University of Science, VNU-HCM

Faculty of Physics – Engineering Physics

Department of Oceanology, Meteorology and Hydrology

Erasmus+ Course Catalogue

Course	Semester	Hours	ECTS
Remote Sensing and GIS	Winter	60	5
Environmental Pollution	Summer	45	3.5
Data mining in Earth Science	Winter	45	3.5
Physical Oceanography in The East Sea	Winter/Summer	30	3
Marine Governance and Marine Economics	Winter/Summer	30	3
Marine Environmental Resources and Climate Change	Winter	30	3
Introduction to Thermodynamics of the Atmosphere	Winter	30	3
Dynamics of Marine Environment	Summer	45	3.5
Coastal Processes	Summer	45	3.5
Dynamics of Atmospheric Environment	Summer	45	3.5
Marine Eco-hydrology Dynamics	Summer	45	3.5
Modelling Tools	Winter	75	5.5
Integrated Coastal Zone Management	Winter/Summer	30	3
Coastal Processes Along the Mekong Delta	Summer	45	3.5
Special subjects of natural risk and environmental assessment	Winter	30	3
Advanced Data Mining Techniques and Applications	Winter	45	3.5
Application of Advanced Technology in Agro-Meteorology	Winter	45	3.5

Module designation:	**Name: Remote Sensing and GIS** **Code: OMH10014**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. HO Dinh Duan MSc. LAM Van Hao
Language	English
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture: 30, practice: 30 Private study: 90
Credit points	3 Credits (5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of remote sensing and geographic information systems. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of remote sensing and geographic information systems in science and life. Be able to design and establish maps. Be capable of processing remote sensing data. - Skills: Be able to work individually, self-study, lifelong learning, and problem-solving. - Competences: Be able to understand the basic concepts of remote sensing and geographic information systems. Have the capacity to learn in the next periods.
Content	This module includes the following topics: 1. Introduction to remote sensing 2. Remote sensing image processing 3. Remote sensing image analysis

	4. Applications of remote sensing in Earth science 5. Introduction to geographic information systems 6. GIS data acquisition 7. GIS data analysis 8. Applications of GIS
Examination forms	1. Individual activities: 50% 2. Group activities: 10% 3. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Le Van Trung (2006), Remote sensing, VNUHCM Publishing House, Vietnam. 2. Le Van Trung, Lam Dao Nguyen, Pham Bach Viet (2012), Practice of remote sensing, VNUHCM Publishing House, Vietnam. 3. Tran Trong Duc (2011), The basic of geographic information systems, VNUHCM Publishing House, Vietnam 4. John R. Jensen (2016), Introductory digital image processing: a remote sensing perspective, Pearson Education. 5. John A. Richards (2013), Remote Sensing Digital Image Analysis - An Introduction, Springer. 6. Peter A. Burrough, Rachael A. McDonnell, Christopher D. Lloyd. (2015), Principles of geographical information systems, Oxford University Press.

Module designation:	**Name: Environmental Pollution** **Code: OMH10016**
Semester(s) in which the module is taught	Summer Semester
Person responsible for the module	Dr. BUI Thi Ngoc Oanh MSc. TRAN Xuan Dung
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice, Group Report.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of environmental pollution and the processes of pollution transport in the air and water, thereby the student can apply the knowledge to simulate the distribution of pollutants in some case studies. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of environmental pollution in science and life. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to calculate and simulate a case of the release of pollutants in the air and water. Have the capacity to learn in the next periods.
Content	This module encompasses the following topics: - An overview of air pollution - Introduction to air pollution models used for predicting and analyzing air quality.

	- Overview of water pollution - Introduction to water pollution models employed for assessing and managing water quality. - Risk analysis and assessment methods used to evaluate the potential risks associated with pollution and develop appropriate mitigation measures.
Examination forms	1. Individual activities (Exercise and Practice): (40%) 2. Group report: (10%) 3. Final exam: (50%)
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Bui Ta Long (2008), Environmental modeling, VNUHCM Publishing House, Vietnam. 2. Dinh Xuan Thang (2007), Air pollution, VNUHCM Publishing House, Vietnam. 3. Schnoor, Jerald L., (1996), Environmental Modeling: Fate and Transport of Pollutants in Water, Air, and Soil, A Wiley – Interscience Series of Texts and Monographs. 4. Vallero D.A., (2008), Fundamentals of Air Pollution, Fourth Edition, Academic Press.

