BACHELOR OF SCIENCE IN OCEANOLOGY

MODULE HANDBOOK

BAA00003 - Ho Chi Minh 's Ideology 1
BAA00004 - General law 3
BAA00005 - Basic Economics 5
BAA00006 – Psychology 7
BAA00007 - Creative Methodology 9
BAA00011 - English 1 11
BAA00012 - English 2 13
BAA00013 - English 3 15
BAA00014 - English 4 17
BAA00021 - Gymnastics 1 19
BAA00022 - Gymnastics 2 21
BAA00101 - Marxist-Leninist Philosophy 23
BAA00102 - Marxist–Leninist Political Economy 25
BAA00103 - Scientific Socialism 27
BAA00104 - History of Vietnamese Communist Party 29
BIO00001 - Fundamental Biology 1 31
BIO00002 - Fundamental Biology 2 33
CHE00001 - General Chemistry 1 35
CHE00002 - General Chemistry 2 37
CSC00003 - Introduction to Informatics 39
ENV00001 - Fundamental of Environment Science 41
MTH00003 - Calculus 1B 42
MTH00004 - Calculus 2B 44
MTH00030 - Linear Algebra 46
MTH00040 - Probability and Statistics 48
MTH00081 - Calculus Laboratory 1B 50
PHY00001 - General Physics 1 (Mechanics - Thermodynamics) 52
PHY00002 - General Physics 2 (Electromagnetic - Optics) 54
PHY00081 - Labwork on General Physics 56
PHY10001 - Functions of a Complex Variable 58
OMH00001 - Introduction to Oceanology, Meteorology and Hydrology 60
OMH10001 - Computational Methods 62
OMH10002- Mathematical Methods for Physics 64
OMH10003 - Application Programming 66

OMH10004 - Fluid Mechanics 68
OMH10005 - General Astronomy 70
OMH10006 – Introduction to Oceanography 72
OMH10007 - Introduction to Meteorology 75
OMH10008 - Introduction to Hydrology 77
OMH10009 - Random Data Measurement and Analysis 79
OMH10010 - Introduction to Ocean-Atmosphere Interaction 81
OMH10011 - Introduction to Geophysical Fluid Dynamics 83
OMH10012 - Numerical Modeling for Geophysical Flows 85
OMH10013 - Methods of Data Mining 1 87
OMH10014 - Remote Sensing and GIS 90
OMH10015 - Practical Oceanography, Meteorology and Hydrology 92
OMH10016 - Environmental Pollution 94
OMH10017 - Data mining in Earth Science 96
OMH10101 - Physical Geography 98
OMH10102 - Introduction to Marine Geomorphology and Geology 100
OMH10103 - Introduction to Estuaries 102
OMH10104 - Oceanic Currents and Water Circulation 104
OMH10105 - Water Wave Mechanics 106
OMH10106 - Tides 108
OMH10107 - Special Topics in Oceanography 111
OMH10108 - Practical Oceanography 114
OMH10109 - Modelling Tools for Oceanographers 116
OMH10110 - Sediment Transport 118
OMH10111 - Chemical Oceanography 120
OMH10112 - Marine Ecosystem 122
OMH10113 - Physical Oceanography in The East Sea 124
OMH10114 - Marine Governance and Marine Economics 126
OMH10115 - Marine Physics 128
OMH10116 - Ocean Surface Waves 130
OMH10117 - Marine Environmental Resources and Climate Change 132
OMH10018 - Biogeochemical Cycles 134
OMH10119 - Data Mining Method 2 136
OMH10120 - Data Management and Analysis in Oceanology, Meteorology and Hydrology data 138

