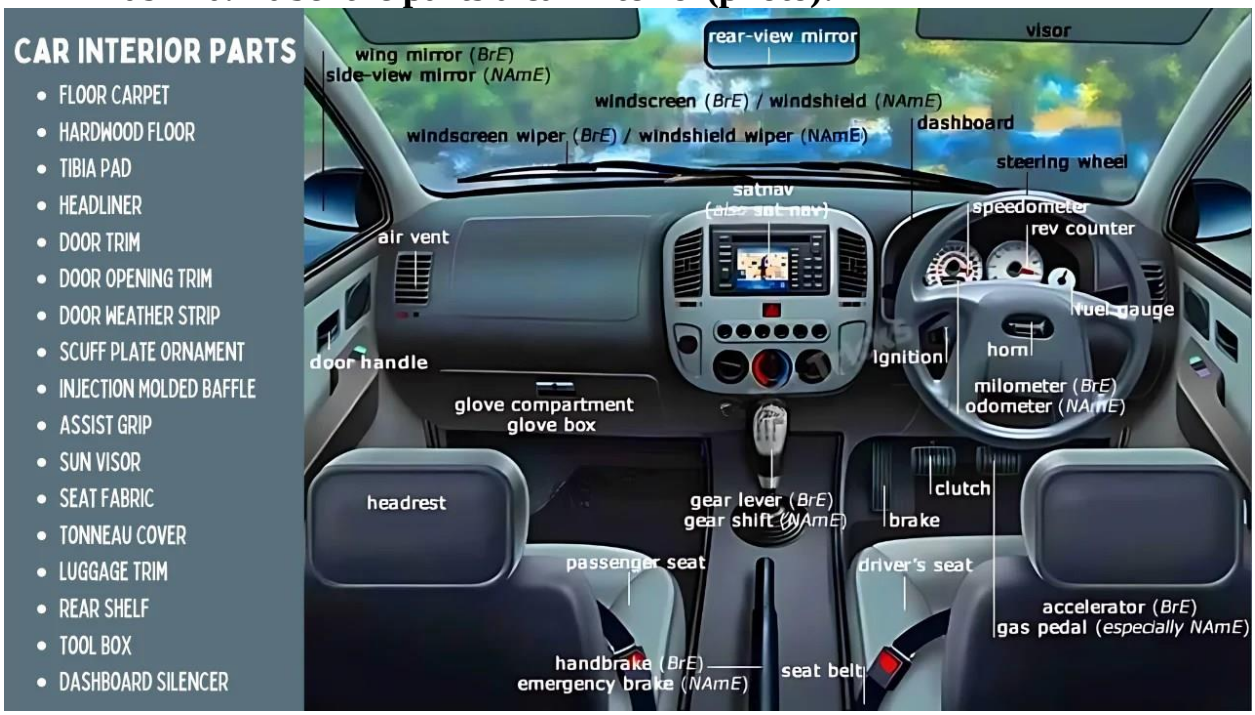
Task 8. Make the derivatives from the words given in the table. Look at the example:

VERB	NOUN	ADJECTIVE
reduce	reduction	reduced
	sustainability	
		accessible
expand		
		integrative
	flexibility	
advance		
	maintenance	
		predictive
	innovations	
generate		

Task 9. Speaking:

With a partner exchange your ideas of the future of the automotive industry and the vital role innovation and collaboration play in shaping its landscape

Task 10. Label the parts a car interior(photo):



Task 11. Complete the sentences with the words from Task 10:

1. Standard equipment includes driver and passenger _____
2. _____ is an instrument panel beneath the front window having various gauges and accessories for the use of the driver.

3. _____ is located on the floor of the vehicle to the left of the brake pedal.
4. The wheels on the car turn 20 degrees during one rotation of _____
5. Documents and the keys can be found in the _____.
6. She released the _____, turned the ignition key, and reversed into the road.
7. When the driver puts his foot on the _____, the system automatically applies the optimum pressure required to avoid hitting the car in front.
8. He pulled the _____ down and glanced in the _____.
9. _____ helps to adjust the temperature and check using a gauge.
10. He eased his foot _____ to slow down.
11. _____ can also be used just like any other automatic gearbox, where the transmission will shift automatically.
12. You should never leave the keys of your car in the _____**.**
13. _____ is the device that makes a loud noise as a signal or warning.
14. _____ is very convenient, when driving, you can hold your cup of coffee in upright position and don't soil the interior.

a) cup-holder	b) horn	c) ignition	d) gear stick	e) accelerator	f) air vent	g) sun visor, or rear
h) airbags	i) dashboard	j) clutch pedal	k) steering wheel	l) glove compartment	m) handbrake	n) brake pedal)

Task 12.: Speaking. Renting a car (online tests)
https: //english-practice.net/listening-exercises-b1-travel/
//english-practice.net/listening-exercises-b1-travel

Task 13. Watch the video describing a car exterior parts :
https://m.youtube.com/watch?v=CxwZQmU6Y3s

Task 14. Match the terms with their definition

1. windscreen	**a.** the pipe at the back of a vehicle or on a machine through which waste gas escapes from the engine
2. a windscreen wiper	**b.** these special rear lights are an indispensable support light for your vehicle to alert other road users to the fact that you are driving backwards or about to do so.
3. bonnet (hood)	**c.** used to cut through the fog and give you more visibility on the road
4. front bumper (rear bumper	**d.** the device in a vehicle that signals the intention to turn or change lanes
5. license(number) plate	**e.** the device in a vehicle that signals the intention to turn or change lanes ("blinker" is used in North

	American English)
6. wheel	**f.** refer to roof pillars, and they're lettered front to back. A – Pillars straddle the windshield, B – Pillars are in the middle of the passenger compartment (just behind the front doors) and C – Pillars are those at the rear of the passenger compartment.
7. a tyre	**g**. the rubber covering that fits around the wheel
8. Pillars A, B, C	**h.** the metal or alloy structure that is attached to the vehicle's axle and on which the tyre is mounted
9. turn signal (blinker)	**i.** an official metal sign with numbers and letters on the front and back of a car
10. headlight	**j.** metal bar attached to the front and rear of your vehicle that helps minimize physical damage in the event of a collision. The front bumper cover supports the car's grille, while the rear bumper cover may include the license plate mounting area.
11. fog light	**k.** the hinged cover over the engine of motor vehicles.
12. stop light (brake light)	**l.** or windshield wiper (American English) is a device used to remove rain, snow, ice, washer fluid, water
13. reversing light	**m.** solid and transparent barrier, placed at the front of a vehicle. And it serves as a shield for the driver and passengers from wind, dust, and other flying debris.
14. exhaust pipe	**n.** warning light that ***indicates brake system troubles***.

Task 15 (a): Read the text. Match the paragraphs with their headlines.

How cars work

A. Dashboard	E. Brake system	I. Lubrication system
B. Fuel system	F. Body	J. Suspension system
C. Steering system	G. Engine	K. Exhaust system
D. Cooling system	H. Drivetrain	

Cars are very complicated machines and all systems in them work together. They power a car, control and steer it and make it comfortable for people to drive in.

(1) _____

The heart of every car is its engine. It produces the power that turns the wheels and electricity for lights and other systems.

Most automobiles are powered by an **internal combustion engine**. **Fuel**, usually **gasoline** or petrol, is burned with air to **create** gases that **expand**. A **spark plug** creates a **spark** that ignites the gas and makes it burn. This energy moves

through cylinders in which **pistons** slide up and down. They are **attached** to **rods** that move a **crankshaft**. Normal car engines have four to six cylinders but there are also models with eight and sixteen cylinders. The turning **movement** is passed through the **drivetrain** to the **drive wheels**.

(2) _____

The fuel system pumps petrol from the tank to the engine. Older cars used to have **carburettors** that mix **fuel** with air and send the gas to the engine. Some cars have a special **fuel** injection system that **sprays** petrol into the engine. Modern cars have **turbo chargers** that **suck** in extra air and **therefore** create more power.

(3) _____

The engine and all parts that carry power to the wheels are called the **drivetrain**. It includes the **transmission**, **drive shaft**, **differential**, the **axles** and the **drive wheels** that move the car. While most cars have driven wheels in the front, some have them in the back. Cars that need to drive over all kinds of ground have a **four-wheel drive**.

The **transmission** controls the speed and **torque**. When a car travels at a normal speed on a flat road it does not need so much **torque** to keep it moving, but when you want to start a car from a hill the engine must produce more power. **Gears** control speed and power of the engine in different driving conditions.

In cars with **manual transmission** you have to change gears by pressing down the **clutch** with your foot and moving a **lever**. Cars with **automatic transmission** change **gears** without control by the driver. Lower gears give the car more **torque** and speed. When the car moves faster the **transmission shifts** to higher **gears**.

The **driveshaft** carries the power to the **axle** which is **connected** to the wheels. It has several **joints** which make the **axle** and wheels **moveable** as the car drives on **uneven** and **bumpy** roads.

The **differential** is **connected** to the rear end of the driveshaft. It lets the wheels turn at different speeds because in curves the outer wheels must travel a greater distance than the inner ones.

(4) _____

The **steering** system controls the front wheels. Turning the steering wheel makes them point to the left or right. Most cars have power steering; a hydraulic system makes it easier for the driver to turn the wheels.

(5) _____

The brake system slows down or stops the car. **Brakes** operate on all four wheels. There are two basic types of brakes: **drum** or **disc brakes**. In both cases a **friction pad** is pressed against a **drum** or **disc** with the help of a hydraulic system.

All cars have **emergency** hand brakes which you use if the hydraulic system **fails**. It is also called a parking brake because you use it to stop a **vehicle** from rolling down a hill. Antilock braking systems (ABS) keep the wheels turning when you step on the brakes. This computer-controlled system **prevents skidding** if you are on a **slippery** road

(6) _____

The **suspension** system supports the **weight** of the car. It has wheels, **axles**, **tires** and **springs**. Most cars have **shock absorbers** to **guarantee** a **smooth** ride.

Springs are between the **axles** of the wheels and the body of the car. They allow each wheel to move up and down on its own. The tires also help to make driving **smoother**. They are built so that they give the car **grip** on roads in all conditions.

(7) _____

When a car burns **fuel** gases are produced. They must be **removed** so that new **fuel** can be burned. The **pistons** in the engine's cylinders force gas out of the engine. It passes through a **muffler** into **tail pipes**. The muffler also keeps the car running quietly. For about thirty years cars have been **equipped** with a **catalytic converter**. It **reduces pollution** by **converting** harmful gases into carbon dioxide and water

(8) _____

Burning **fuel** inside a car's engine **creates** a lot of heat. Most of it has to be removed by a cooling system. **Liquid** cooling systems have a mixture of water and chemicals. A water pump **forces** this mixture to flow between the cylinders of the engine. The hot water is then pumped through a **radiator** where the air carries away the heat.

(9) _____

Oil is important for an engine to work. It **flows** through the moving parts so that the metal does not **rub** against other metallic pieces. Without **lubrication** the metal would become too hot and the engine would be destroyed.

Oil is **stored** in an oil tank at the bottom of the engine. From there it is pumped around the engine. A filter **removes dirt** from the oil so that it won't do any **damage** to engine parts. After you have driven a certain number of kilometers you must change the oil and the oil filter.

(10) _____

The **dashboard** has many instruments that show you how fast you are moving, the **amount** of petrol that is left in the tank, the oil temperature and some other information.

(11) _____

The body of the car is the outer **shell** that **surrounds** the mechanical parts and the passengers inside. Most bodies are made of **steel**, although some parts are made of strong plastic or fiberglass. The body **includes** the **passenger compartment**, **hood**, **trunk** and the **fenders** which cover the wheels.

Task 15 (b). Read the following statements and decide whether they are TRUE or False

	Statements	**True**	**False**
1.	It is the engine of a car that makes its wheels go round.		
2.	An internal combustion engine powers ALL types of automobiles.		
3.	The number of cylinders is limited to 4 or 6 in all models of cars.		
4.	Carburators used to mix fuel with air and send the gas to the engine in older models.		
5.	Due to turbo chargers sucking in extra air modern cars are more powerful.		
6.	A four-wheel drive is necessary for driving only flat surfaces.		

7.	In any transmission system, either manual or automatic, a driver has to control changing gears.		
8.	A hydraulic steering system simplifies turning the wheels for the driver.		
9.	There are emergency brakes in all cars in case the hydraulic braking system is out of order.		
10.	A cooling system removes a lot of heat, created during the burning fuel inside a car's engine.		
11.	The dashboard is a multi-tool instrumental panel.		

Task 16. Read the text about the most popular kind of automotive transport.

What is an Electric Vehicle?

An electric vehicle represents a significant shift from traditional gasoline-powered vehicles. At its core, an EV is powered by electricity, which is stored in batteries rather than relying on the combustion of fossil fuels. This fundamental difference not only makes EVs environment-friendly but also alters the way they operate.

Electric vehicles rely more on the propulsion power of electric motors. These motors draw electricity from the vehicle's battery pack, converting it into motion.

Basic Components of an Electric Vehicle

The following are the basic components of an electric vehicle:

Electric Motor: The electric motor is an important part of an electric vehicle. It converts electrical energy from the battery into mechanical energy to drive the vehicle's wheels. There are various types of electric motors used in EVs, such as DC motors, AC induction motors, and permanent magnet synchronous motors.

Battery Pack: The battery pack stores the energy required to power the electric motor. It consists of multiple lithium-ion battery cells organized into modules and packs. The battery's capacity determines the range of the vehicle – how far it can travel on a single charge.

Power Electronics Controller: The power electronics controller manages the flow of electrical energy between the battery, electric motor, and other vehicle systems. It includes components like inverters, converters, and control software.

Charging System: Charging systems can vary in terms of voltage, current, and charging speed. There are different levels of charging, including Level 1 (standard household outlet), Level 2 (dedicated charging station), and Level 3 (fast DC charging).

Electric Vehicle Working Principle

The working principle of electric vehicles (EVs) is based on the conversion of electrical energy stored in batteries or generated through other means into mechanical energy to propel the vehicle.