Module designation:	**Name: Data mining in Earth Science** **Code: OMH10017**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Assoc. Prof., Dr. VO Luong Hong Phuoc Dr. LE Nguyen Hoa Tien
Language	English
Teaching methods	Proactive lecturing, brainstorming, Q&A, group discussion, seminar
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	The subject provides the knowledge of data mining procedure, necessary conditions for sampling and data analysis methods in Earth Science. The subjects will focus on theories and practices by using MATLAB, FORTRAN to solve some basic problems in Earth Science such as statistics, time series analysis, geo-statistics, spectral analysis and digital signal processing. Some measured data will be used for application by some specific tools. Students who complete this module could be achieved the following: - Knowledge: Be able to Understand the processes and methods of data mining in Earth Science; Practice computer skills to solve typical problems in Earth Science; Apply tools to analyze data in the fields of Oceanography, Meteorology, and Hydrology. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. Ability to demonstrate creative and critical thinking in problem-solving; Read English in specialized

	documents and use some basic specialized English terminology; Ability to program some application problems. - Attitudes: Be able to apply analyze and evaluate data/problems - Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Data Mining Process 2. Fundamentals of Matlab 3. Signals 4. Fourier Transform 5. Non-parametric Spectrum Analysis 6. Filtering 7. Interpolation 8. SPSS Applications in Data Analysis 9. R Applications in Data Analysis 10. Specialized Applications
Examination forms	1. Individual and group activities: 30% 2. Midterm exam (seminars): 30% 3. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Kris Jamsa (2020), Introduction to Data Mining and Analytics, Jones & Bartlett. 2. Bendat, J.S. & Piersol, A.G. (2010), Random Data: Analysis and Measurement Procedures (4th Edition), Wiley. 3. Dang Van Liet (2004), Numerical receipts, VNU Publisher (Vietnamses). 4. Martin H. Trauth (2015), MATLAB Recipes for Earth Sciences, Springer. 5. Monson H. Hayes (1996), Statistical Digital Signal Processing and Modeling, John Wiley & Sons. 6. William J. Emery and Richard E. Thomson (1998),

	Data Analysis Methods in Physical Oceanography, Elsevier Science. 7. Nguyen Van Tuan (2014), Data analysis by R, Ho Chi Minh City General Publishing House

Module designation:	**Name: Physical Oceanography in The East Sea** **Code: OMH10113**
Semester(s) in which the module is taught	Winter/Summer Semester
Person responsible for the module	Assoc. Prof., Dr. VO Luong Hong Phuoc Dr. LE Dinh Mau
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	Students completing this course will be able to: + Distinguish between marine resources and marine environment + Skills to protect the environment and marine resources + Understand your own ethics and responsibilities
Content	Introduction of natural conditions, position, resources and major oceanographic processes on the East Sea. Including characteristics of natural conditions, position, history of Oceanography research in the East Sea; features of topography, geomorphology, hydrology, dynamics, marine biology, biological resources, natural disasters, marine economy, zoning of the East Sea.
Examination forms	1. Exercise: 25% 2. Midterm exam: 25% 3. Final exam 50%
Study and examination requirements	Minimum attendance at lectures is 80%

Reading list	1. Vietnam Academy of Science and Technology (2009), East Sea, Volume I: Overview of the East Sea, Natural Science and Technology Publishing House. 2. Vietnam Academy of Science and Technology (2009), East Sea, Volume II: Hydrometeorology and Marine Dynamics, Natural Science and Technology Publishing House. 3. Vietnam Academy of Science and Technology (2009), East Sea, Volume III: Marine Geology - Geophysics, Natural Science and Technology Publishing House. 4. Vietnam Academy of Science and Technology (2009), East Sea, Volume IV: Marine biology and ecology, Natural Science and Technology Publishing House. 5. Nguyen Van Phong (1997), Oceanography and Vietnam's sea, Education Publishing House.