OMH10121 - Special Topics in Sea – Air Interaction 140
OMH10201 - Introduction to Thermodynamics of the Atmosphere 142
OMH10202 - An Introduction to Dynamics Meteorology 144
OMH10203 - Synoptic Meteorology 146
OMH10204 - Climatology and Climate in Vietnam 148
OMH10205 - Special Topics in Meteorology 150
OMH10206 - Practical Meteorology 152
OMH10207 - Modeling Tools in Meteorology 154
OMH10208 - Introduction to Boundary Layer Meteorology 156
OMH10209 - Numerical Prediction 158
OMH10210 - Agricultural Climate 160
OMH10211 - Aeronautical Meteorology 162
OMH10212 - Tropical Meteorology 164
OMH10213 - Weather Prediction by Numerical Methods 166
OMH10214 - Introduction to Ocean Climate and Air-Sea Interaction 168
OMH10215 - Microclimatology 170
OMH10216 - Statistical Methods in Climate 172
OMH10217 - Atmospheric Convection 174
OMH10218 - Data Analysis and Weather Prediction By Statistical Methods 176
OMH10301 - River Dynamics 178
OMH10302 - Hydraulic 180
OMH10303 - Watershed Hydrology 182
OMH10304 - Hydrological Topics 184
OMH10305 - Practical Hydrology 186
OMH10306 - Geography and Hydrogeology 188
OMH10307 - Estuarine Hydro-Ecology 190
OMH10308 - Hydrological Modelling Tools 192
OMH10309 - Hydrological Agriculture and Urban 194
OMH10310 - Computational Hydrology 196
OMH10311 - Prediction of Hydrology 198
OMH10312 - Hydrological and Hydrolics Models 200
OMH10313 - Hydrologic Measurement 202
OMH10314 - Environmental Hydrology 204
OMH10315 - River Engineering 206

OMH10316 - Management of Water Resources 208
OMH10401 - Dynamics of Marine Environment 210
OMH10402 - Coastal Processes 213
OMH10403 - Dynamics of Atmospheric Environment 215
OMH10404 - Marine Eco-hydrology Dynamics 217
OMH10405 - Special Topics in Oceanology, Meteorology, and Hydrology 219
OMH10406 - Practical Majors 221
OMH10407 - Modelling Tools 223
OMH10408 - Weather Forecast 225
OMH10409 - Integrated Coastal Zone Management 227
OMH10410 - Coastal Processes Along the Mekong Delta 229
OMH10411 - Special subjects of natural risk and environmental assessment 231
OMH10412 - Advanced Data Mining Techniques And Applications 233
OMH10413 - Application of Advanced Technology in Agro-Meteorology 235

Module designation:	**Name: Ho Chi Minh 's Ideology** **Code: BAA00003**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	PHAN Thi Cam Lai
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Knowledge: Equip students with basic knowledge about the concept, origin, the process of formation and development of Ho Chi Minh thought; the basic contents of Ho Chi Minh's thought; the application of the Communist Party of Vietnam in the national-democratic revolution and the socialist revolution, in the current national renewal process. - Skills: Helping students to think, analyze, evaluate, and creatively apply Ho Chi Minh's Thoughts to solve problems in real life, study and work. - Attitudes: Helping students improve their political bravery, patriotism, loyalty to the goal, the ideal of national independence associated with socialism; aware of the role and value of Ho Chi Minh's thought for the Vietnamese Party and nation; realize their responsibility in studying and training to contribute to the construction and defense of the country.

Content	The subject equips students with basic knowledge about objects, research methods, and learning meanings of Ho Chi Minh's ideology; on the basis, of the process of formation and development of Ho Chi Minh thought; on national independence and socialism; on the Communist Party and the State of Vietnam; on great national and international solidarity; about culture, ethics, people.
Examination forms	- Presentation: 15% - Midterm exam: 20% - Discussion: 15% - End semester exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ministry of Education and Training (2019), Textbook of Ho Chi Minh Ideological, National Political Publishing House. 2. Faculty of Politics and Administration - VNU-HCM, Study Guide for Ho Chi Minh Ideological.

Module designation:	**Name: General law** **Code: BAA00004**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	TRAN Xuan Thien An
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	By the end of the course, students will be able to understand the basic legal concepts and terms related to the country's legal system and state apparatus; apply legal provisions to solve some simple case studies; help students form and develop some skills such as looking up legal documents, analyzing legal regulations, and working in groups, thereby improving their sense of survival, learning and working following the Constitution and the law, the right behavior orientation in life. Students who complete this module could be achieved the following: - Knowledge: Present basic legal concepts and terms related to the state apparatus and the Vietnamese legal system; Solve some exercise cases based on the provisions of a law book in the legal system of Vietnam; - Skills: Analyzing legal regulations; Lookup legal documents; Working group. - Attitude, diligence: Raise awareness of living, studying, and working following the Constitution and the law.