Here is a detailed overview of the working principles of electric vehicles:

Energy Storage: Electric vehicles use batteries to store electrical energy. These batteries are typically made of lithium-ion cells, which are known for their high energy density and long cycle life.

Electric Motor: Instead of an internal combustion engine, EVs use electric motors for propulsion. When electricity flows through the motor, it creates a magnetic field, which causes the motor to spin. This spinning motion is then transferred to the wheels, propelling the vehicle forward.

Power Electronics: This component converts the direct current (DC) from the battery to alternating current (AC) for the motor. It also controls the speed and torque of the motor, allowing for smooth acceleration and deceleration.

Regenerative Braking: It is one of the highlights of many EVs. When the vehicle slows down, the electric motor functions as a generator, converting some of the kinetic energy into electrical energy, which is then stored in the battery. This process helps to increase the vehicle's range.

Charging: Plugging an electric power source into an EV allows you to recharge the battery. Charging might take anywhere from a few minutes to several hours, depending on the charger type. Later, we will discuss the various charging levels for an electric car.

Task 17. Match the terms to their definitions.

1. AC induction motor	a) system made up of a number of parts that work together to move the vehicle by converting electrical energy into motion
2. DC motor	b) the machine which converts the AC electric power into mechanical power by using an electromagnetic induction phenomenon
3. Permanent Magnet Synchronous Motor (PMSM)	c) electrical motor that uses direct current (DC) to produce mechanical force
4. inverter	d) device that converts alternating current to direct current or vice versa.
5. converter	e) power conversion device that uses semiconductors and converts direct current to alternating current (DC-AC)
6. acceleration	f) the slowing down of an object, which means that the magnitude of the velocity decreases
7. deceleration	g) rate at which velocity changes with time, in terms of both speed and direction.
8. Electric Vehicle Propulsion System	h) an electric motor that uses permanent magnets on the rotor to generate a magnetic field that interacts with the stator winding to produce mechanical rotation

Task 18. Answer the questions:

1. What is EV powered by?
2. What fundamental difference makes EV eco-friendly?
3. How many basic components are there in EV?
4. There are various types of electric motors used in EV, aren't there?
5. What does battery's capacity determine?
6. Do EVs use electric motors or an internal combustion engine for propulsion?
7. What component transforms DC from the battery to AC for the motor?
8. How does regenerative braking help to increase the vehicle's range?
9. How long might charging take?
10. How many levels are there in a charging system?

Task 19. Fill in the table with information about basic components of an EV.

Name of a basic part of EV	**Function**	**Includes**	**Examples**
Electric Motor	Converts electrical energy from battery into mechanical energy		DC motors, Induction motors
Battery Pack			
Power Electronics Controller			

Charging System			

Task 20. Multiple choice

1. To store energy, electrical vehicle uses batteries which are typically made of_____

a) nickel metal hydride

b) alkaline

c) lead acid

d) lithium-ion cells

2. When electricity flows through the motor, _____

a) it creates a magnetic field which causes wheels to spin

b) it creates a magnetic pole which causes wheels to spin

c) it creates an electromagnetic field which causes wheels to spin.

d) it creates a magnetic field, which causes the motor to spin.

3. Power electronics converts the DC from the battery to AC for the motor as well as_____

a) controls only the speed and torque of the motor

b) allows for smooth acceleration and deceleration.

c) controls speed and a gearbox

d) controls the speed and torque of the motor, allowing for smooth acceleration and deceleration

4. When the vehicle slows down, the electric motor functions_____.

a) as a generator, converting some of the mechanical energy into electrical energy

b) as a generator, converting some of the kinetic energy into mechanical energy

c)as a generator, accumulating electrical energy.

d) as a generator, converting some of the kinetic energy into electrical energy.

5. Charging system can vary_____

a) in terms of voltage, current and can take from a few hours to several days

b) in terms of power, temperature and can take from a few minutes to a several hours

c) in terms of resistance, current and can take from a few minutes to a several hours.

d) in terms of voltage, current and can take from a few minutes to several days.

Task 21. Fill in the gaps in the sentences with the following phrasal verbs in the proper form:

a) rely on	c) be known for	e) plug into	g) slow down
b) draw from	d) convert into	f) flow through	h) depend on

1. When electricity _____ the motor, it creates a magnetic field, which causes the motor to spin.
2. An EV is defined as a vehicle that can be powered by an electric motor that _____ electricity _____ a battery.
3. The battery is the heart of an electric vehicle, and its performance directly _____it.
4. When you _____ an electric power source _____ an EV, it allows you to recharge the battery.
5. Every time you use your car brakes, they create friction to _____ the rotation of your wheels.
6. AC induction motor is the machine which _____ the AC electric power _____ mechanical power by using an electromagnetic induction phenomenon.
7. Electric cars are _____ for their environmentally friendly approach to manufacturing a car.
8. We can _____ EV's comfort and efficiency.

Task 22. Watch the video about types of EV and write down the main ideas:

https://m.youtube.com/watch?v=cmSRQgv8woU
https://youtu.be/fIvnKKPERZk

Supplementary Reading

Text 1. Future electric cars could go more than 600 miles on a single charge thanks to battery-boosting gel

By Roland Moore-Coyler
published February 16, 2024

By using gel, researchers have found a way to incorporate silicon into batteries while negating its destructive tendency to expand – meaning future EVs could use the technology to go much further on a single charge.

Silicon has been explored as an anode candidate before, but it expands by up to receiving a charge, which can damage the battery. (Image credit: Andriy Onufriyenko via Getty Images)

Electric vehicle (EV) range anxiety could soon be a thing of the past thanks to a breakthrough in battery technology, which could give EVs a range of more than 620 miles (1,000 km).

Today's EVs have a maximum range of 300 miles (480 km) on average. Even the longest-range electric car, the Lucid Air, runs out of charge after about 500 miles (800 km).

But in a new study, researchers used tiny silicon particles and a gel-based electrolyte to tap into the high-charge capacity of silicon anodes in lithium-ion

batteries. The scientists published their findings on Jan. 17 in the journal Advanced Science.

Charging works inversely, with positive lithium ions returning to the anode and electrons flowing back across a circuit to the terminal as it gains a positive charge. When no more ions can flow to the node – now technically a cathode – the battery is considered fully charged.

Silicon has been widely explored as a candidate for the anode in lithium-ion batteries because it can hold up to 10 times as many lithium ions versus equivalent graphite anodes – which are used in most Lithium-ion batteries today. But silicon expands by up to three times its size when receiving a charge, which can damage the battery. Nanometre-scale silicon can mitigate this problem, but such a system requires a complex and expensive production process.

However, in the new study, the scientists opted for micrometre-scale silicon particles linked to an elastic gel electrolyte that disperses the internal stress caused by an expanding silicon anode. This prevents battery degradation without compromising conductivity.

As micrometre-scale particles are 1,000 times larger than nanometre equivalents, this new battery system paves the way for high-charge capacity silicon anodes without the costly production.

Silicon has been explored as an anode candidate before, but it expands by up to receiving a charge, which can damage the battery.

Electric vehicle (EV) range anxiety could soon be a thing of the past thanks to a breakthrough in battery technology, which could give EVs a range of more than 620 miles (1,000 kilometres).

Today's EVs have a maximum range of 300 miles (480 km) on average. Even the longest-range electric car, the Lucid Air, runs out of charge after about 500 miles (800 km).

But in a new study, researchers used tiny silicon particles and a gel-based electrolyte to tap into the high-charge capacity of silicon anodes in lithium-ion batteries. The scientists published their findings on Jan. 17 in the journal Advanced Science.

Charging works inversely, with positive lithium ions returning to the anode and electrons flowing back across a circuit to the terminal as it gains a positive charge. When no more ions can flow to the node – now technically a cathode – the battery is considered fully charged.

Silicon has been widely explored as a candidate for the anode in lithium-ion batteries because it can hold up to 10 times as many lithium ions versus equivalent graphite anodes – which are used in most Lithium-ion batteries today. But silicon expands by up to three times its size when receiving a charge, which can damage the battery. Nanometre-scale silicon can mitigate this problem, but such a system requires a complex and expensive production process.

However, in the new study, the scientists opted for micrometre-scale silicon particles linked to an elastic gel electrolyte that disperses the internal stress caused by an expanding silicon anode. This prevents battery degradation without compromising conductivity.

As micrometre-scale particles are 1,000 times larger than nanometre equivalents, this new battery system paves the way for high-charge capacity silicon anodes without the costly production.

Text 2. Flying car designed to hop across the Philippines' 7,000 islands coming this year

By Roland Moore-Coyler
published February 29, 2024

The Luft Pinoy is an electric minivan combined with a hydrogen-powered eVTOL system to create a flying car that's practical for island-hopping.

A vehicle that's a strange blend between a futuristic electric minivan and the rear half of an airplane could soon revolutionize island-hopping. The unusual vehicle, which is currently still only a concept, will be able to travel both on land and in the air and be powered by electricity or hydrogen, its designers claim.

The Luft Pinoy electric vertical take off and landing (eVTOL) project is being designed as a novel way to traverse the 7,101 islands that make up the Philippines archipelago. It's being developed through a collaboration between Florida-based startup Luft Car and the e Francisco Motor Corporation (eFMC) from the Philippines – with a prototype expected to be completed before the end of 2024.

"Our flying and road vehicle concept is tailor made for connecting the archipelagos and serving cargo, air ambulance, tourism, and regional transportation verticals", Santh Sathya, CEO of Luft Car, said in a statement. "Our hydrogen propulsion will serve long distance and heavy payload carrying needs in the region."

While a full prototype has yet to be produced, the concept design is pleasingly straightforward compared with the likes of the Supernal SA-2. Rather than creating a flying car, the main component of the Luft Pinoy is a customizable minivan powered by a hydrogen fuel cell or electric battery system for road-based transit.

When it needs to take to the skies, the minivan has a subframe used to attach it to an eVTOL airframe that has four propellers and its own hydrogen power system. This effectively transforms the van into a small aircraft that can take off and land vertically, without the need for a runway.

Text 3. Experimental wireless EV charger is just as fast as a superfast wired plug, scientists say

By Keumars Afifi-Sabet
published March 21, 2024

This 14-inch wireless charging device works at a rate of 100 kW, scientists claim, meaning it's up to 10 times as fast as some of the best commercially available alternatives.

A new type of wireless charging system can power electric vehicle (EV) batteries up to 10 times faster than the fastest available wireless chargers, and it's just as efficient as charging your car with a superfast cable.

Scientists at the Oak Ridge National Laboratory in Tennessee used a "polyphase electromagnetic coupling coil" with rotating magnetic fields to wirelessly charge a Hyundai Kona EV, which has an estimated range of about 261 miles, at 100 kilowatts with 96% efficiency, according to a statement released March 12.

For reference, the fastest EV charging cables provide between 50 kW and 350 kW in power, while the ones that plug into a home wall socket have a power output of 1 kW, according to the Department of Transportation.

They used their prototype charging device, which has a diameter of 14 inches (36cm), to transfer power to the EV across a 5-inch (13 cm) air gap.

The goal of research like this is to integrate wireless charging devices into the – in parking spots, for example. That way, drivers no longer need to plug their cars into dedicated charging infrastructure with bulky cables.

References

1.Tallodi J. Types of Electric Cars. June, 8, 2022. URL: https://www.carwow.co.uk/blog/types-of-electric-cars (accessed: 28.09.2025).

2. Klopp V. The Future of Automotive Trends to watch in 2024. February, 14, 2024. URL: https://www.nsonemotors.com/the-future-of-automotive-trends-to-watch-in-2024 (accessed: 28.09.2025).

3. The Top Trends in Automotive Industry. March, 20, 2024. URL: https://www.tatacapital.com/blog/loan-for-vehicle/the-top-trends-in-2024-for-the-automobile-industry/ (accessed: 28.09.2025).

4. Types of Electrical Vehicles Explained, March, 2024. URL: https://www.greenvehicleguide.gov.au/News/Article/20220908_News_TypesOfElectricVehiclesExplained (accessed: 28.09.2025).

5. Keumars A. S. Experimental wireless EV charger is just as fast as a superfast wired plug, scientists say. March 21, 2024. URL: https://www.livescience.com/technology/electric-vehicles/experimental-wireless-ev-charger-100-kw-is-just-as-fast-as-a-superfast-wired-plug (accessed: 28.09.2025).

6. Moore- Colyer R. Flying car designed to hop across the Philippines' 7,000 islands coming this year. February, 29, 2024. URL: https://www.livescience.com/technology/electric-vehicles/flying-car-evtol-designed-to-hop-across-the-philippines-7000-islands-coming-this-year (accessed: 28.09.2025).

UNIT 3
LOGISTICS

Focus on:

- Actively engaging with reading and listening materials by paying attention to details.
- Taking notes while reading or watching audio-visual content to better interact with the information sources.
- Improving active reading techniques and critical thinking abilities.
- Enhancing both soft and hard skills for effective information processing.

By the end of the unit students will be able to:

- Understand the concept of Logistics.
- Identify Logistics components and tactics.
- Visualize and articulate the information gathered.
- Formulate arguments to support discussion points.
- Write technical reports and other forms of written communication.
- Strengthen the discussion and presentation skills to support both individual and group advancement.

Lead-in

Task 1. Discuss the following questions related to logistics with a partner use as many words from "word cloud" as you can.

1. What role do you think logistics plays in today's global economy?
2. In your opinion, what are the biggest challenges faced by companies in managing their logistics operations?

Reading

Task 2. Read the text. Pay attention to the highlighted words.