Module designation:	**Name: Marine Governance and Marine Economics** **Code: OMH10114**
Semester(s) in which the module is taught	Winter/Summer semester
Person responsible for the module	Assoc. Prof., Dr. VO Luong Hong Phuoc Dr. LE Dinh Mau
Language	English
Teaching methods	Lecture, Discussion, Debate, Brainstorming.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of marine governance and marine economics. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of marine governance and marine economics in science and life. - Skills: Be able to work in individual, self-study, lifelong learning, and problem-solving. - Competences: Be able to explain the basic concepts of marine governance and marine economics. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. The evolution of awareness on ocean, marine and coastal management 2. Protection, governance and development 3. Ocean and economy 4. Current status of marine economy in Vietnam

Examination forms	1. Paper assignment: 25% 2. Midterm exam: 25% 2. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Tac An, Phan Minh Thu, Nguyen Thanh Van, Tong Phuoc Hoang Son (2018), Governance and economic development in the East Sea, Natural Science and Technology Publishing House, Vietnam 2. Nguyen Tac An, Tong Phuoc Hoang Son (2004), Using geographic information systems in integrated coastal zone management. VNUHCM Publishing House, Vietnam. 3. A.V. Souvorov (1999), Marine Ecologonomics: The Ecology and Economics of Marine Natural Resources Management, Elsevier Science. 4. Biliana Cicin-Sain, Robert W. Knecht (1998), Integrated Coastal and Ocean Management: Concepts and Practices, Island Press.

Module designation:	**Name: Marine Environmental Resources and Climate Change** **Code: OMH10117**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. BUI Thi Ngoc Oanh
Language	English
Teaching methods	Lecture, Discussion, Debate, Presentation, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of marine resources and the ocean's role in climate change. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and classify the concept of and important of marine resources and its roles relating to ocean; and apply knowledge to use and protect marine environment - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: be able to explain the role of an organic grower and opportunities of organic farming. can develop an organic production system
Content	1. Fundamentals of Organic farming Basic concepts of atmospheric thermodynamics 2. Preparation and application of Organic Input 3. Organic crop management 4. Organic certification
Examination forms	1. Paper assignment: 10%

	2. Individual activities: 10% 3. Midterm exam: 30% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. S.R. Reddy (2017), Principles of Organic Farming, Kalyani Publishers, New Delhi. 2. S.P. Palaniappan and K. Annadurai (2010), Organic Farming: Theory and Practice, Scientific Publishers, New Delhi.

Module designation:	**Name: Introduction to Thermodynamics of the Atmosphere** **Code: OMH10201**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. LE Nguyen Hoa Tien
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of atmospheric thermodynamics. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of dynamics of atmospheric environment in science and life. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the basic atmospheric phenomena from physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Gas laws 2. The hydrostatic equation 3. The first law of thermodynamics 4. Adiabatic processes 5. Water vapor in air 6. Static stability

	7. The second law of thermodynamics 8. Nucleation of water vapor condensation
Examination forms	1. Paper assignment: 10% 2. Individual activities: 10% 3. Midterm exam: 30% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Wallace, J. M., Hobbs, P. V. (2006), Atmospheric Science - An Introductory Survey, Academic Press. 2. Bigg, G. R. (2003), The Oceans and Climate, Cambridge University Press. 3. Tsonis Anastasios A. (2007), An introduction to atmospheric thermodynamics, Cambridge University. 4. Wells, N. C. (2012), The Atmosphere and Ocean: A Physical Introduction, Wiley- Blackwell.