Content	The module provides knowledge about the structure of the State apparatus as well as the functions, authority, and legal status of agencies in the State apparatus of the Socialist Republic of Vietnam in terms of economic management; Legal nature, and structure of the system of legal documents. From an overview of the system of legal branches in our State's legal system, a course is devoted to studying the basic contents of administrative law, civil law, and criminal law as branches of law. the main law (original branches of law) of the legal system, so that learners can easily access themselves to other branches of law arising from these major branches of law.
Examination forms	- Progress Test: 10% - Discussion, exercise, practice: 10% - Attendance: 10% - Mid term exam: 20% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ho Chi Minh City University of Law (2014), Textbook of General Law. 2. Hanoi University of Law (2013), Textbook of Theory of State and Law.

Module designation:	**Name: Basic Economics** **Code: BAA00005**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	LE Nhan My
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	• **Knowledge:** Grasp the basic content of Microeconomics - a part of economics: - Understand the theory of economic choice, the influence of the law of scarcity, and economic models on economic choice. - Understand the theory of supply and demand. - Understand the theory of consumer behavior. - Understand the theory of producer behavior. - Understand the theory of competition and monopoly. - Understand the theory of factor markets. - Understand the theory of the role of government. - Understand the analysis of the influence of factors on the balance of the market. • **Skills:** - Having the ability to apply the knowledge learned to study the nature of economic phenomena, the laws, and trends of the phenomena, and the laws of the market economy. - Ability to apply the knowledge learned in the study of macroeconomics, development economics, and several

	other economic subjects. - Forming and developing (one step) capacity to collect information, skills to synthesize and systematize issues in an overall relationship; skills to compare, analyze, comment, and evaluate micro-economic issues. - Develop reasoning and public speaking skills. • **Attitude:** Trying to be righteous in recognizing and evaluating the lines, policies, and laws of the State of Vietnam in the development of the market economy with the state's regulation. • **Other Objectives**: Through presentations and problem-solving. - Forming and developing collaboration and teamwork skills: - Develop skills of creative thinking, discovery, and discovery; - Cultivate and develop assessment and self-assessment capacity; - Develop public speaking and commenting skills.
Content	The course presents some basic problems of economics; principles of economics, supply and demand patterns and market equilibrium; theory of consumer behavior and business behavior; types of markets; aggregate supply, aggregate demand, and measure national output.
Examination forms	- Exercise: 20% - Midterm exam: 20% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Mankiw, N.G. (2003), Principles of economics (2nd edition), NewYork: Worth Publisher. 2. Duong Tin Diep (2001), Macroeconomics, Statistics Publishing House.

Module designation:	**Name: Psychology** **Code: BAA00006**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	TRAN Huong Thao
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** - Understand the system of basic concepts of psychological science and research methods in psychology. - Understand the origin, formation and development of psychology and consciousness. - Understand the nature of human psychological processes: perception; emotion - affection; act. - Identify human psychological states. - Understand the psychological attributes that make up the personality structure. Understand the factors affecting the formation and development of personality. **Skills:** - Developing the capacity to study documents: Analyze, synthesize, compare, and generalize. - Form and develop the ability to identify psychological phenomena and apply learned knowledge to solve practical problems. - Consulting and consulting skills. **Attitude:** - Cultivate a passion for learning and studying subjects.