TEXT 1. The nature of logistics

Logistics derived from the Greek term *logistikos* (to calculate). In a contemporary setting, it refers to the set of operations required for goods to be made available on markets or to specific **locations**. The growth of **freight flows** has been a fundamental component of contemporary economic systems changes at the global, regional, and local scales, which has made logistics increasingly relevant. These changes are not merely quantitative with more freight in **circulation**, but also structural and operational. **Structural changes** mainly involve **manufacturing systems** with their expanded geography of production, while **operational changes** mainly concern **freight transportation** with its geography of **distribution**, namely **intermodal transport systems**. New **modes of production** are concomitant with new modes of distribution, which brings forward the realm of logistics. The application of logistics enables greater efficiency of movements with an appropriate choice of **modes**, **terminals**, **routes**, and **scheduling**. The implied purpose of logistics is to make available **goods**, **raw materials**, and **commodities**, fulfilling four major requirements related to **order**, **delivery**, **quality**, and **cost fulfillment**. Logistics is thus a multidimensional **value-added activity**, including **production**, location, time, and control of elements of the **supply chain**. It thus enables a better managerial level of space-time relations and as such, an important aspect of transport geography. Logistics acts as the material and organizational support of globalization, requiring a complex set of decisions to be made concerning an array of issues such as the location of **suppliers**, the transport modes to be used, where the freight will be stored, and the timing and **sequencing of deliveries**.

The distinction between logistics and supply chain management can be subject to contention since the terms are often used interchangeably. Activities comprising

logistics include **physical distribution**; the derived transport segment, and **materials management**; the induced transport segment.

Physical distribution is the range of activities involved in the movement of goods from points of production to final points of sale and consumption. Physical distribution includes all the functions of movement and **handling of goods**, particularly transportation services, **transshipment** and **warehousing services**, **trade**, **wholesale** and **retail**. **Materials management** considers all the activities involved in the manufacturing of **commodities** in all their stages of production along a supply chain. It includes production and marketing activities such as **production planning**, **demand forecasting**, **purchasing**, and **inventory management**.

There are various supply chain and logistics tactics, including **third - party logistics**, **reverse logistics**, **inbound logistics**, and **outbound logistics**. Determining the most effective means of transporting goods from one location to another is a necessary step in designing a logistics. **Contracting** with **outside vendors** to deliver services like **shipping**, warehousing, and **inventory control** is known as **outsourcing** in logistics. Identifying potential risks and creating strategies to mitigate them are key components of risk management in logistics.

Optimising the flow of goods and services from the point of origin to the point of consumption is the goal of logistics and includes picking suppliers, choosing modes of transportation, picking inventory management programs, and picking warehousing options. **Costs** should be kept to a minimum while **customer satisfaction** should be increased. Logistics is not complete without transportation. **Air freight**, **ocean freight**, **rail freight**, **trucking**, and intermodal transportation are all forms of transportation. Since each mode has advantages and disadvantages of its own, it is crucial to choose the best mode for each shipment. When choosing a mode, transportation costs must also be taken into account. The management of the supply chain and logistics includes **warehousing**. It entails keeping products in storage until clients or other businesses require them. Depending on the needs of the organization, warehouses can be used for either long or **short term storage**. Warehouses can also be utilized for order fulfillment or distribution. It is crucial to take into account aspects like location, **size**, cost, **security**, and **accessibility** when choosing a warehouse solution.

In logistics, information technology is crucial. IT systems can be used to monitor customer orders, **track shipments**, manage inventory levels, **produce reports** on **performance metrics**, and more. Additionally, processes like **order processing** and warehouse operations can be automated using IT systems. Organizations can increase **productivity** and lower costs associated with logistics by utilizing IT systems.

Task 3. Answer the following questions.

1. What is the origin of the term "logistics," and how is it defined in a contemporary context?
2. How has the growth of freight flows impacted contemporary economic systems?
3. What are the structural changes associated with logistics?

4. What are the four major requirements fulfilled by logistics regarding goods, raw materials, and commodities?

5. How does logistics contribute to globalization?

6. What are some logistics tactics mentioned in the text?

7. How does information technology play a crucial role in logistics?

Task 4. Mark the following statements as true (T) or false (F).

1. Logistics is solely concerned with the movement of goods from production points to final points of sale.

2. Logistics encompasses both quantitative and qualitative changes in contemporary economic systems.

3. Operational changes in logistics primarily involve changes in manufacturing systems.

4. The distinction between logistics and supply chain management is clear and uncontested.

5. Outsourcing in logistics refers to contracting with outside vendors to provide services like shipping and warehousing.

6. Transportation is not an essential component of logistics.

7. Information technology plays a minor role in logistics and supply chain management.

Vocabulary

Task 5. Match the words (1-10) with the definitions (a - j).

1. **logistics**	**a)** goods transported in bulk by truck, train, ship, or aircraft.
2. **freight**	**b)** the storing of goods in a warehouse.
3. **customer**	**c)** obtaining (goods or a service) from an outside or foreign supplier, especially in place of an internal source.
4. **terminals**	**d)** a person or organization that buys goods or services from a store or business.
5. **freight transportation**	**e)** a person or organization that provides goods or services to another entity.
6. **scheduling**	**f**) a request or instruction for goods or services to be delivered or performed.
7. **order**	**g)** the process of planning and organizing events, activities, or tasks to occur at specific times or intervals**.**
8. **supplier**	**h)** facilities or structures where goods, passengers, or information are transferred between different modes of transportation or stored temporarily.
9. **outsourcing**	**i)** the process of moving goods or cargo from one place to another, typically using various modes of transportation such as trucks, trains, ships, or planes.
10. **warehousing**	**j)** the detailed coordination of a complex operation involving many people, facilities, or supplies, especially in the business sector.

Task 6. Choose the best answer for each question.

1. What is the primary goal of logistics?
   a) Maximizing profits
   b) Minimizing costs
   c) Optimizing the flow of goods and services
   d) Expanding market reach

2. Which term refers to the movement of goods from points of production to final points of sale and consumption?
   a) Structural changes
   b) Materials management
   c) Physical distribution
   d) Third - party logistics

3. What is the process of contracting with outside vendors to deliver services like shipping and warehousing?
   a) Supply chain management
   b) Outsourcing in logistics
   c) Reverse logistics
   d) Inbound logistics

4. Which of the following is **NOT** a form of transportation mentioned in the text?
   a) Ocean freight
   b) Land freight
   c) Rail freight
   d) Intermodal transportation

5. What term refers to the keeping of products in storage until clients or other businesses require them?
   a) Production planning
   b) Warehousing
   c) Demand forecasting
   d) Inventory management

6. What activity involves identifying potential risks and creating strategies to mitigate them?
   a) Third - party logistics
   b) Reverse logistics
   c) Risk management in logistics
   d) Outbound logistics

7. Which term describes the set of operations required for goods to be made available on markets or to specific locations?
   a) Supply chain management
   b) Structural changes
   c) Physical distribution
   d) Logistics

Task 7. For each word or phrase in bold, choose the option that is closest in meaning (synonym) or opposite in meaning (antonym) from the provided choices.

1. Contemporary

a) Traditional	**b)** Modern	**c)** Outdated	**d)** Ancient

2. Quantitative

a) Large-scale	**b)** Qualitative	**c)** Numeric	**d)** Numerous

3. Multidimensional

a) One - dimensional	**b)** Complex	**c)** Simplistic	**d)** Unidirectional

4. Induced

a) Triggered	**b)** Caused	**c)** Derived	**d)** Prevented

5. Outsourcing

a) Insourcing	**b)** Delegating	**c)** Hiring	**d)** Internalizing

6. Optimizing

a) Maximizing	**b)** Enhancing	**c)** Minimizing	**d)** Pessimizing

7.Crucial

a) Optional	**b)** Important	**c)** Unnecessary	**d)** Essential

8. Contingent

a) Dependent	**b)** Independent	**c)** Unrelated	**d)** Optional

9. Mitigate

a) Intensify	**b)** Aggravate	**c)** Alleviate	**d)** Exacerbate

10.Globalization

a)Localization	**b)**Internationalization	**c)**Regionalization	**d)**Isolationism

Task 8. Match the following words with the numbers (1 - 11) in the Picture 1

loader	**airplane**	**tanker**	**truck**	**packaging**	**transportation**
delivery	**shipping**	**control**	**warehouse**	**robot**	

1.	**3.**	**5.**	**7.**	**9.**	**11.**
2.	**4.**	**6.**	**8.**	**10.**	

Picture 1

Task 9. Match the words on the left with their correct definitions on the right:

1. **Loader** - A. Vehicle used for transporting goods over land.
2. **Airplane** - B. Process of managing the flow of goods from production to consumption.
3. **Tanker** - C. Large vehicle used for transporting liquids or gases in bulk.
4. **Truck** - D. Vehicle used for lifting and moving heavy loads.
5. **Logistics** - E. Vehicle used for transporting goods through the air.
6. **Packaging** - F. Process of preparing goods for transportation or storage.
7. **Delivery** - G. Act of bringing goods to a destination.
8. **Shipping** - H. Process of transporting goods by sea or air.
9. **Control** - I. Process of overseeing and managing the movement of goods.
10. **Warehouse** - J. Facility for storing goods before distribution.

Task 10. Complete each sentence with the appropriate word from Task 7 (Picture 1):

1. The _____ is responsible for lifting and moving heavy loads on construction sites.

2. We need to ensure that the _____ of our products is robust to prevent damage during transit.

3. The _____ team is in charge of coordinating the movement of goods within the warehouse.

4. An _____ is the fastest mode of transportation for long-distance travel.

5. A _____ is used for transporting liquids, such as oil or chemicals, in bulk.

6. Efficient _____ systems help companies streamline their operations and reduce costs.

7. The _____ of goods to customers is a critical aspect of any business's service.

8. _____ is the process of moving goods from one place to another. Answer: transportation

9. International _____ involves the movement of goods between countries.

10. The _____ is where goods are stored before being distributed to retailers or customers

Task 11. Decide whether the following statements are true or false:

1. A loader is a vehicle used for transporting goods over water.
2. Packaging is not important for ensuring the safety of products during transportation.
3. The control team manages the movement of goods within the warehouse.
4. Tankers are used for transporting solids in bulk.
5. Transportation systems have no impact on reducing operational costs for companies.

Task 12. Associate each word from (1 - 11) with the words or phrase from (a - k):

1. loader	a) movement of goods
2. airplane	b) storage facility
3. tanker	c) product protection
4. logistics	d) land transportation
5. packaging	e) overseas transportation
6. delivery	f) heavy machinery
7. shipping	g) inventory management
8. control	h) bulk liquids
9. warehouse	i) final destination
10. transportation	j) supply chain management
11.truck	k) fast delivery

Task 13. Read the text and fill in the gaps with appropriate words from the given options.

Distribution Systems

A distribution system involves all the processes, equipment, and facilities supporting the mobility of freight along value chains. They are embedded in a framework that can be roughly characterized by their flexibility and __1__. Flexibility implies a highly differentiated, market, and customer-driven mode of creating added value. Contemporary production and distribution are no longer subject to single-firm activity, but increasingly take the form of networks of suppliers and __2__. The supply chain bundles together all this by information, communication, cooperation, and, finally, by physical distribution. Globalization means that the spatial frame for the entire economy has been expanded, implying the spatial expansion of the economy, more complex global economic integration, and an intricate network of global flows and hubs.

The flow - oriented mode affects almost every single activity within the entire value chain. The core component of materials management is the supply chain, the time and space - related arrangement of freight mobility between supply, manufacturing, distribution, and consumption. Its major components are the supplier, the producer, the distributor (e.g. a wholesaler, a freight forwarder, a carrier), the retailer, the __3__ consumer, all of whom represent particular interests. Compared with conventional freight transport systems, the evolution of supply chain management and the emergence of the logistics industry are mainly characterized by three features:

Integration. A fundamental restructuring of goods merchandising by establishing integrated supply chains with integrated freight transport demand. Demand-side oriented activities are becoming predominant. While traditional deliveries were primarily driven by supply, current supply chains are increasingly driven by __4__. **Time mitigation**. Whereas transport was traditionally regarded as a tool for overcoming space, logistics is concerned with mitigating time. Due to the requirements of modern distribution, the issue of time is becoming increasingly important in the management of commodity chains. Time is a major issue for freight distribution as it imposes inventory holding and depreciation costs, which becomes sensitive for tightly integrated supply chains. **Specialization**. This was achieved by shifts towards vertical integration, namely subcontracting and outsourcing, including the logistical function itself. There are layers of logistics services that are becoming complex and time-sensitive to the point that many firms are now sub - contracting parts of their supply chain management to what can be called third - party logistics providers. More recently, a new category of providers, called fourth - party logistics providers have emerged. They offer a wide range of services such as production planning and real - time monitoring.

The growth in the geographical and functional complexity of supply chains relies on effective management and information processing. Information technologies have helped improve the efficiency of supply chains as the vast majority of the tasks are __5__ recorded and transferred. This has incited a growing emphasis on issues related to supply chain integration so that despite acute geographical separation, physical and managerial processes have minimal __6__. The emerging trend

concerns the full digitization of supply chains using electronic ledgers (blockchain technology).

Options for Gaps:

1.

A.adaptation	B. standardization	C. globalization

2.

A. consumers	B. subcontractors	C. competitors

3.

A. end	B. intermediate	C. potential

4.

A. demand	B. supply	C. production

5.

A. manually	B. digitally	C. physically

6.

A. tension	B. friction	C. collaboration

Task 14. Fill in the blanks with appropriate words from the text. Choose the best option from the given choices.