Module designation:	**Name: Dynamics of Marine Environment** **Code: OMH10401**
Semester(s) in which the module is taught	Summer semester
Person responsible for the module	Assoc. Prof., Dr. VO Luong Hong Phuoc Assoc. Prof., Dr. LE Quang Toai Assoc. Prof., Dr. LA Thi Cang,
Language	English
Teaching methods	Proactivelecturing, brainstorming, Q&A, group discussion, seminar
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	The course aims to provide fundamental knowledge of marine wave dynamics, ocean currents, and tides. This helps students grasp the principles of fluid dynamics, enabling them to explain natural and practical phenomena related to fluid dynamics. Students who complete this module could be achieved the following: - Knowledge: Be able to recognize the fundamental theoretical principles of waves, currents, and tides; Apply harmonic oscillation analysis methods, determine wave characteristics, and analyze current fields; Distinguish various models for waves, currents, and tides; Perform calculations for basic marine dynamics problems; Apply knowledge to practical scenarios. - Skills: Be able to work in individual and group work, self-study, lifelong learning, and problem solving. Ability to demonstrate creative and critical thinking in problem-solving; Read English in specialized

	documents and use some basic specialized English terminology; Ability to solve some application problems. - Attitudes: Be able to apply analyze and evaluate data/problems - Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Environmental Fluid Dynamics 2. Hydrodynamic Tide Models 3. Harmonic Analysis and Tide Prediction 4. Uniform Waves on the Sea Surface 5. Wind-Generated Waves 6. Geostrophic Currents 7. Ocean Layer Adaptation to Wind 8. Wind-Driven Circulation in the Open Ocean 9. Thermohaline Circulation
Examination forms	1. Exercises: 15% 2. Individual and group activities: 15% 3. Midterm exam: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Arnoldo Valle-Levinson (2022), Introduction to Estuarine Hydrodynamics, Cambridge University Press. 2. La Thi Cang (1996), Ocean Waves, HCM University of Natural Sciences Textbook Series. (Vietnamese) 3. La Thi Cang (2015), Dynamics Processes in Marine Ecosystems, HCM University Publishing House. (Vietnamese) 4. Pham Van Huan (2002), Ocean Dynamics - Part III: Tides, VNUHN Publishing. (Vietnamese) 5. Le Quang Toai (2009), Fundamentals of Oceanography, VNUHCM Publishing House.

	(Vietnamese) 6. S. R. Massel (2013), Ocean Surface Waves, World Scientific. 7. Open University Course Team (1989), Ocean Circulation, Butterworth-Heinemann. 8. USACE (2006), Coastal Engineering Manual (CEM) - Part II Coastal Hydrodynamics, Washington.

Module designation:	**Name: Coastal Processes** **Code: OMH10402**
Semester(s) in which the module is taught	Summer semester
Person responsible for the module	Dr. NGUYEN Cong Thanh Dr. LE Nguyen Hoa Tien
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides the basic and advanced knowledge of hydrodynamic and sediment dynamic processes in coastal zones which are the main driving factors of coastal evolutions, coastal morphological changes and shoreline changes. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of hydrodynamics processes including tide, wave, currents and sediment transport driving by these factors. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and interpret data of tide, wave, current and sediment transport in coastal zone. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Introduction to coastal zones and fundamental concepts

	2. Sediment characteristics 3. Long-term processes: long-term sea-level changes and vertical movements 4. Hydrodynamic processes in coastal zone: tide, wave, current, long-shore current 5. Sediment transport and morphological changes
Examination forms	1. Assignment: 35% 2. Individual activities: 10% 3. Midterm exam: 15% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Judith Bosboom and Marcel J.F. Stive (2022), Coastal Dynamics, Delft University of Technology, The Netherlands. 2. Robin Davidson-Arnott (2010), Introduction to Coastal Processes and Geomorphology, Cambridge University Press. 3. Dang Truong An (2018), Sediment transport, VN Publishing House (Vietnamese). 4. Dominic Reeve, Andrew Chadwick and Christopher Fleming (2014), Coastal Engineering: Processes, Theory and Design Practice, CRC Press. 5. Robert Dean and Robert Dalrymple (2004), COASTAL PROCESSES with engineering applications, Cambridge Press.