	- Forming a sense of initiative and positivity in self-study. - Form the right motivation in learning. - Raise a sense of responsibility for group activities. **Other goals:** - Forming personality qualities in accordance with the requirements of the integration period. - Forming communication and behavioral skills in the community. - Forming a modern and scientific way of living and working. - Forming and developing the ability to think creatively, independently and critically. - Skill formation: Reasoning skills; Public speaking skills; - Form and develop teamwork skills.
Content	The course of general psychology helps learners to acquire basic knowledge about the nature and characteristics of psychological phenomena and basic psychological laws of humans (perception, emotion, will, etc.) actions and personalities...). On that basis, it helps learners to apply knowledge in practice to identify and distinguish basic psychological phenomena in humans.
Examination forms	- Individual exercises: 15% - Group exercises: 15% - Mid term exam: 20% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Dang Thanh Nga (2006), General psychology textbook, People's Public Security Publishing House. 2. Nguyen Quang Uan (2005), General psychology textbook, Hanoi University of Education Publishing House.

Module designation:	**Name: Creative Methodology** **Code: BAA00007**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	VUONG Huynh Minh Triet
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Provide a system of ways of looking at things - Increase observation, curiosity, creativity - Analyze and logically explain existing creative solutions - Increase the agility of absorbing and assessing the value of information - See the unified similarity between seemingly very different systems - Overcoming psychological inertia - Helps to discover available reserves in the system, especially free and easy to use heavenly reserves - Give and choose an appropriate approach to solve the problem - Play out ideas for improving a given system - Forecasting the development trend of a given system in the future - Help detect, place and select problems to be solved - Used to practice developing creative imagination - Used to improve yourself, build your style, think and work scientifically and creatively

	- Contributing to building system-dialectical thinking
Content	- Introduction - Natural methods of problem-solving and decision making - Some scientific and technical knowledge is the basis of the subject - Some basic creative tricks - Methods of activating creative thinking - Rules of system development
Examination forms	- Exercise: 20% - Mid term exam: 30% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Phan Dung (2010), Introduction: Methodology of Creativity and Innovation, Youth Publishing House. 2. Phan Dung (2010), The world inside the creative person, Youth Publishing House. 3. Phan Dung (2000), Logical, Dialectical and Systematic Thinking, Youth Publishing House.

Module designation:	**Name: English 1** **Code: BAA00011**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	TRUONG Thi Huynh Nhu
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Role-plays
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)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students will enhance their basic knowledge of general English of vocabulary and grammar in four skills: Listening, Speaking, Reading and Writing. Here are the objectives in detail: - Student will be able to understand and use vocabulary in various topics such as leisure activities, important life events, emotion, attitude, physical appearance description, travel plans, presenting dreams, countries, people, and languages. - Student can understand and use grammar structures at the pre-intermediate level such as basic tenses and other related matters. - Student will be able to choose the answer that best describes the given picture, choose the correct response to the questions, and understand dialogues and short monologues. - Student will be able to pronounce single words, word clusters and sentences, describe a given picture, and build basic communications in daily life. - Student will be able to comprehend 300-500 word passage of familiar topics, and gain more knowledge of

	different cultures around the world. - Student can write essays about familiar topics related to daily life, learning activities, entertainment, events …
Content	- Leisure and lifestyle - Important firsts - At rest, at work - Special occasions - Appearance - Time off - Ambitious dreams - Countries and cultures
Examination forms	- Exercise, Activities: 25% - Mid term exam: 25% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: student's book, Harlow: Pearson Education. 2. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: workbook, Harlow: Pearson Education.

Module designation:	**Name: English 2** **Code: BAA00012**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	TRUONG Thi Tuyet Hanh
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Role-plays
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)
Requirements and recommended prerequisites for joining the module	BAA00011 - English 1
Module objectives/intended learning outcomes	Student will enhance their basic knowledge of general English of vocabulary and grammar in four skills: Listening, Speaking, Reading and Writing. Here are the objectives in detail: - Student will be able to understand and use vocabulary in various topics such as everyday items, important life events, holiday plans, health problems, hobbies and interests, personalities, finance- related issues. - Student can understand and use grammar structures in pre-intermediate level such as basic tenses and more complex grammatical structures including conditional sentences, passive, and verb patterns. - Student will be able to choose the correct response for the questions and understand dialogues and short monologues. - Student will be able to pronounce words, generate short conversations, discuss real-life familiar topics, understand and quickly respond to generated questions, and improve basic communication skills in daily life. - Student will be able to comprehend 500-700 word passages of familiar topics, and gain more knowledge of

	different cultures around the world. - Student can write appropriate responses to written requests or complaints in business and social contexts, applying theories into real life practice.
Content	- Old and new - Take care! - The best thing in life - Got to have it! - Choosing the right person - Money, Money, Money - Imagine
Examination forms	- Exercise, Activities: 25% - Mid term exam: 25% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: student's book, Harlow: Pearson Education. 2. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: workbook, Harlow: Pearson Education.

