

B.A. (VS) MATERIALS MANAGEMENT

DSE 6.3: Inland Waterways and Coastal Shipping

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Inland Waterways and Coastal Shipping DSE: 6.2	4	3	1	-	Pass in Class XII	NIL

Learning Objectives:

This course provides a comprehensive understanding of inland waterways and coastal shipping as important modes of transportation. Students will explore the characteristics, operations, and challenges associated with inland waterways and coastal shipping systems. The course will cover topics such as waterway infrastructure, vessel types, navigation and safety, regulatory frameworks, intermodal connectivity, and the economic and environmental aspects of these modes of transportation.

Learning Outcomes:

After completion of the course, learners will be able to:

- explain role of inland waterways and coastal shipping in the transportation sector and identify the characteristics and features of inland waterways and coastal shipping systems.
- analyze the infrastructure requirements for efficient and safe navigation in inland waterways and coastal areas.
- evaluate the different types of vessels used in inland waterways and coastal shipping and their operational considerations and understand the regulatory frameworks and policies governing inland waterways and coastal shipping operations.
- assess the intermodal connectivity between inland waterways, coastal shipping, and other modes of transportation. examine the economic and environmental aspects of inland waterways and coastal shipping and their impact on regional and national economies.
- to solve the problems in the context of inland waterways and coastal shipping.

Unit 1: Introduction to Inland Waterways and Coastal Shipping **9 hours**

Definition and significance of inland waterways and coastal shipping, Comparison with other modes of transportation, Historical development and current trends, Characteristics of Inland Waterways and Coastal Areas, Types of inland waterways (rivers, canals, lakes), Coastal zones and their unique features, Impact of geography and topography on navigation

Unit 2: Waterway Infrastructure, Vessel Types and Operations **9 hours**

Locks, dams, and channels, Port facilities and terminals, Navigation aids and signaling systems
Vessel Types and Operations, Barges, towboats, and push boats Ferries and passenger vessels
Cargo handling and stowage considerations,

Unit 3: Navigation and Safety **9 hours**

Navigation rules and regulations, Vessel traffic management systems, Safety protocols and emergency response, Regulatory Frameworks and Policies, Integration with road, rail, and air transportation, Inland ports and intermodal terminals, Last-mile connectivity and hinterland distribution, Economic and Environmental Aspects

Unit 4: International and national regulations **9 hours**

Port authorities and governing bodies, Environmental regulations and sustainability initiatives
Intermodal Connectivity, Economic benefits and challenges of inland waterways and coastal shipping, Environmental impact and sustainability considerations, Case studies of successful projects and initiatives

Unit 5: Emerging Technologies and Future Trends **9 hours**

Digitalization and automation in inland waterways and coastal shipping, Energy-efficient and alternative fuel technologies, Predictive analytics and smart shipping solutions, Analysis of real-world projects and operations.

Exercise:

1. Divide the students into groups and assign each group a specific mode of transportation (inland waterways, coastal shipping, road, rail, air). Instruct each group to research and prepare a presentation comparing their assigned mode with others in terms of cost, capacity, environmental impact, and geographic coverage. The groups should discuss the strengths and weaknesses of each mode and present their findings to the class.
2. Provide students with maps and charts of different regions with varying geographic and topographic features (e.g., rivers, canals, lakes, coastal areas). Ask them to analyze how

these features can affect navigation in inland waterways and coastal areas. Students should identify the challenges posed by specific geographic and topographic characteristics and propose strategies to overcome them.

3. Divide the students into small groups and assign each group the task of designing a port terminal for a specific inland waterway or coastal area. Students should consider factors such as vessel types, cargo handling requirements, navigation aids, and safety protocols. Each group should create a layout plan, identify the necessary infrastructure elements (e.g., locks, dams, channels), and explain their design choices.
4. Provide students with different types of cargo (e.g., bulk goods, containers, hazardous materials) and ask them to analyze the appropriate stowage considerations for each type. Students should consider factors such as weight distribution, stability, and securing methods. They should create stowage plans and discuss the potential challenges and safety implications associated with each cargo type.
5. Using a vessel traffic management simulation software or a virtual environment, create scenarios simulating vessel traffic in a specific inland waterway or coastal area. Students should take on different roles, such as vessel operators, traffic controllers, and safety officers, and practice making decisions to ensure safe and efficient navigation. After the simulation, students should reflect on the challenges faced and discuss improvements to enhance navigation and safety.
6. Conduct an emergency response drill in a simulated inland waterway or coastal shipping scenario. Students should develop emergency response plans, including communication protocols, evacuation procedures, and resource allocation. Simulate a specific emergency situation (e.g., collision, hazardous spill) and evaluate the effectiveness of the response efforts. Students should analyze the outcomes and propose enhancements to the emergency response plans.
7. Assign each student or group a specific port authority or governing body responsible for regulating inland waterways or coastal shipping. Students should research and analyze the regulatory framework, policies, and environmental initiatives of the assigned authority. They should assess the compliance levels of the authority and present recommendations for improving regulatory effectiveness and sustainability practices.
8. Provide students with case studies of successful inland waterways or coastal shipping projects or initiatives. Students should critically analyze the economic benefits, challenges, environmental impact, and sustainability considerations of each case study. They should identify key factors contributing to the success of these projects and propose lessons learned that can be applied to future endeavors.
9. Students should research and select a specific digitalization or automation technology used in inland waterways

Suggested Readings

- Baird, A. J., & Kemp, A. C. (2015). *Estuaries: Dynamics, Mixing, Sedimentation and Morphology*. Cambridge University Press.
- Bell, R. L. (2017). *Maritime Logistics: A Complete Guide to Effective Shipping and Port Management* (4th ed.). Kogan Page.

- Cappuccilli, R. (2017). Handbook of Coastal and Ocean Engineering: Inland and Coastal Navigation and Coastal Protection (Vol. 2). World Scientific Publishing.
- Goulielmos, A. M. (2015). Sustainable Coastal Management and Climate Adaptation: Global Lessons from Regional Approaches in Australia. Springer.
- Lalli, C. M., & Parsons, T. R. (2022). Biological Oceanography: An Introduction (4th ed.). Elsevier.
- Ramasamy, S. M., & M. A., S. M. (2019). Maritime Economics and Logistics (4th ed.). Routledge.
- Roe, M. (2019). Inland Waterways of Great Britain (9th ed.). Imray, Laurie, Norie & Wilson Ltd.
- Turan, O., & Yong, J. Y. (Eds.). (2019). Sustainable Coastal and Ocean Engineering: Proceedings of the 3rd International Conference on Sustainable Coastal and Ocean Engineering. CRC Press.
- White, R. (2013). The Inland Waterways Manual: The Complete Guide to Boating on Rivers, Lakes, and Canals (3rd ed.). Adlard Coles Nautical.

Notes:

- **Suggested readings shall be updated and uploaded on the college website from time to time.**
- **Examination scheme and mode shall be prescribed by the Examination branch, University of Delhi from time to time.**