Module designation:	**Name: Dynamics of Atmospheric Environment** **Code: OMH10403**
Semester(s) in which the module is taught	Summer semester
Person responsible for the module	Assoc. Prof., Dr. LE Quang Toai Dr. LE Nguyen Hoa Tien
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 75 Contact hours: lecture: 15, exercise: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of atmospheric thermodynamics and the planetary boundary layer. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of dynamics of atmospheric environment in science and life. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the basic atmospheric phenomena from physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Basic concepts of atmospheric thermodynamics 2. The first law of thermodynamics and adiabatic processes 3. Water vapor in air 4. Static stability and the second law of thermodynamics

	5. Dynamics of the planetary boundary layer 6. Dynamics of the layer thin & closest to Earth's surface (thickness = 10 - 100m)
Examination forms	1. Assignment: 10% 2. Individual activities: 10% 3. Midterm exam: 30% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Wallace, J. M., Hobbs, P. V. (2006), Atmospheric Science - An Introductory Survey, Academic Press. 2. Laikhtman, D.L. (1970), Physics of the Boundary Layer of the Atmosphere, Hydrometeorological Publishing House, Leningrad (in Russian). 3. Garratt, J. K. (1992), The atmospheric boundary layer, Cambridge Univesity Press. 4. Sorbjan, Z. (1989), Structure of the atmospheric boundary layer, Prentice Hall.

Module designation:	**Name: Marine Eco-hydrology Dynamics** **Code: OMH10404**
Semester(s) in which the module is taught	Summer semester
Person responsible for the module	Dr. BUI Thi Ngoc Oanh Dr. DO Huu Hoang
Language	English
Teaching methods	Lecture, Discussion, Debate, Presentation, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides basic knowledge of marine ecology and chemistry and its affect to nature and human. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and assess the issue to aquatic ecology and environment. - Skills: Be able to work in individual, group work, self-study, and problem solving. - Competences: be able to know, solve the affect to aquatic system.
Content	1. Aquatic ecologic systems 2. Marine Chemistry
Examination forms	1. Assignment: 10% 2. Individual activities: 10% 3. Group activities: 10% 4. Midterm exam: 20% 5. Final exam: 50%

Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Thi Ngoc An (2008), Ecology and environment, Agriculture Publishing House 2. Doan Van Bo (2001), Methods of chemical analysis of sea water, VNUHN Publishing House 3. Jacques C. J. Nihoul (2017), Marine Interfaces Ecohydrodynamics, Elsevier 4. Open University Course Team, Ocean Chemistry and Deep-Sea Sediments, Pergamon.

Module designation:	**Name: Modeling Tools** **Code: OMH10407**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. DANG Truong An MSc. NGUYEN Hoang Phong MSc. NGUYEN Minh Giam
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 165 Contact hours: lecture: 15, practice: 60 Private study: 90
Credit points	3 Credits (5.5 ETCS Credits)
Module objectives/intended learning outcomes	These module objectives aim to equip students with the knowledge and skills necessary to effectively use modeling tools for various applications. By understanding different types of modeling tools, developing models, analyzing outputs, and integrating models into decision-making processes, students can enhance their ability to simulate, analyze, and optimize systems in diverse fields. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of data analysis and operating models in work. - Skills: Be able to work in individual, self-study, problem-solving. - Competences: Be able to explain, operate the basic characteristics of model and database. Have the ability to learn in the next stages.

Content	This module includes the following topics: 1. Introduction to modeling tools 2. Selection and evaluation of modeling tools 3. Simulation modeling (WRF, GENESIS, DELFT3D) 4. Visualization and interpretation of model outputs 5. Sensitivity analysis and model validation 6. Integration of models and decision support 7. Case studies and applications
Examination forms	1. Assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Pham Van Huan (2003), Calculation in Oceanology, VNU-HN Publishing (Vietnamese). 2. Richard E. Thomson, William J Emery (2009), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science (Vietnamese). 3. Steven A Hughes (1993), Physical Models and Laboratory Techniques In Coastal Engineering, World Scientific. 4. Bruce F. Rowell, Wendy L. Ryan (1996), Methods in introductory oceanography, McGraw-Hill. 5. Torsvik, T. (2013), Introduction to Computational Fluid Dynamics and Ocean Modelling, Springer International Publishing.