Module designation:	**Name: English 3** **Code: BAA00013**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	LE Tran Thuc
Language	English
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Role-plays
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)
Requirements and recommended prerequisites for joining the module	BAA00012 - English 2
Module objectives/intended learning outcomes	Student will enhance their basic knowledge of general English of vocabulary and grammar in four skills: Listening, Speaking, Reading and Writing. Here are the objectives in detail: - Student will be able to understand and use vocabulary in various topics such as leisure activities, important life events, emotion, attitude, physical appearance description, travel plans, dreams, countries, people, and languages. - Student can understand and use new language in a natural, communicative way. - Student will be able to present their opinions about some social and cultural issues and understand dialogues and talks. - Student will be able to comprehend 500-700 word passages of familiar topics, and gain more knowledge of different cultures around the world. - Student can write paragraphs about familiar topics related to daily life, learning activities, entertainment, events, etc.

Content	- All about you - Memory - Around the world - Life stories - Success - In the media
Examination forms	- Exercise, Activities: 25% - Mid term exam: 25% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: student's book, Harlow: Pearson Education. 2. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: workbook, Harlow: Pearson Education.

Module designation:	**Name: English 4** **Code: BAA00014**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	NGUYEN Thi Bich Phuong
Language	English
Relation to curriculum	Compulsory
Teaching methods	Discussion, Debate, Role-plays
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)
Requirements and recommended prerequisites for joining the module	BAA00013 - English 3
Module objectives/intended learning outcomes	Student will enhance their intermediate knowledge of general English of vocabulary and grammar in four skills: Listening, Speaking, Reading and Writing. Here are the objectives in detail: - Student can understand and use the language needed in more complex real-life situations in a natural, communicative way. - Student will be able to express their own ideas in interviews, mini-talks, problem-solving and story¬telling. - Student will be able to comprehend 700-1000 word passages of up-to-date topics of international interest, and learn more about the world and other cultures. - Student can write essays about familiar topics related to daily life, learning activities, entertainment, events, etc.
Content	- Socialising - Things you can't live without - Future society - An amazing story - Rules and freedom - Dilemmas

Examination forms	- Exercise, Activities: 25% - Mid term exam: 25% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: student's book, Harlow: Pearson Education. 2. Sarah Cunningham, Peter Moor, Jane Comyns Carr (2005), New Cutting Edge, pre-intermediate: workbook, Harlow: Pearson Education.

Module designation:	**Name: Gymnastics 1** **Code: BAA00021**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	CAO Hong Chau
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Practice
Workload (incl. contact hours, self-study hours)	Total workload: 75 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** - Knowledge of injury prevention, hygiene in physical education and sports training - Understanding the role of physical education and sports training in human health **Skills:** - Basic practical skills and the ability to apply techniques and tactics in the training and competition of some sports - Knowledge of some rules, how to organize competitions, first aid skills and hygiene in physical education and sports training - Communication, teamwork and coordination skills **Competence and Attitude:** - Applying the knowledge of sports learned to practice every day - Applying the knowledge of sports learned to practice every day - Always have a sense of responsibility for learning, have a progressive spirit

Content	**General knowledge:** - Brief history of the development of physical education and sports - Effects of physical education and sports training on body development - The role of physical education and sports in comprehensive education - Injuries in physical education and sports and preventive measures - A brief history of the development and effects of exercises of a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) **Motor skills:** - Techniques for practicing a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) - Exercises to develop general and professional strength
Examination forms	- Attendance: 10% - Midterm exam: 30% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Hoang Ha, Tran Nam Giao, Nguyen Thi Le Hang, Pham Kim Dien (2010), Textbook of Physical Education Volume 1. 2. Phan Thanh My, Nguyen Minh Man (2010), Textbook of Physical Education Volume 2. 2. Duong Van Hien, Nguyen Chi Cuong, Pham Cho, Cao Hong Chau, Nguyen Huu Quy (2010), Textbook of Physical Education Volume 3. 3. Luu Quang Hiep, Le Duc Chuong, Vu Chung Thuy, Le Huu Hung (2000), Sports medicine, Sports Publishing House.