1. A distribution system involves all the processes, ____, and facilities supporting the mobility of freight along value chains.

a) tasks
b) equipment
c) objectives

2. Flexibility implies a highly differentiated, market, and customer - driven mode of creating added ____.

a) wealth
b) value
c) profit

3. Contemporary production and distribution are no longer subject to single - firm activity, but increasingly take the form of networks of suppliers and ____.

a) contractors
b) subcontractors
c) manufacturers

4. Globalization means that the spatial frame for the entire economy has been expanded, implying the spatial ____ of the economy.

a) expansion
b) contraction
c) restriction

5. The flow - oriented mode affects almost every single activity within the entire value ____.

a) chain
b) network
c) system

6. The core component of materials management is the supply chain, the time and space - related arrangement of freight mobility between supply, manufacturing, distribution, and ____.

a) transportation
b) consumption
c) production

7. Compared with conventional freight transport systems, the evolution of supply chain management and the emergence of the logistics industry are mainly characterized by three ____.

a) characteristics
b) features
c) components

8. Integration involves establishing integrated supply chains with integrated freight transport ____.

a) provision
b) demand
c) supply

9. Time mitigation is concerned with ____ time in logistics.

a) accelerating
b) managing
c) mitigating

10. Specialization was achieved by shifts towards vertical integration, namely subcontracting and ____, including the logistical function itself.

a) outsourcing
b) in-house
c) insourcing

11. Information technologies have helped improve the ____ of supply chains.

a) effectiveness
b) efficiency
c) productivity

12. The emerging trend concerns the full digitization of supply chains using electronic ____.

a) records
b) ledgers
c) databases

Audio-visual assignments

Task 15. Watch the video about "Transportation Logistics" and mark the following statements as true (T) or false (F).

https://www.youtube.com/watch?v=r1rnSnvfIPc

1. Inventory management ensures that companies have either too much or too little stock, which can affect their profits.
2. Smart technologies such as RFID tags, IoT sensors, and AI are not being utilized in inventory management to enhance operational efficiency.
3. Warehousing within the logistics chain is primarily concerned with ensuring products are organized with precision to facilitate quick location, packing, and shipping.

4. Smart warehousing technologies like Warehouse Management Systems, Internet of Things, and Artificial Intelligence are not used to provide real-time visibility and automation in logistics.

5. Effective packaging in transportation logistics doesn't involve selecting materials and designs that can withstand various stresses during transit.

6. Smart packaging solutions, such as RFID tags and sensors, are not contributing to improved supply chain visibility and customer satisfaction.

7. Transportation logistics primarily involves finding the least cost-effective way to move goods, regardless of efficiency.

Task 16. Watch the video about "Transportation Logistics" and fill in the blanks with the appropriate terms from the video.

https://www.youtube.com/watch?v=r1rnSnvfIPc

GPS tracking	**packaging**	**real-time visibility**	**RFID tags, QR codes, and sensors**	**Smart technologies**

1. _____, including RFID tags and IoT sensors, are transforming logistics by enabling real - time inventory tracking.

2. Warehouse Management Systems provide _____, precision tracking, and automation from inventory management to order fulfilment.

3. Effective _____ aims to optimize space utilization within transportation vehicles.

4. Smart packaging solutions like _____ are increasingly being incorporated into logistics to enhance tracking and monitoring.

5. Autonomous Mobile Robots and _____ are driving significant advancements in transportation logistics.

Task 17. Watch the video about "Transportation Logistics" and complete the following sentences with the appropriate terms from the video.

https://www.youtube.com/watch?v=r1rnSnvfIPc

A. route optimization
B. just the right amount of stock
C. the warehouse to your doorstep
D. Warehouse Management Systems
E. smart packaging solutions like RFID tags, QR codes, and sensors

1. Inventory management ensures that companies maintain _____ to meet customer needs without any hiccups.

2. Smart warehousing within the logistics chain utilizes cutting - edge technologies like _____ for precision tracking and automation.

3. Effective packaging in transportation logistics aims to optimize space utilization and minimize environmental impact through the use of _____.

4. Transportation logistics involves finding the most efficient and cost - effective way to move goods from _____.

5. Autonomous Mobile Robots and GPS tracking are examples of smart technologies used to streamline operations and improve _____.

Speaking

Task 18: Imagine you are a logistics manager in a company. Role-play the following scenarios with your partner:

Scenario 1: You are responsible for planning the transportation of a large shipment of goods from your company's warehouse to a distribution center located in another city. Discuss with your partner the various factors you need to consider when choosing the mode of transportation and the logistics tactics to be employed.	**Scenario 2**: Your company has received customer complaints about delayed deliveries and damaged goods. As the logistics manager, discuss with your partner the steps you plan to take to address these issues and improve customer satisfaction.

Task 19: Prepare a short presentation (2-3 minutes) on one of the following topics related to logistics and present it to your partner.

1. The importance of risk management in logistics operations.
2. The role of information technology in optimizing logistics processes.
3. The impact of globalization on logistics strategies.
4. The challenges and benefits of implementing reverse logistics practices.

Writing

Task 20: Essay Writing Write an essay discussing the importance of logistics in today's global economy. In your essay, address the following points:

1. Define logistics and its significance in contemporary settings.
2. Explain how logistics contributes to the efficiency of supply chains and the movement of goods.
3. Discuss the role of logistics in supporting globalization and facilitating international trade.
4. Analyse the challenges faced by companies in managing logistics operations and provide possible solutions.
5. Conclude with your thoughts on the future of logistics and its potential impact on businesses and consumers.

Task 21: Proposal Writing Imagine you are a logistics manager for a company and write a proposal outlining strategies to improve logistics efficiency. Your proposal should address the following points:

- **Introduction**: Briefly introduce the importance of logistics in your company's operations.
- **Current Challenges**: Identify specific challenges or inefficiencies in your company's logistics processes.
- **Proposed Solutions**: Present concrete strategies or initiatives to address the identified challenges and improve logistics efficiency.
- **Implementation Plan**: Outline steps for implementing the proposed solutions, including timelines and responsibilities.
- **Expected Benefits**: Describe the expected benefits of implementing the proposed solutions, such as cost savings, improved customer satisfaction, or enhanced operational efficiency.
- **Conclusion**: Summarize the key points of your proposal and emphasize the potential impact on the company's overall performance.

Supplementary reading

TEXT 1. Inventory management

Maintaining inventory is always a cost factor for logistics since it has to be carried until sold to customers. **Lean supply chains**, as a managerial concept, are often labelled as seminal in the emergence of modern supply chains where inventory levels are kept at a minimum and where a share of the inventory is kept in constant circulation. Typically, the manufacturing sector has 6 to 8 inventory turnovers per year, implying that it takes, on average, about 50 to 60 days to sell what is being produced. In the electronics sector, this can even be more frequent, with 10 to 20 inventory turnovers per year. Better inventory management enables to reduce the inventory and its related costs and increase the number of inventory turns.

Freight distribution is within a paradigm shift from inventory - based logistics (push) to replenishment-based logistics (pull). Demand, particularly in the retailing sector, is challenging to anticipate accurately and is prone to cycles. Closer integration between supply and demand enables a more efficient production system with fewer wastes in terms of unsold inventory and time spent managing processes. Standardization is also an important aspect with parts that can be used, when possible, for several lines of products, thus reducing the overall inventory footprint.

TEXT 2. Modes and terminals

Since logistics involves improving the efficiency of flows, load units have become particularly important. They are the basic physical management units in freight distribution and take the form of pallets, swap bodies, semi - trailers, and containers. Another important requirement was **containerization**, which conferred substantial flexibility to production systems in addition to the container being its own storage unit. Containers are the privileged load unit for long - distance trade, but the

growing complexity of logistics required a more specific level of load management. A whole array of logistics activities has emerged to support the organization and management of containerized flows. The use of bar codes and RFID (Radio Frequency Identification Device) enables a high level of control of the load units in circulation.

The expansion of standard transport infrastructures such as highways, terminals, and airports, was also essential for the development of modern logistics. Logistics and integrated transport systems are therefore related, particularly because the container has become a load (transport), production, and distribution unit.

Transport modes have been the object of limited technological changes in recent decades. In some cases, modes have adapted to handle containerized operations such as road and rail (e.g. double stacking). It is maritime shipping that has experienced the most significant technological change, which required the construction of an entirely new class of ships and the application of economies of scale to maritime container shipping. This massification of container flows has also brought unique logistical challenges, namely the repositioning of empty containers because of imbalanced trade flows.

The technological changes have been very significant with the construction of new terminal facilities operating on a high turnover basis. Better handling equipment, particularly through automation, lead to improvements in the velocity of freight at the terminals, which are among the most significant technological changes brought by logistics in materials mobility. In such a context, the port has become one of the most significant terminals supporting global logistics. Port facilities are increasingly being supported by an array of inland terminals connected by high capacity corridors.

TEXT 3. Distribution centers and distribution clusters

Technological changes impacted the location, design, and operation of distribution centers; the facilities handling the requirements of modern distribution. They serve different purposes depending on the combination of fabrication, storage, and distribution functions they perform within their supply chains. Modern distribution centers tend to consume more space, both from the site they occupy and the building area. From a locational standpoint, distribution centers mainly rely on trucking, implying a preference for suburban locations with good road accessibility. They try to service regional markets with a 48 hours service window (lead time) on average, implying that replenishment orders from their customers are met within that time period. They have become one - floor facilities designed more for throughput than for warehousing with specialized loading and unloading bays and sorting equipment.

Cross-docking distribution centers represent one of the foremost expressions of a facility that handles freight in a time - sensitive manner, with the emergence of large consolidation and deconsolidation facilities. Automation is also pushing forward the productivity level of distribution centers. For instance, it is possible to fully automate the sorting, storing, and palletizing processes in a distribution center so that the efficiency, customization level, and throughput can be improved, such as

for groceries or retail goods. Another trend has been the setting of freight distribution clusters where distribution activities agglomerate to take advantage of shared infrastructures and accessibility. This tends to expand the added value performed by logistics.

TEXT 4. Information technologies

The vast array of information processing changes brought by logistics requires the extensive use of information technologies. Value chains are linked with physical flows, as well as **information flows**. Producers, distributors, and consumers are embedded in a web of reciprocal transactions. While these transactions mostly take place virtually, their outcomes are physical flows. The commercial diffusion of Global Positioning Systems (GPS) is allowing for the identification and routing of vehicles and, therefore, better utilization of these assets. The outcome is often more efficient production and distribution planning with the added convenience of tracking modes, shipments, and inventories and thus giving greater visibility for customers. Recently, the emergence of distributed electronic ledgers, called 'blockchains', is transforming logistics management with increased reliability, tracking, and record-keeping. This is crucial since logistics generates numerous transactions, and organizing these transactions provides benefits.

The standardization provided by the Internet in terms of communication protocols enabled corporations to establish interfaces with a large customer base, which permitted new forms of retailing. E-commerce offers advantages for the whole commodity chain, from consumers being exposed to a broader range of products to manufacturers and distributors being able to adapt quickly to changes in the demand. It is, therefore, a key driver of change for freight distribution. E-commerce generates parcel movements for home deliveries that are carried by conventional postal services as well as specialized parcel carriers.

In the United States, about half of all home deliveries are made by the US Postal Services, while the remaining is carried by private parcel companies. Fulfillment (warehousing, packaging) costs account for 10 to 12 % of the revenue of e-commerce, while shipping and delivery costs added up another 10 %. E-commerce is also inciting shifts in retail freight distribution with the setting of new fulfillment and sortation centers. Online retailers such as Amazon have extensively developed distribution centers to support their activities. Because of its more effective cost structure,
e-commerce is able to offer goods 10 to 15 % cheaper than retail. As retail sales are partially replaced by online sales, the need for conventional retail space declines while the footprint occupied by distribution center increases. There are also revised expectations in terms of the performance of e-commerce. The more efficient and reliable freight distribution is, the higher the expectations of the customers, which creates a feedback loop to improve efficiency. While just a decade ago, expectations for home deliveries were within two weeks, this has shifted to less than five days with some online retailers able to deliver within 48 hours for a selected range of products.

References

1. Rodrigue J-P. Transportation Modes, Modal Competition and Modal Shift. The Geography of Transport Systems, Sixth Edition, New York : Routledge, 2024. P. 130 – 178. URL: https://transportgeography.org/contents/chapter5/transportation-modes-modal-competition-modal-shift/ (accessed: 16.04.2024).

2. The 6 Types of Transportation in Logistics. Inbound Logistics. December 2023. URL: https://www.inboundlogistics.com/articles/transportation-in-logistics (accessed: 18.04.2025).

3. Evans V., Dooley J., Buchannan D. Career Paths: Logistics. Express Publishing. 2017. 16 p.
URL: https://www.expresspublishing.co.uk/files/Logistics.pdf (accessed: 15.05.2025).

UNIT 4
INTELLIGENT TRANSPORTATION SYSTEMS

Focus on:

- reading and listening for details
- making notes while reading or watching audio and visual materials to engage with the information sources actively.
- developing active reading strategies and critical thinking
- enhancing soft and hard skills to process information

By the end of this Unit students will be able to:

- **Identify** the main trends in ITS.
- **Analyse** advantages and disadvantages of the system.
- **Visualise and describe** the information obtained
- **Develop** arguments to support the points of the discussion.
- **Evaluate** and **make** comparative analysis of existing ITS
- **Create** technical reports and other types of writing correspondence.

Lead - in

Task 1. Discuss the following questions related to ITS with a partner.
Topics for discussion:

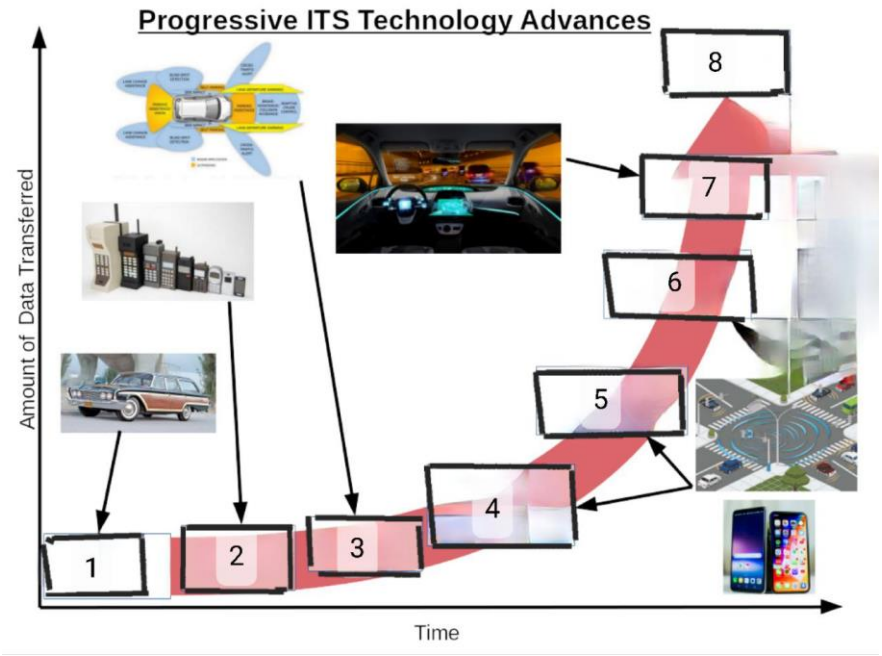
1. How do you think intelligent transportation systems impact daily commuting experiences?
2. In what ways can intelligent transportation systems contribute to reducing traffic congestion in urban areas?
3. Do you believe that the implementation of intelligent transportation systems improves overall road safety?
4. How might advancements in technology influence the future development of intelligent transportation systems?
5. Have you personally experienced any benefits or drawbacks of using intelligent transportation systems in your area?