Module designation:	**Name: Integrated Coastal Zone Management** **Code: OMH10409**
Semester(s) in which the module is taught	Winter/Summer semester
Person responsible for the module	Assoc. Prof., Dr. VO Luong Hong Phuoc Dr. LE Dinh Mau
Language	English
Teaching methods	Proactivelecturing, brainstorming, Q&A, group discussion, seminar
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	The course aims to prepare students to become effective coastal managers, researchers, and advocates who can contribute to the sustainable management of coastal zones around the world. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the fundamental concepts and principles of Integrated Coastal Zone Management (ICZM); Comprehend the needs and solutions for regional ICZM in Vietnam; and Apply basic regional ICZM methods to carry out practical exercises and applications. - Skills: Be able to present the coastal zone management issues, work in individual, group work, self-study, lifelong learning, and problem solving. - Attitudes: Be able to apply knowledge to understand phenomena in the ocean; standards and ethical principles. - Behaviors: Demonstrate seriousness and honesty in learning, examinations

Content	This module includes the following topics: 1. Overview of Coastal Zones 2. Overview of Coastal Zone Management 3. Theoretical Issues in Coastal Zone Management 4. Coastal Zone Management in Vietnam 5. Specific Topics
Examination forms	1. Individual and group activities: 30% 3. Midterm exam (seminars): 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Einar Dahl, Josianne Støttrup (2012), Global Challenges in Integrated Coastal Zone Management, Wiley-Blackwell. 2. Meffe K. Gary et al. (2002), Ecosystem Management: adaptive, community-based conservation, Island Press, 3. Dao Manh Tien, Nguyen The Tuong, Nguyen Ba Dien (2011), Integrated Management and Zoning of Coastal Zones in Vietnam, Natural Science and Technology Publishing House (in Vietnamese). 4. Le Trinh (2000), Environmental Impact Assessment - Methods and Applications, Science and Technology Publishing House (in Vietnamese). 5. Institute of Oceanology (2011), Handbook for Reference - Natural Conditions, Environment, Economy, Society, and Integrated Management of Coastal Zones in the South Central Coast, Natural Science and Technology Publishing House (in Vietnamese). 6. Nguyen Thi Ngoc An (2004), Environmental Management and Natural Resource Management, Agriculture Publishing House (in Vietnamese). 7. Frank Ahlhorn (2018), Integrated Coastal Zone Management - Status, Challenges, and Prospects,

	Elsevier.

Module designation:	**Name: Coastal Processes Along the Mekong Delta** **Code: OMH10410**
Semester(s) in which the module is taught	Summer semester
Person responsible for the module	Dr. NGUYEN Cong Thanh
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	This module provides the basic and advanced knowledge of hydrodynamic and sediment dynamic processes in coastal zones which are the main driving factors of coastal evolutions, coastal morphological changes and shoreline changes along the coast of the Mekong Delta, Vietnam. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of hydrodynamics processes including tide, wave, currents and sediment transport driving by these factors. Particularly, the case studies are based on data and state -of-the-art published researches for the Mekong Delta coastal areas. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and interpret data of tide, wave, current and sediment transport in coastal zone of the Mekong Delta. Have the capacity to learning in the next periods.

Content	This module includes the following topics: 1. Introduction to coastal zones and fundamental concepts 2. Sediment characteristics 3. Long-term processes: long-term sea-level changes and vertical movements worldwide and in the Mekong Delta 4. Hydrodynamic processes in coastal zone: tide, wave, current, long-shore current in general and along the Mekong Delta 5. Up-to-date researches of sediment transport and morphological changes along the Mekong Delta coastal zone
Examination forms	1. Assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Judith Bosboom and Marcel J.F. Stive (2022), Coastal Dynamics, Delft University of Technology, The Netherlands 2. Robin Davidson-Arnott (2019), Introduction to Coastal Processes and Geomorphology, Cambridge University Press. 3. State-of-the-art published articles related to coastal processes in and along the Mekong Delta. 6. Dang Truong An (2018), Sediment transport, VNU Publishing House (Vietnamese). 7. Dominic Reeve, Andrew Chadwick and Christopher Fleming (2014), Coastal Engineering: Processes, Theory and Design Practice, CRC Press. 8. Robert Dean and Robert Dalrymple (2004), COASTAL PROCESSES with engineering applications, Cambridge Press.