Module designation:	**Name: Gymnastics 2** **Code: BAA00022**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	NGUYEN Chi Cuong NGUYEN Minh Man
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Practice
Workload (incl. contact hours, self-study hours)	Total workload: 75 Contact hours: lecture: 15, practice:30 Private study: 30
Credit points	2 Credits (3.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** - Knowledge of injury prevention, hygiene in physical education and sports training - Understanding the role of physical education and sports training in human health **Skills:** - Basic practical skills and the ability to apply techniques and tactics in the training and competition of some sports - Knowledge of some rules, how to organize competitions, first aid skills and hygiene in physical education and sports training - Communication, teamwork and coordination skills **Competence and Attitude:** - Applying the knowledge of sports learned to practice every day - Applying the knowledge of sports learned to practice every day - Always have a sense of responsibility for learning, have a progressive spirit

Content	**General knowledge:** - Principles and methods of physical education and sports training - Rules of competition for a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) - A brief introduction to the tactics of a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) - Methods of organizing competitions and refereeing for a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) **Motor skills:** - Techniques for practicing a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) - Methods of organizing competitions and refereeing for a specific sport (football, volleyball, basketball, table tennis, tennis, badminton, martial arts, aerobics, swimming, chess) - Exercises to develop general and professional strength
Examination forms	- Attendance: 10% - Midterm exam: 30% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Hoang ha, Tran Nam Giao, Nguyen Thi Le Hang, Pham Kim Dien (2010), Textbook of Physical Education Volume 1. 2. Phan Thanh My, Nguyen Minh Man (2010), Textbook of Physical Education Volume 2. 2. Duong Van Hien, Nguyen Chi Cuong, Pham Cho, Cao Hong Chau, Nguyen Huu Quy (2010), Textbook of Physical Education Volume 3. 3. Luu Quang Hiep, Le Duc Chuong, Vu Chung Thuy, Le Huu Hung (2000), Sports medicine, Sports Publishing House.

Module designation:	**Name: Marxist-Leninist Philosophy** **Code: BAA00101**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	GIANG Thi Truc Mai
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Group activities
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- The course equips students with the basic contents of the worldview and the Marxist-Leninist philosophical methodology. - Helping students apply knowledge about the worldview, Marxist-Leninist philosophy, and philosophy creatively in cognitive and practical activities, to solve problems that the social life of a country or of the time being set.
Content	- Introduction - Philosophy and its role in social life - Dialectical Materialism - Historical Materialism
Examination forms	- Group presentation: 15% - Midterm exam: 20% - Discussion: 15% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ministry of Education and Training (2012), Textbook of basic principles of Marxism-Leninism, National Political

	Publishing House of Vietnam. 2. Ministry of Education and Training (2019), Textbook of Marxist-Leninist Philosophy, National Political Publishing House of Vietnam.

Module designation:	**Name: Marxist–Leninist Political Economy** **Code: BAA00102**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	GIANG Thi Truc Mai
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	BAA00101 - Marxist-Leninist Philosophy
Module objectives/intended learning outcomes	Firstly, equip students with basic and core knowledge of Marxist-Leninist political economy in the context of economic development of the country and the world today. Ensure the basic, systematic, scientific, update new knowledge, associate with practice, creativity, skills, thinking, learner quality, connectivity to overcome duplication, enhance integration and reduce the load, reduce content that is no longer relevant or scholastic content for students of non-theoretical colleges and universities. Second, on that basis, forming thinking and analytical skills, assessing and identifying the nature of economic benefit relations in the country's socio-economic development, contributing to helping students build appropriate social responsibility in the job position and life after graduation. Third, contribute to building the stance and ideology of Marxism-Leninism towards students.