Task 2. Match the definitions with their meaning

1. **transmission**	a. a part or element of a larger whole, especially in a mechanical or electronic system.
2**. destination**	b. the basic physical and organizational structures needed for

	the operation of a society or enterprise.
3. component	c. the ability to accomplish a task with minimal waste of time and effort.
4. density	d. the action of moving people or goods from one place to another.
5. infrastructure	e. people who regularly travel between their place of residence and work.
6. maintenance	f. the process of sending or conveying something from one place to another.
7. commuters	g. the degree of compactness of a substance or object.
8. transportation	h. the place to which someone is going or something is being sent.
9. efficiency	i. the process of preserving or keeping something in proper condition.

Task 3. Analyse this graph dealing with the stages of ITS technology advances and match the numbers with the definitions.



A. Autonomous Vehicles
B. Vehicle to Vehicle (V2V) Communications
C. Vehicle to Infrastructure (V2I) Communications
D. Automated ITS Crowdsourcing
E. Vehicular Social Networks (VSN)
F. Passive Sensors
G. No Communications Technology
H. Cellular Devices

Reading

Task 4. Look through the text "Intelligent Transportation System" and find the answers to the following questions:

1. How does an intelligent transportation system (ITS) improve the efficiency and safety of transportation systems?
2. What role does real-time data collection and analysis play in an ITS?
3. How do dynamic message signs and mobile apps contribute to communicating with users in an ITS?

4. What are some of the benefits of implementing an ITS for commuters and the environment?

5. Can you explain how the E-ZPass system works and its impact on toll collection?

6. Describe the Traveler Information System (TIS) in Los Angeles and how it helps drivers make informed decisions.

7. What are some examples of ITS technologies being used in public transportation, and how do they enhance service quality

Intelligent Transportation System

An intelligent transportation system (ITS) is a sophisticated network of hardware, software, and communication technologies that improves the efficiency and safety of transportation systems. ITS encompasses a wide range of applications, including traffic management, public transportation, electronic toll collection, and vehicle-to-vehicle communication.

One of the key components of an ITS is its ability to collect and analyze data in real-time. For example, sensors embedded in roadways can detect the number and speed of vehicles on the road, as well as weather conditions. This information can then be used to adjust traffic signal timings, reroute traffic, and provide drivers with up-to-date travel information.

Another important feature of an ITS is its ability to communicate with users. For instance, dynamic message signs located along highways can display information about accidents, construction zones, and travel times. In addition, mobile apps and websites can provide users with personalized travel recommendations based on their current location and destination.

The benefits of an ITS are numerous. By reducing congestion and delays, it can save commuters time and money. It can also reduce fuel consumption, air pollution, and greenhouse gas emissions. Furthermore, by providing drivers with real-time information about road conditions, it can improve safety and reduce the likelihood of accidents.

One of the most well-known examples of an ITS is the E-ZPass system, which is used for electronic toll collection on toll roads, bridges, and tunnels in the United States. With E-ZPass, drivers can pay their tolls without having to stop at a toll booth. Instead, they simply drive through a designated lane, and the toll is automatically deducted from their prepaid account. Not only does E-ZPass save drivers time, but it also reduces congestion and lowers the cost of toll collection.

Another example of an ITS is the Traveler Information System (TIS) in Los Angeles. The TIS provides drivers with real-time traffic information, including travel times, congestion levels, and accident reports. This information is available on dynamic message signs located along highways, as well as on the TIS website and mobile app. By giving drivers the ability to make informed decisions about their routes, the TIS helps to reduce congestion and improve traffic flow.

In recent years, there has been growing interest in the use of ITS technologies for public transportation. For example, many cities have implemented bus rapid

transit (BRT) systems, which use dedicated lanes and traffic signal priority to provide faster and more reliable bus service. In addition, some cities are experimenting with autonomous vehicles, which have the potential to revolutionize public transportation by reducing costs and increasing accessibility.

Despite its many benefits, the widespread adoption of ITS technologies faces several challenges. One of the main challenges is the cost of implementation. While the long-term benefits of an ITS can be significant, the upfront costs can be substantial. In addition, the deployment of an ITS requires close coordination among multiple stakeholders, including government agencies, private companies, and the public.

Another challenge is the need for interoperability. To be effective, ITS must be able to communicate and exchange data with other systems. However, different regions and countries often use different standards and technologies, which can make interoperability difficult.

Despite these challenges, the future of ITS looks promising. As technology continues to advance, and as the need for more efficient and sustainable transportation systems becomes increasingly urgent, the demand for ITS solutions is likely to grow. By leveraging the power of data and communication technologies, ITS has the potential to transform the way we travel and to create a safer, more efficient, and more sustainable transportation system for future generations.

Task 5. Based on the information from the reading passage choose the best option.

1. What primary function of an intelligent transportation system (ITS) is highlighted in the passage?

A. Improving transportation infrastructure
B. Enhancing public transit operations
C. Collecting and analysing real-time data
D. Reducing greenhouse gas emissions

2. How does the E-ZPass system exemplify the benefits of ITS technology?

A. It streamlines toll collection and reduces congestion.
B. It provides personalized travel recommendations to users.
C. It enables dynamic adjustment of traffic signal timing.
D. It coordinates communication between different transportation modes.

3. What is a key challenge to the widespread implementation of ITS as identified in the passage?

A. The need for interoperability between diverse systems and technologies.
B. The lack of public acceptance and adoption of ITS innovations.
C. The high upfront costs associated with ITS deployment.
D. The difficulty in obtaining real-time traffic data across large regions

4. Which aspect of the Traveler Information System (TIS) in Los Angeles is highlighted in the passage?

A. Its integration with autonomous vehicle technology.
B. Its ability to reroute traffic and reduce congestion.
C. Its provision of real-time traffic information to drivers.

D. Its coordination with public transportation operators.

5. How does the passage suggest autonomous vehicles could impact public transportation?

A. By increasing accessibility and reducing operational costs.

B. By enabling faster and more reliable bus service.

C. By improving safety and reducing the likelihood of accidents.

D. By promoting the use of dedicated lanes and signal priority.

Task 6. Complete each sentence with the correct ending.

1. An ITS can help ...	a. ... real-time data on things like trip time, travel speed, delays, traffic accidents, route changes, detours, and the state of work zones, among other things.
2. An ITS reduces ...	b. track of data like traffic volume, surveillance, trip time and speed, position, vehicle weight, and delays, among other things.
3. The system provides ...	c. the traffic management centre (TMC).
4. A variety of technological devices, including ...	d. required for strategic planning.
5. Data transmission ...	e. the data that has been gathered and received in several ways.
6.Intelligent transportation is important ...	f. a cutting-edge application that strives to offer significant services connected to various modes of transportation and traffic management that help users be better informed and use transportation networks in a safer, more organized, and "smarter" way.
7. Data Analysis: TMC processes ...	g. a brilliant way for transportation authorities to gather, analyse, and deliver data to users of a transportation network on the current condition of the network so they can plan their trip based on readily available real-time data.
8. The crucial component of ITS is ...	h. involves transmitting collected data from the field to TMC for analysis and then delivering that information back to travellers from TMC.
9. As a result, an intelligent transport system is ...	i. because it enhances worker productivity, convenience, and safety, as well as existing infrastructure.
10. An intelligent transportation system is ...	j. traffic congestion while also enhancing traffic safety and maximizing the use of existing infrastructure.
11. Data collection: Accurate, thorough, rapid, and real-time	k. are employed to advise users of transportation upgrades.

observation is ...	
12. The information is ...	l. make a city "smarter" by saving its inhabitants' time.
13. The hardware primarily keeps ...	m. gathered and evaluated for use in future operations, real-time traffic management, or data on local vehicles.
14. Traveller Information: Travel advisory systems (TAS) ...	n. variable message signs, highway advisory radio, the internet, SMS, and automated cell phones, are used to distribute this information.

Task 7. Look through the video "What is Intelligent Transport System? How does Intelligent Transport System work? " ***https://youtu.be/TlxUQwmLwGw?si=xBLdaIRAmr9ZJpRN*** **and complete the tasks that follow.**

Task 8. Match the words with their definitions.

Word	**Definition**
1. traffic efficiency	a. a specialized area of study or work that combines knowledge from multiple disciplines.
2. efficient infrastructure	b. a city that uses technology and data to improve the quality of life for its residents.
3. density of passengers	c. the number of open seats on public transportation or in a venue.
4. smart city	d. systems and structures that are designed to operate effectively with minimal waste or resources.
5. regular information	e. the situation where there are too many vehicles on the road, causing slow movement or standstill.
6. seat availability	f. the number of people occupying a certain space, such as a vehicle or building.
7. current location	g. the immediate exchange of data or messages between individuals or systems.
8.real-time information communication	h. the exact position of a person or object at a specific moment in time.
9.multidisciplinary conjunctive field	i. the ability to move vehicles through an area quickly and smoothly, reducing delays and congestion.
10. traffic congestion	j. consistent updates or data provided at set intervals.

Task 9. Look through the video and fill in the gaps.

a) density b) destination c) infrastructure d) safety e) conception f) congestion g) component h) applications i) commuters j) efficiency

Part 1. What is Intelligent Transport System?

With the _____ **(1)** of smart city transmuting cities into digital societies, making the life of its citizens easy in every facet, Intelligent Transport System becomes the indispensable _____ **(2)** among all. In any city mobility is a key concern; be it going to school, college and office or for any other purpose citizens use transport system to travel within the city. Leveraging citizens with an Intelligent Transport System can save their time and make the city even smarter. Intelligent Transport System (ITS) aims to achieve traffic _____ **(3)** by minimizing traffic problems. It enriches users with prior information about traffic, local convenience real-time running information, seat availability etc. which reduces travel time of _____ **(4)** as well as enhances their safety and comfort.

The application of ITS is widely accepted and used in many countries today. The use is not just limited to traffic _____ **(5)** control and information, but also for road _____ **(6)** and efficient _____ **(7)** usage. Because of its endless possibilities, ITS has now become a multidisciplinary conjunctive field of work and thus many organizations around the world have developed solutions for providing ITS _____ **(8)** to meet the need.

One such example is the city of Glasgow. In the city, Intelligent Transport System gives regular information to the daily commuters about public buses, timings, seat availability, the current location of the bus, time taken to reach a particular _____ **(9),** next location of the bus and the _____ **(10)** of passengers inside the bus.

Task 10. Match the words with their definition.

1. city administrators	a. the coordination and regulation of vehicular movement to ensure safety and efficiency.
2. local transportation vehicle	b. new information or developments related to public or private travel options.
3. automatized data collection	c. an organization responsible for overseeing and managing public transportation services.
4. transportation authority	d. the process of setting goals and determining actions to achieve them efficiently.
5. transportation updates	e. the process of gathering information automatically without human intervention.
6. hardware devices	f. officials responsible for managing and governing a municipality or urban area.
7. control management of the traffic	g. the sending of gathered information from one point to another.
8. transmission of collected data	h. physical equipment or tools used in conjunction with software or technology.
9. strategic planning	i. a mode of transport used within a specific area or region.
10. real-time	j. information or data that is updated instantly as it happens.

Task 11. Look through the video again and fill in the gaps.

a) communication b) management c) data d) collection e) transportation f) observation g) transmission h) hardware i) maintenance j) vehicle

Part 2. How does Intelligent Transport System work?

Traffic Management Centre (TMC) is the vital unit of ITS. It is mainly a technical system administered by the _____ **(1)** authority. Here all data is collected and analysed for further operations and control _____ **(2)** of the traffic in real time or information about local transportation _____ **(3).**

Well-organized and proficient operations of Traffic Management Centre depend on automatized _____ **(4)** with precise location information than analysis of that data to generate accurate information and then transmitting it back to travellers. Let's understand the entire process in a more detailed way.

Strategic planning needs precise, extensive, and prompt data collection with real-time_____ **(5).** So, the data here is collected via varied _____ **(6)** devices that lay the base of further ITS functions. Rapid and real-time information _____ **(7)** is the Key to proficiency in ITS implementation so this aspect of ITS consists of the _____ **(8)** of collected data from the field to TMC and then sending back that analysed information from TMC to travellers. The data that has been collected and received at TMC is processed further in various steps. Travel Advisory Systems (TAS) is used to inform transportation updates to the traveling user. ITS is a win-win situation for both citizens and city administrators where it provides safety and comfort to citizens and easy _____ **(9)** and surveillance to city administrators.

Task 12. Based on the information provided in the video choose the best option.

1. Which aspect of the Intelligent Transport System is considered the "vital unit" that collects and analyses data for real-time traffic control management?

A. Travel Advisory Systems
B. Automated data collection devices
C. The Traffic Management Centre
D. Real-time information transmission

2. The video indicates that the Intelligent Transport System in the city of Glasgow primarily provides commuters with what type of information?

A. Upcoming traffic congestion and delays
B. Public bus schedules, locations, and seat availability
C. Directions and route options for personal vehicles
D. Parking availability and pricing

3. According to the video, which of the following is cited as a key benefit of the Intelligent Transport System for both citizens and city administrators?