Module designation:	**Name: Special subjects of natural risk and environmental assessment** **Code: OMH10411**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. BUI Thi Ngoc Oanh Dr. NGUYEN Cong Thanh
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Module objectives/intended learning outcomes	This module provides knowledge about natural disaster issues and its impact on socio-economic issues. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of natural disaster issues in life and science. - Skills: Be able to work in individual, self-study, problem-solving. - Competences: Be able to explain the basic characteristics of natural disasters and understand natural phenomena. Have the ability to learn in the next stages.

Content	This module includes the following topics: 1. Introduction to the network of scientific organisations and institutes for research and risk management of natural hazards 2. Concepts and classifications of natural hazards 3. Assess and manage risks from natural disasters
Examination forms	1. Assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ulrich Ranke (2016), Natural disaster risk management: geosciences and social responsibility, Springer International Publishing Switzerland. 2. Ben Wisner, Piers Blaikie, Terry Cannon and Ian David (1994), At risks: Natural hazards, people's vulnerability and disasters, Routledge.

Module designation:	**Name: Advanced Data Mining Techniques and Applications** **Code: OMH10412**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. NGUYEN Cong Thanh MSc. NGUYEN Hoang Phong
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	Students completing this course will be able to: + Make good use of a number of free specialized data sources + Applying exploited data in learning and scientific research + Improve professionalism and initiative in learning and research
Content	This course is an advanced module of data mining. The course provides students with knowledge and skills in collecting, analyzing, evaluating and applying data obtained from many different sources in oceanographic, meteorological and hydrological research.
Examination forms	1. Individual activities (Exercise and Practice): 55% 2. Final exam: 45%
Study and examination requirements	Minimum attendance at lectures is 80%

Reading list	1. Trauth, Martin H (2015), Data Analysis in Earth Sciences, Springer Berlin Heidelberg. 2. Nguyen Van Tuan (2015), Data analysis with R, Ho Chi Minh City General Publishing House. 3. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 4. Joseph F Hair, Ronald L Tatham, Rolph E Anderson (1990), Multivariate data analysis (2nd edition), Macmillan.

Module designation:	**Name: Application of Advanced Technology in Agro-Meteorology** **Code: OMH10413**
Semester(s) in which the module is taught	Winter semester
Person responsible for the module	Dr. DANG Truong An MSc. NGUYEN Minh Giam MSc. LAM Van Hao
Language	English
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 105 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Module objectives/intended learning outcomes	These module objectives aim to provide students with the knowledge and skills necessary to effectively utilize advanced technology in agro-meteorology for improved agricultural practices, climate resilience, and decision-making. By understanding remote sensing, weather forecasting, data assimilation, precision agriculture, and decision support systems, students can contribute to sustainable and efficient agricultural systems in the face of changing weather patterns and climate conditions. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the concepts and methods of agrometeorology and its role in sustainable agriculture. Identify and evaluate different sources and types of agrometeorological data and information, including in-situ, satellite, and modelled data.

	- Skills: Be able to apply appropriate techniques and tools for processing, analyzing and interpreting agrometeorological data and information. - Competences: Be able to apply simple crop models and forecasts to assess crop growth, yield, water use, pest and disease risk.
Content	This course introduces the principles and applications of advanced technology in agrometeorology, which is the study of weather and climate information for enhancing or expanding agricultural production and reducing environmental impacts. The course covers topics such as agrometeorological data acquisition, analysis, crop modelling, forecasting and early warning systems, mitigation solutions for climate variability and change. This module includes the following topics: 1. Introduction to agrometeorology 2. Basic meteorological factors affecting crop growth 3. Advanced instrumentation and data collection 4. Applications in crop modeling and forecasting 5. Internet of Things (IoT) in agro-meteorology 6. Drone technology in agro-meteorology 7. Recent advances and future directions
Examination forms	1. Assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. V Radha Krishna Murthy (2015), Basic Principles of Agricultural Meteorology, Bsp Books Pvt. Ltd. 2. Udaya Sekhar Nagothu. (2017), Smart Technologies for Sustainable Smallholder Agriculture: Upgrading in the Value Chain, Elsevier Publishing

	House 3. Harpal Singh (2017,) Principles and Applications of Climate Studies in Agriculture, Routledge Publishing House