A. Reduced travel times for commuters
B. Increased revenue from transportation fares

C. Enhanced safety and comfort for citizens

D. Improved surveillance and maintenance for the city

4. What is described as the "Key to proficiency" in the implementation of the Intelligent Transport System?

A. Strategizing transportation infrastructure upgrades

B. Rapid and real-time communication of collected data

C. Comprehensive and timely data collection in the field

D. Effective processing of data at the Traffic Management Centre

5. The video suggests that the Intelligent Transport System has become a "multidisciplinary conjunctive field of work" due to what factor?

A. The evolving technological capabilities of the system

B. The diverse set of stakeholders involved in its development

C. The wide range of applications and benefits it can provide

D. The increasing demand for such systems in cities worldwide

6. Which of the following is identified as a primary goal of the Intelligent Transport System, according to the video?

A. Minimizing traffic problems and congestion

B. Enhancing the overall efficiency of public transit

C. Providing travellers with real-time traffic updates

D. All of the above

7. The video indicates that the Intelligent Transport System in the city of Glasgow aims to achieve which of the following for commuters?

A. Reduced travel times and increased safety

B. Personalized route recommendations

C. Improved accessibility to public transportation

D. All of the above

Reading

Task 13. Do the following statements agree with the information given in the passage? Look through the text and choose the best option:

True	if the statement agrees with the information
False	if the statement contradicts the information
Not Given	if there is no information on this

1. Intelligent transport systems are the only solution to reducing emissions in cities.

2. Real-time data regarding traffic does not contribute to making informed decisions.

3. ITS technology can predict the exact time of arrival at the final destination.

4. ITS systems are primarily used for entertainment purposes.

5. By improving the flow of vehicles from day-to-day trips, all harmful emissions are eliminated.

An Intelligent transportation system is part of the Internet of Things **(IT),** consisting of vehicle-to-vehicle **(V2V)** and vehicle-to-infrastructure **(V2I)** technology that applies both wireless and wireline communications-based information and electronics technologies. ITS systems are most commonly used in transportation and traffic management systems to improve the safety, efficiency, and sustainability of various transportation networks, reduce traffic congestion as well as enhance user experience.

ITS systems consist of state-of-the-art technologies that are wireless, electronic, and operate through automation. As a whole, these technologies hold the potential to integrate different vehicles used in transit such as trucks and personal vehicles, along with various systems and infrastructure. In-vehicle technologies and automation allow great precision in the case of docking buses for example, along with automated guideways and collision avoidance systems. The technology itself relies on a broad range of applications and sensors that process and share information to connect vehicle data and location to other vehicles and modes of transport, including pedestrians or bicyclists, and local or remote infrastructure that is linked to a cloud.

ITS is already creating a significant impact in the transportation industry through applications such as electronic toll collection, ramp meters, traffic light cameras, traffic-signal coordination, transit signal priority, and traveller-information systems. Implementing these systems come with a variety of benefits for both the general public and commercial users, along with a reduced environmental impact and economic gain. Experts in the field generally classify Intelligent Transport Systems into three categories:

Mobility

In terms of mobility, ITS technology aims to provide the shortest route between an origin and the final destination, taking into account factors such as distance, time, and the consumption of energy, and then comparing it to a data-rich environment in order to calculate the most optimal route for the journey. This can help with the monitoring and management of various transportation networks and systems. Traffic signals can be adjusted accordingly, transit operators can be managed dynamically, and emergency and maintenance services can be promptly dispatched if needed.

Safety

When an Intelligent Transport System is used for the purpose of increasing safety it can give speed warnings along slippery roadways, effectively reducing crashes and fatalities, a problem that claims the lives of thousands of Americans each year. An ITS system can provide advisories and warnings to travellers and it can also be applied in vehicle safety applications and emergency management.

Environment

Intelligent transport systems are considered vital to solving the problem of growing emissions and congestion in cities. Real-time data regarding traffic can help with the making of informed decisions that improve efficiency across all

transportation systems and modes. By improving the flow of vehicles from day-to-day trips, a significant amount of fuel is saved, therefore there are fewer harmful emissions being released into the atmosphere which creates a positive environmental impact. Travelers are able to get to their destinations faster and in a more sustainable manner and there are fewer cars on the roads.

Task 14. Look through the text again and choose the best option.

1. What is the primary purpose of utilizing wireless and wireline communications-based technologies in an Intelligent Transportation System?

A. To improve the safety of transportation networks

B. To enhance the efficiency and sustainability of various transportation modes

C. To automate the integration of different vehicle types

D. To provide a real-time data-rich environment for journey planning

2. Which aspect of Intelligent Transportation Systems is specifically focused on reducing crashes and fatalities on roadways?

A. Mobility

B. Safety

C. Environment

D. Infrastructure

3. How do Intelligent Transportation Systems contribute to improving the environmental impact of transportation?

A. By reducing congestion through real-time traffic monitoring

B. By providing advisories and warnings to travellers

C. By integrating various modes of transportation

D. By dispatching emergency services promptly

4. Which capability of Intelligent Transportation Systems enables precise docking of buses?

A. In-vehicle automation technologies

B. Vehicle-to-infrastructure (V2I) communication

C. Collision avoidance systems

D. All of the above

5. What is the primary goal of Intelligent Transportation Systems in terms of mobility?

A. To provide the shortest route based on distance, time, and energy consumption

B. To dynamically manage transit operators

C. To coordinate traffic signals for optimal efficiency

D. To integrate different transportation modes

6. How do Intelligent Transportation Systems contribute to reducing traffic-related fatalities?

A. By providing speed warnings on slippery roads

B. By applying the technology in emergency management

C. By coordinating traffic signals and transit priority

D. All of the above

7. Which of the following is NOT a common application of Intelligent Transportation Systems mentioned in the passage?

A. Electronic toll collection
B. Traveler information systems
C. Ramp metering
D. Destination routing

Task 15. Match the terms with the numbers on the picture.

A. Vehicle to Infrastructure
B. Mobile Network
C. Vehicle to Vehicle
D. Mobile Network
E. Global Positioning System (GPS)
F. Vehicle to Sensor
G. IoV Cloud Infrastructures

Task 16. Match the definitions with their meaning.

Words:	**Definitions:**
1. application	a. the fast growth and expansion of cities due to an increase in population.
2.collaborative effort	b. measures taken to protect against threats, dangers, or unauthorized access.
3. autonomous	c. programs and applications used on computers or electronic devices to perform specific tasks.
4. software	d the act of choosing between different options or courses of action.
5. security	e. able to operate independently without human control or intervention.
6.rapid urbanization	f. working together with others towards a common goal or objective.
7. decision-making	g. the process of putting a decision or plan into effect.
8. implementation	h. systems that allow for the movement of people or goods from one place to another.

9.transportation networks	i. improvements or developments in technology, knowledge, or society.
10. advancements	j. the practical use or relevance of something in a specific context.

Task 17. Look through the text "Applications of Intelligent Transport Systems" and complete the tasks that follow.

Intelligent Transportation Systems can differ depending on the purpose; however, the principles of their functions remain similar. Developers of such advanced technologies use the latest tech available such as Computer Vision, Deep Learning, Edge Computing, IoT, and others to create solutions. An ITS model typically combines different stages such as data collection, data annotation, data analysis, training, and testing of AI models. Most common applications include speed control, capacity management, increased efficiency and safety in multimodal mobility, reduction in fuel usage, and better incident management.

Applications of Intelligent Transport Systems

Automation is one of the many advantages these types of systems offer as various activities that were traditionally dependent on human intervention no longer require such involvement.

Additionally, the performance of road networks can be closely monitored and adjusted, in real-time. Data that was previously collected by expensive infrastructure can now be gathered through newer and more abundant data collection sources. Real-time data analytics further aid in the analysis of historic data as this task is undertaken by advanced intelligence systems.

Another impressive aspect comes down to the wide array of channels through which users can now access real-time travel information and make choices from there (as opposed to following road signs only), by using their mobile devices or in-car systems.

ITS can aid in the optimization of trips in the form of route guidance, decrease unnecessary travelled miles, and reduce time spent along congested motorways and streets whilst promoting the use of additional modes.

Another great benefit is the improvement of overall air quality and the reduction of reliance on foreign oil. When applied to the system management of vehicles, highways, and transit, they can effectively reduce the consumption of fuel by facilitating optimal travel routes that take into consideration all aspects of planning and timing along with better control of accelerations or decelerations and stopping, reducing time spent idling. This reduces congestion and improves the efficiency of all vehicles including those for personal use, commercial such as

delivery or public transportation, and emergency services (including improved response time).

Why do we need Intelligent Transport Systems?

Intelligent Transportation systems have the capacity to solve a lot of the traditional problems we see in the transport industry. We've witnessed the rising levels of congestion in cities increase the time people spend traveling, not to mention the strain this has on infrastructure and the billions of dollars which are spent every year on maintenance, road accidents, and fatalities that result from crashes. ITS offers promising solutions to all of this by improving efficiency in transit, increasing safety, optimizing various systems and processes, saving money and fuel as well as alleviating the effects transportation has on the environment.

Reducing our collective carbon footprint in the form of GHG emissions is fundamental to meeting sustainability goals and ensuring that we preserve a future for our planet and the next generations. With the help of ITS, the transportation sector (one of the biggest polluters on earth) can begin to shift towards more sustainable and effective practices. Digitization of the transport sector is the next big step in this direction according to experts, along with other objectives. The Sustainable and Smart Mobility Strategy underlines the importance of milestones such as deploying automated mobility at a large, global scale by 2030 which is said to be a key element to eliminating fatalities across transit networks and all modes of transport.

Integration of such advanced technologies is no easy task so it's expected that a significant amount of effort, time, qualified personnel, and resources will be needed to utilize this technology and use it to our advantage. The benefits are truly worth the investment and effort and as technology continues to advance, we're excited to see what the future holds for the transport sector and mobility as a whole.

Task 18. Based on the information provided in the text choose the best option.

1. Which of the following best describes the primary purpose of Intelligent Transportation Systems (ITS)?

A. To automate various transportation activities and optimize system performance.

B. To reduce the environmental impact of the transportation sector.

C. To enhance safety and emergency response capabilities.

D. To provide real-time travel information to users.

2. The passage suggests that the development of ITS involves the integration of which of the following advanced technologies?

A. Virtual Reality and Quantum Computing.

B. Blockchain and Augmented Reality.

C. Computer Vision, Deep Learning, and IoT.

D. 5G and Edge Computing.

3. Which of the following is **NOT** identified as a common application of ITS in the passage?

A. Speed control and capacity management.

B. Reduction in fuel usage and better incident management.

C. Improved accuracy of weather forecasting.

D. Increased efficiency and safety in multimodal mobility.

4. According to the passage, how do ITS contribute to the improvement of air quality and the reduction of reliance on foreign oil?

A. By facilitating optimal travel routes and better control of vehicle operations.

B. By encouraging the use of public transportation and carpooling.

C. By promoting the adoption of electric vehicles and renewable energy sources.

D. By reducing the number of road accidents and fatalities.

5. The passage states that the Sustainable and Smart Mobility Strategy sets a key objective for the deployment of which of the following by 2030?

A. Fully digitized transportation systems.

B. 50% reduction in road accidents and fatalities.

C. 20% reduction in greenhouse gas emissions from the transportation sector.

D. Automated mobility at a large, global scale.

6. The passage suggests that the primary challenge in integrating advanced technologies like ITS is:

A. The high cost of implementation and maintenance.

B. The lack of qualified personnel to operate and maintain the systems.

C. The resistance to change from the traditional transportation industry.

D. All of the above.

7. According to the passage, how do ITS help improve the performance of road networks?

A. By closely monitoring and adjusting the road network in real-time.

B. By providing real-time travel information to users through mobile devices and in-car systems.

C. By optimizing routes and reducing unnecessary traveled miles.

D. All of the above.

Task 19. Fill in the gaps with the words provided below.

A) investment B) transportation networks C) advanced D) security E) rapid urbanization F) decision-making G) application H) potential I) autonomous J) implementation K) collaborative effort L) software M) advancements N) reduction

An intelligent transportation system includes the _____ **(1)** of hardware and computer technology within the transport industry. ITS systems collect and process that data and then utilize the processed data to improve the management of the transportation system and offer the user with more and better information, that is used for _____ **(2)** which is further utilized for improving traffic management and making them safe.

The global intelligent transportation system market has enormous growth _____ **(3),** the major driving factors for the growth of the market are _____ (4) and recent technological _____ **(5)** in the technology. Similarly, with the ongoing _____ **(6)** for the development of efficient _____ **(7)** between countries irrespective of political, industrial, cultural, or institutional barriers, the ITS market is expected to witness significant growth in coming years.

The growth of the global Intelligent transportation system market is driven by rise in traffic jams globally, increased _____ **(8)** in railways and increased inclination of governments towards CO2 emission _____ **(9)** from the transportation industry. However, factors such as high cost of technology restrain the market growth. On the contrary, growth of connected and _____ **(10)** driving car and the improvement of high-speed internet and communications technologies are expected to provide lucrative growth opportunities for the market growth.

The global intelligent transportation system market is segmented on the basis of component, _____ **(11),** and end-use. Based on components, the market is bifurcated into hardware, _____ **(12),** and services. Depending on applications, the market has been segregated into traffic management, freight management, _____ **(13)** traveller information systems, advanced public transportation systems, _____ **(14)** and surveillance, ticketing and tolling systems, and others. Based on end use it is fragmented into roadways, railways, waterways, and airways. Region-wise, the market is analysed across North America, Europe, Asia-Pacific, and LAMEA.

Task 20. Match the definitions with their meaning.

Word	**Definitions**
1. observation	a. means of transporting people or goods from one place to another.
2. management	b. the condition of being protected from harm or danger
3. vehicle	c. the process of gathering and measuring information for analysis.
4. data collection	d. the physical components of a computer or other electronic device.
5. communication	e. the act of forming or devising a plan or idea.
6. applications	f. the action or process of closely monitoring or watching something or someone.
7. conception	g. the state of being overcrowded or blocked, typically related to traffic or transportation.
8. safety	h. the process of dealing with or controlling things or people.
9. hardware	i. the imparting or exchanging of information or news
10. congestion	j. specific software programs designed to perform particular tasks on a computer or mobile device.

Task 21. Look through the text and complete the tasks that follow.

Traffic Management and Control

Any traffic management and control need information on traffic flows, speeds, queues, incidents (e.g. accidents, vehicle breakdowns, obstructions), air quality and vehicle types, lengths and weights. This information will be collected using infra-red, radio, loop, radar, microwave or vision detectors or through the use of probe vehicles. In addition, public and private organisations will provide information on planned events (roadworks, leisure events, exhibitions).

The use to which this information is put depends on the objectives set for management and control. Network management objectives set for urban areas include: influencing traveller behaviour, in particular modal choice, route choice and the time at which journeys are made; making travel more efficient (safer, less polluting, cheaper and better informed); Helping drivers find the best route to their destination including providing information on where to park; reducing the impact of traffic on air quality; improving priority for buses and light rapid transit (LRT) vehicles; providing better and safer facilities for pedestrians, cyclists and other vulnerable road users; restraining traffic in sensitive areas; managing demand and congestion more efficiently.

The software systems used will include control applications such as SCOOT, SCATS, SPOT and MOTION. The SCOOT traffic adaptive control system is credited with achieving reductions in traffic delay of between 10% and 40% compared with the previous fixed-time control system. These are responsive systems which control a network of traffic signals to meet these objectives.

Automatic vehicle location and identification will provide information for giving priority or allowing access to certain vehicles only. Bus priority relies on vehicle location equipment and a means of communication to traffic control equipment. Vehicle location is achieved using detector loops, roadside beacons, vehicle profile recognition (using inductive loop detection) and global positioning systems (GPS).

Communication from loop or roadside beacon is normally wireline based while GPS usually communicate by wireless signal to the traffic signal controller. Enforcement of bus lanes is required to ensure bus priority measures are successful. Air quality monitoring can be linked to a control centre to provide information for decisions on changes to traffic control.

Automated access control is now commonplace on UK urban streets to prevent access for general traffic at certain times of day into sensitive areas. Often control is by lifting barrier or rising bollard using transponders and roadside card readers. Inter-urban network management systems will have similar objectives but will make greater use of ATM measures.

These measures extend variable speed limits, introduced in the controlled motorway system on the M25 between Junctions 10 and 16, to include incident management, maintenance management and access control such as ramp metering. They will include reducing congestion through more efficient use of road space such as hard shoulder operation in peak periods or during incidents. ATM includes motorway incident detection and automatic signalling (MIDAS) with automatic

queue detection, a network of CCTV cameras, gantry-mounted Advanced Motorway Indicators. Digital enforcement equipment will open and close lanes, control speeds and provide enhanced driver information.

Regional traffic control centres (RTCC) advise motorists of incidents and alternative routes by VMS, and by radio data system and traffic message channel (RDS–TMC), a signal frequency modulation (FM) radio service broadcasting localised traffic messages and advice to drivers. Their role now is expanding to include controlled motorways and other ATM measures. In the UK there has been a series of UTMC demonstrator projects in the four towns/cities of York, Reading, Preston and Stratford.

Examples of integrated inter-urban and urban management systems are provided by Munich's COMFORT, Southampton's ROMANSE project and by MATTISSE and the Midlands Driver Information System.

MATTISSE is now a partnership between eight local authorities in the West Midlands, Marconi and Mott MacDonald. It has migrated from a service based on user terminals into an Internet-based service through the MATTISSE Viewer which is UTMC compliant and utilises the Travel Information Highway. It provides real-time traffic and travel information on both highway and public transport networks across the region.

Another example is the London Traffic Control Centre Initiative. This includes an extensive network of CCTV and Automatic Numberplate Recognition (ANPR) cameras. Coupled with urban traffic control (UTC) information, the COMET information system uses this network to provide a range of real-time information displayed on a map-based user interface.

1. Which novel traffic management and control technologies are mentioned in the passage for collecting information on traffic conditions?

A. Infrared, radio, and microwave detectors

B. Radar, loop, and vision detectors

C. Probe vehicles and planned event data

D. All of the above

2. What is the primary goal of network management objectives in urban areas according to the passage?

A. Reducing the impact of traffic on air quality

B. Improving priority for buses and light rapid transit vehicles

C. Restraining traffic in sensitive areas

D. Influencing traveller behavior and making travel more efficient

3. How does the SCOOT traffic adaptive control system achieve reductions in traffic delay compared to a fixed-time control system?

A. By using responsive systems to control a network of traffic signals

B. By implementing variable speed limits and incident management

C. By providing better and safer facilities for pedestrians and cyclists

D. By automatically detecting queues and managing access control

4. What technology is mentioned in the passage as being used for both vehicle location and enforcement of bus lanes?

A. Detector loops and roadside beacons

B. Vehicle profile recognition and global positioning systems

C. Transponders and roadside card readers

D. Both A and B

5. How do regional traffic control centres advise motorists of incidents and alternative routes according to the passage?

A. Through variable message signs (VMS) and radio data system/traffic message channel (RDS-TMC)

B. By expanding their role to include controlled motorways and other ATM measures

C. By providing real-time traffic and travel information on both highway and public transport networks

D. All of the above

6. Which example of an integrated inter-urban and urban management system is mentioned as using an extensive network of CCTV and Automatic Numberplate Recognition (ANPR) cameras?

A. Munich's COMFORT system

B. Southampton's ROMANSE project

C. MATTISSE and the Midlands Driver Information System

D. The London Traffic Control Centre Initiative

7. Which of the following is not listed as a key objective of inter-urban network management systems according to the passage?

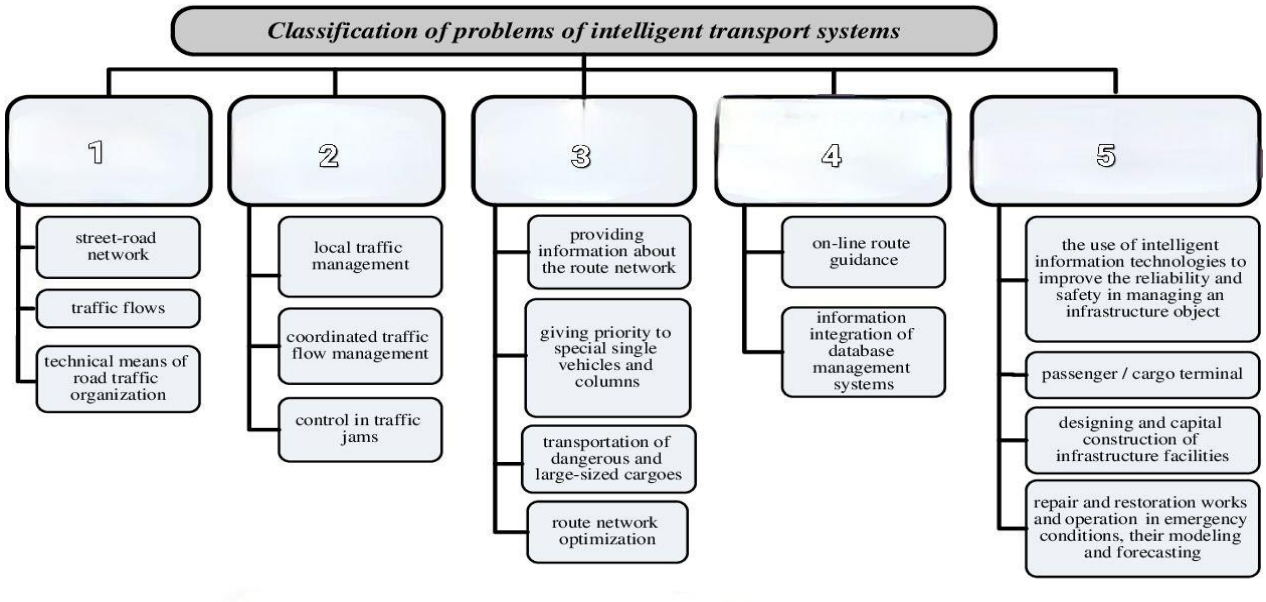
A. Incident management and maintenance management

B. Reducing congestion through more efficient use of road space

C. Providing better and safer facilities for pedestrians and cyclists

D. Access control such as ramp metering

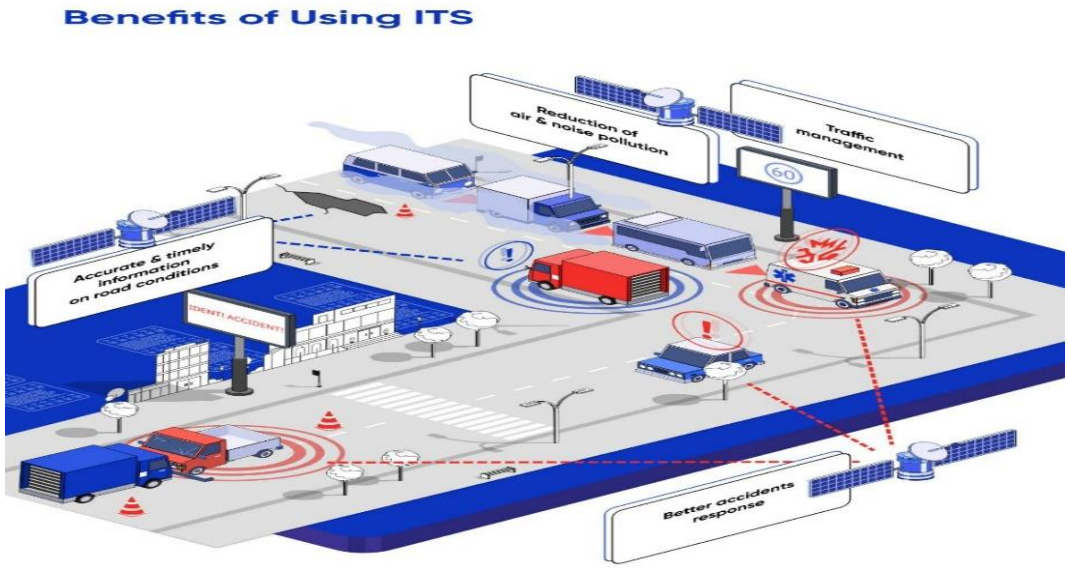
Task 22. Look through the flow-chart and match the numbers (1-5) with the definitions (A-E).



A. Information Support of Participants of the Movement
B. Providing Transport Infrastructure Management
C. Performance Monitoring
D. Providing Transportation Process
E. Providing Traffic Management

Writing

Task 23. Look through the scheme describing the benefits of ITS and write a summary.



Reading

Task 24. Do the following statements agree with the information given in the passage? Look through the text and choose the best option:

True if the statement agrees with the information
False if the statement contradicts the information
Not Given if there is no information on this

1. The application of ITS is only accepted in a few countries.
2. The city of Glasgow is the only city using ITS in the world.
3. The Traffic Management Centre (TMC) is not important in the ITS system.
4. The data collected at TMC is immediately deleted after processing.
5. ITS only benefits city administrators and not citizens.
6. The author provides step-by-step instructions for implementing ITS.
7. The application of ITS is only accepted in a few countries.
8. The application of ITS is only accepted in a few countries.
9. The application of ITS is the most popular in the United States.
10. The application of ITS is only accepted in a few countries.

Where are the best Public Transportation Systems in the world?

Urban mobility is becoming a major challenge for cities around the globe as streamlining traffic and dealing with population growth isn't as easy as it sounds. Urbanization has led to many issues such as traffic jams, air pollution, and infrastructure in need of upgrades and repairs, making navigating cities a real struggle. According to the United Nations projections, over 55% of the world's population lives in urban areas and these figures are only expected to grow as experts claim they will reach 68% by 2050. This places a tremendous amount of pressure on public transport systems and many city planners and officials grapple with providing solutions that allow current transit networks to cope with the increasing demand for transporting people safely and efficiently. Let's take a look at some of the best public transportation systems in the world and what are the key components and factors which helped them achieve this.

Hong Kong, China

The Special Administrative Region of China – Hong Kong currently holds the top spot in the Urban Mobility Readiness Index for 2022 for having the world's best public transportation system. The city's transport network is often praised for being affordable and having a high station density along with a good railway infrastructure.

Hong Kong's Mass Transit Railway operates through a multifaceted network that serves over 166 stations with very minimal delays or disruptions to services. It's cheap, accessible (rarely more than a short walk away), and efficiently designed with interchanges to ensure a smooth flow of passengers. Because of this, the residents of the city are avid public transportation users, with Hong Kong having reported the highest utilization rate in the world. The city's high population density has led local authorities to carefully strategize, prioritizing public transit over private modes as well as integrating the metro system into the city's infrastructure. Hong Kong also boasts ample car-free zones, and the rate of car ownership remains relatively low. The city is pedestrian-friendly, with many journeys being carried out on foot.

Oslo, Norway

The city of Oslo is often referred to as the electric vehicle capital of the world due to its impressive efforts in this field which include the nationwide adoption of eclectic vehicles along with strong monetary incentives, backed by local authorities who invest heavily in charging infrastructure. It's estimated that by the end of 2023, the residents of Oslo can expect to circulate fossil fuel-free as the city develops the world's first fully electric public transit system. The government has effectively encouraged electric vehicle use through various incentives such as lower taxes, free parking schemes, access to bus lanes, and removal of road tolls. This is probably the reason why since 2021, the number of electric vehicles entering Oslo's toll ring was reported to be higher than the figures for fossil-fuelled vehicles.

Oslo has an established reputation for road safety, which is achieved through a combination of measures that discourage the use of cars and slow down traffic such as reducing parking space, tolls on vehicles, expensive parking charges, and a 30 kph

speed limit for many residential areas and schools. Additionally, the city has significantly improved its cycling and public transport infrastructure, further encouraging residents to opt for sustainable ways of traveling. Oslo's metro system consists of several well-functioning lines, with an additional one being under construction. Multiple tram lines also run primarily on ground level, integrated with existing road networks via dedicated tracks.

What's even more impressive is that the city promotes a circular economy by using biogas produced from bio-waste and city sewage, converting it to fuel that is used by city buses and waste trucks. The city aims to become one of the first zero-emission cities in the world and is set on achieving a 95% reduction rate in climate emissions by 2030.

Stockholm, Sweden

The capital of Sweden is among the European leaders when it comes to clean mobility and innovation, ranking second with the highest share of electric vehicles after the city of Oslo. The government has made significant investments in charging infrastructure, along with incentives that encourage the switch to electric vehicles, further boosting the market share of electric cars and turning Stockholm into a prime example for success in the field of electrification.

The city hardly slacks when it comes to its public transport either. The capital boasts a condensed, multimodal mass transit system with great connections to Sweden's already excellent national rail network. Stockholm's commitment to clean mobility allows the citizens of the city to enjoy good air quality as well as low levels of noise and light pollution since electric vehicles produce less noise than gasoline-powered vehicles. According to the capital's climate action plan, a framework to reach net-zero emissions is already in place and expected to be achieved by 2040, with further plans of expanding the city's public transit systems, and bicycle lanes as well as establishing mobility hubs that promote free sharing services.

Zurich, Switzerland

Zurich's public transport system has a stellar reputation when it comes to efficiency, affordability, and ease of access as most stations and systems are easily reached within walking distance. The city greatly benefits from Switzerland's superb rail networks and the same goes for its road infrastructure – high quality, well-functioning, and safe, benefiting pedestrians and residents, resulting in very low traffic-related fatalities. The country's traffic enforcement structure is a large reason for this which includes incentives that encourage good behaviour among drivers through a mounting, income-based system of fines. Congestion in the city is not considered a major issue and air quality remains highly rated.

Switzerland's largest city is planning to release a comprehensive master plan in 2023, which is said to integrate urban and social space with transportation, featuring an urban climate vision along with an agenda for achieving this in the next several decades. Despite strong public investments in mobility, many expect that the city's heavy reliance on trams can cause it to fall behind other more technologically

advanced cities, simply because automation of metro systems has shown to progress much faster.

Singapore, Asia

Singapore's rich innovation ecosystem, paired with a strong political will to improve mobility has resulted in many incredible achievements in the transportation sector. The country is known for its unparalleled traffic management system, along with strict policies on congestion pricing, for which many claim it to be a pioneer in terms of reducing congestion. Traffic rules are strongly enforced and there is a well-established network of CCTV systems in circulation, reinforcing positive driving behavior. In Singapore, academics collaborate with government officials, who have taken an active role in promoting connected autonomous vehicles, particularly through its National Research Foundation. Singapore famously launched the first self-driving taxi trial in the world back in 2016, and the city-state is often referred to as a hub for urban mobility solutions, with numerous startups taking place there.

In 2003, Singapore invested in one of the world's very first automated rail systems and it's done incredibly well in maintaining it ever since. Public transit options remain affordable and within a short walking distance so that residents find it convenient to get around. The city has also been highly praised for its disaster-management policies in transit, with strong preparation capabilities, making its transportation networks strong and resilient, especially in case of emergencies.

Helsinki, Finland

Helsinki is considered a leader in providing a clean urban living environment for its residents, and it ranks third in both the Urban Mobility Readiness Index and the Sustainable Mobility sub-index. With an extensive network of car-free zones and a high market share of electric vehicles, the city has done more than well in its contribution to superior air quality, with noise and light pollution remaining relatively low. Car taxation in Finland is placed on vehicle carbon dioxide emissions intensity and the country currently has the second highest excise duty for petrol (gasoline) in Europe, along with the fourth highest for diesel.

Helsinki's public transportation network follows a multimodal approach consisting of bus, tram, metro, commuter train, and ferry services. It's considered incredibly convenient thanks to the interconnectivity of systems along with a sturdy national rail and an app for journey planning created by a Helsinki startup, ultimately integrating all modes of transit. Traveling around Helsinki is also very affordable, with a single fare costing around $3.00 and being valid on any type of transport in the city. Many residents prefer to make their journeys on foot as well since the city is incredibly pedestrian-friendly.

Tokyo, Japan

Tokyo's huge and rather complex public transit system may seem daunting at first glance, but it's truly one of the most efficient, well-optimized, and convenient in the world. The railway system in Tokyo carries over 14 billion passengers annually and is a key component of the city's transport network. It's actually estimated that out of the 20 busiest stations in the world, 11 are found in Japan. The Japanese railway

system is so efficient and punctual that they are well-known for being incredibly stern and strict regarding their adherence to schedules. The transportation system of Tokyo is interconnected with Japan's top-notch rail network which includes some pretty impressive high-speed bullet trains. Given the extensive magnitude of the system, private vehicles and motorcycles contribute very little to urban transport in Tokyo.

The Japanese Capital is also very diligent when it comes to enforcing traffic laws and can pride itself on very few fatalities from road accidents. Eco-friendly modes of transport such as walking and cycling are incredibly common and the residents of Tokyo regularly use their bikes for making trips around town whether it's for shopping, work, or school commutes. It's estimated that around 14% of trips in Tokyo are made by bikes, a significantly higher rate than most large cities, despite cycling infrastructure being somewhat limited. Japan's sustainability plan aims to reduce greenhouse gas emissions by 50% by 2030, using renewable energy and green hydrogen wherever possible. The new strategy further strives to improve the city's road infrastructure, including developments for existing public transit networks (particularly when it comes to multimodality) as well as upgrading cycling and pedestrian routes.

Paris, France

Over the last few years, Paris has reorganized its public parking space system, limiting availability as a means of encouraging Parisians to use other forms of transit. The introduction of more car-free zones around the city as well as additional bike parking facilities and measures that improve safety have made the city more accessible to visitors and residents who prefer to get around on foot or use other eco-friendly modes of transport. The city has more than 1,000 km of cycling infrastructure altogether, including 300 km of bike lanes. Most parts of the city remain accessible within a short walking distance from a public transit station and the city's transport networks enjoy a high usage rate.

The city's public transit network currently consists of a 16-line Paris metro system, interconnected with the Réseau Express Régional network, further reaching out and serving the surrounding region, as well as four tram lines around the perimeter. The Grand Paris Express project which is scheduled for completion by 2030, will further expand the Nation's public transit which will benefit residents of many areas. New projects underway include trains that will use 200 km of new, automated tracks around the town, serving 68 new stations. In addition, major infrastructure work is being conducted for the improvement of traffic flow ahead of the 2024 Olympic Games. Innovation in smart mobility naturally flourishes in the French capital as it's home to some of the world's best academic institutions for engineering and computer science. The government invests heavily in the sector which explains why many mobility organizations have their headquarters in Paris.

Berlin, Germany

Berlin has long been praised for its multimodal approach to mobility that is safe, efficient, and versatile, stretching through its vast networks of metro and suburban trains, trams, and ferries. This is assisted by an integrated app that incorporates journey planning as well as fare payments for all modes of transit,

including vehicles and e-scooters. Some issues regarding low station density, however, make public transit less appealing and convenient for residents, which means that more journeys are still made by car and on foot, despite the government's efforts.

Berlin is also a leader when it comes to road safety, with records indicating very few traffic fatalities. This is due to the strict policies on speed limits which include a standard maximum speed limit of 50 kph, which has been reduced to 30 kph in certain residential areas. The government's recent investment in cycling infrastructure has further contributed to the modernization of the city's cycling network. This includes new additions such as dedicated spaces and markings for cyclists, protected bike lanes, cycle superhighways, and various parking facilities. The city has also introduced schemes that encourage the use of cargo bikes.

London, UK

The UK capital has one of the largest public transport networks in the world, with integrated underground train and bus systems spanning throughout the entire city. The tube connects every major part of London which makes it incredibly convenient to get around and this remains true even for visitors to the city. In 2022, the Capital expanded its underground railway system by adding an additional line – the high-frequency Elizabeth line, stretching between suburbs to the east and west of the city. The City's strict policies on pollution vehicles have helped contribute to a significant decrease in city pollution over the last decade. This is aided by a moderate level of car ownership and the London Congestion Charge, which is applied to most vehicles circulating the central part of town.

As part of the Mayor's strategy to increase active and sustainable mobility in the city, the uptake of plug-in electric vehicles has been increasing with each passing year. The city's government is advocating for the switch to electric vehicles by investing in charging infrastructure and incentives that promote the use of electric vehicles such as a "cleaner vehicle discount" as well as imposing charges on older, more-polluting vehicles. The city further expanded its Low Emission Zone in 2021 from central London to a wider area, a move expected to further contribute to air quality. Additionally, cycling infrastructure has been expanded significantly, so much that it was reported that in 2022, over 20% of the residents of London lived within 400 meters of a Cycleways network.

When it comes to the U.S., San Francisco ranked quite high in the Urban Mobility Readiness Index, in part due to its EV-charging network. The city also has one of the best-known public transportation networks in the country, including the city's famous Bay Area Rapid Transit. Portland, on the other hand, has done incredibly well in promoting eco-friendly modes of transport such as walking and cycling while the residents of Boston get to enjoy the benefits of the city's robust transit system.

Overall, cities in the U.S. ranked rather low when compared to other countries in terms of mobility in urban areas, mostly because of the nation's overdependence on cars. This trend often excludes the use of public transit, placing emphasis on

individual transportation. New York City, for example, which is often praised for having one of the best mass transit systems in the country, is still at about half of pre-pandemic ridership levels and ranks very poorly as a city for driving or getting around despite having such an extensive transit system. City officials are still working on implementing a congestion pricing plan that would charge drivers a fee for entering busy neighbourhoods such as Manhattan.

Policy choices can tip the scales for countries in favour of public transportation as many cities are beginning to introduce initiatives such as "congestion pricing". Discouraging car use will lead to less traffic, fewer accidents on congested roads, and better air quality in cities – especially in larger ones where this is already a huge issue. This can unlock broader, shared benefits for everyone including lowering the levels of greenhouse gas emissions – a good opportunity for nations to collectively take further action against climate change.

Writing

Task 25. Choose one of the topics and write an essay.

1. The integration of intelligent transportation systems has transformed the way people travel and commute. In what ways has this technology changed the transportation landscape? Is this a positive or negative development?

2. Some argue that investing in intelligent transportation systems is crucial for addressing traffic congestion and improving road safety. Others believe that traditional methods are still effective. Discuss both perspectives and share your own opinion.

3. Intelligent transportation systems have the potential to enhance public transportation services and reduce reliance on personal vehicles. To what extent do you agree or disagree with this statement?

4. The rapid advancement of intelligent transportation systems has raised concerns about privacy and data security. Are the benefits of these technologies worth the risks associated with data protection?

5. As intelligent transportation systems become more prevalent, some worry about the implications of over-reliance on technology for navigation and traffic management. Is the increasing dependence on these systems a positive or negative development?

References

1. Slinn M., Matthews P., Guest P. Traffic Engineering Design. Principles and Practice. Second edition: Elsevier Butterworth-Heinemann, 2005. 241 p. URL: https://aatma.gov.et/wp-content/uploads/2024/10/Traffic-Engineering-Design-Principles-and-Practice-Mike-Slinn-Paul-Matthews-Peter-Guest.pdf (accessed: 27.09.2025).

2. Implementing an Intelligent Transportation System: a bottom-up approach to value creation, Intellias, January 11, 2024. URL: https://intellias.com/implementing-intelligent-transportation-system/ (accessed: 26.09.2025).

3. Intelligent transportation systems (ITS). Market insights. Opportunities and forecast 2023 – 2032, Allied Market Research, 2023, 473 p. URL: https://www.alliedmarketresearch.com/intelligent-transportation-system-market (accessed: 26.09.2025)

4. Intelligent Transport System: Trends, best practices, success stories, N-iX, January 14, 2021. URL: https://www.n-ix.com/intelligent-transport-system/ (accessed: 26.09.2025)

5. Intelligent Transportation Systems: why are they important, Advent Biztech Solutions, August 2022. URL: https://www.linkedin.com/pulse/intelligent-transportation-systems-advent-biztech-solution-pvt-ltd (accessed: 26.09.2025).

6. Intelligent Transportation Systems (ITS) and the paradigm V2X, ART intelligent solutions, 2023. URL: https://www.artgroup-spa.com/intelligent-transportation-systems-its-and-the-paradigm-v2x/ (accessed: 26.09.2025).

7. Sustainable transport: rules to boost Intelligent Transport Systems for safer and more efficient transport agreed, European Commission, Mobility and Transport: Directorate-General for Mobility and Transport, June 9, 2023. URL: https://transport.ec.europa.eu/news-events/news/sustainable-transport-rules-boost-intelligent-transport-systems-safer-and-more-efficient-transport-2023-06-09_en (accessed: 26.09.2025).

8. What is an Intelligent Transport System and how does it work? Modeshift, September 14, 2023. URL: https://www.modeshift.com/what-is-an-intelligent-transport-system-and-how-does-it-work/ (accessed: 26.09.2025).

Навчальне видання

Білан Наталія Іванівна
Губкіна Вікторія Вікторівна
Іванченко Ірина Анатоліївна
Левицька Світлана Іванівна

ПРАКТИКУМ З ІНОЗЕМНОЇ МОВИ ПРОФЕСІЙНОГО СПРЯМУВАННЯ (АНГЛІЙСЬКОЇ)

Навчальний посібник

Видано в авторській редакції.

Електронний ресурс.

Підписано до видання . Арк. 6,3.

Підготовлено до видання
в Національному технічному університеті «Дніпровська політехніка».
Свідоцтво про внесення до Державного реєстру ДК № 1842 від 11.06.2004.
49005, м. Дніпро, просп. Дмитра Яворницького, 19.