Content	- Objects, research methods and functions of the Marxist-Leninist political economy - Commodities, markets and the role of market participants - Surplus value in a market economy - Competition and Monopoly in a Market Economy - Socialist-oriented market economy and economic interests in Vietnam - Vietnam's industrialization, modernization and international economic integration
Examination forms	- Group presentation: 15% - Midterm exam: 20% - Discussion: 15% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	Mac-Leninist political economy textbook for undergraduates who are not majoring in political economy.

Module designation:	**Name: Scientific Socialism** **Code: BAA00103**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	GIANG Thi Truc Mai
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	BAA00101 - Marxist-Leninist Philosophy BAA00102 - Marxist–Leninist Political Economy
Module objectives/intended learning outcomes	The subject equips students with the basic contents of scientific socialism (one of the three components constituting Marxism-Leninism). Helping students apply basic knowledge of scientific socialism creatively in cognitive and practical activities, solving problems that the social life of a country, of the times being set.
Content	- Introduction - Introduction to Scientific Socialism - The historical mission of the working class - Socialism and the transition to socialism - Socialist democracy and the socialist state - Class social structure and class and class alliances in the transition to socialism - Ethnic and religious issues in the transition to socialism - The problem of the family during the transition to socialism
Examination forms	- Group Presentation: 15% - Midterm exam: 20%

	- Discussion: 15% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ministry of Education and Training (2019), Textbook of Scientific Socialism, National Political Publishing House of Vietnam. 2. Ministry of Education and Training (2012), The Basic Principles of Marxism-Leninism, National Political Publishing House of Vietnam

Module designation:	**Name: History of Vietnamese Communist Party** **Code: BAA00104**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	QUACH Thi Minh Trang
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Students know the systematic and basic knowledge about the birth of the Communist Party of Vietnam (1920-1930), the Party's leadership over the Vietnamese revolution during the period of political struggle. government authority (1930-1945), in two resistance wars against French colonialism and American imperialism (1945-1975), in the cause of national construction and defence during the country's transition to socialism. association, conducting the renovation work (1975-2018). - Through historical events and experiences on the leadership of the Party, students know how to build a sense of respect for objective truths, raise pride and confidence in the Party's leadership. - Students know how to scientific thinking methods on history, skills in choosing research materials, studying subjects and the ability to apply historical awareness to practical work, criticising misconceptions on the history of the Party.

Content	- Introduction - The Communist Party of Vietnam was born and led the struggle for power (1930-1945) (12 hours) - The Party led two resistance wars, completed national liberation and reunification (1945-1975) - The Party led the country in the transition to socialism and carried out the doi moi (1975-2018)
Examination forms	- Group Presentation: 15% - Midterm exam: 20% - Discussion: 15% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	Ministry of Education and Training (2012), Subject program of History of Vietnamese Communist Party.

Module designation:	**Name: Fundamental Biology 1** **Code: BIO00001**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	VO Thi Phi Giao
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Students are able to understand the basic concepts of biology and methods of studying life. - Students are able to explain the chemical basis of life. - Students are able to distinguish the structure and explain the function of cells, biological membranes, and organelles. - Students are able to be understanding the basis and mechanism of heredity and variation - Students are able to know some application techniques of modern genetic engineering. - Students are able to understand the concepts and mechanisms of speciation, evolution, and diversity in organisms.
Content	- Introduction - The chemical basis of Life - Cells - Heredity - Evolution Mechanism
Examination forms	- Attendance: 5% - Exercise: 25%

	- Mid term exam: 20% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Bui Trang Viet (2012), Cell biology, VNUHCM Publishing House. 2. Pham Thanh Ho (2011), General biology: Cellology, Genetics and Evolutionary Theory, VNUHCM Publishing House.

Module designation:	**Name: Fundamental Biology 2** **Code: BIO00002**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	VO Thi Phi Giao
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Students are able to know and demonstrate basic knowledge of plant morphology. - Students are able to know and describe the basic functional processes of plants in the life cycle. - Students are able to know and present basic knowledge about animal morphology. - Students are able to know and describe the basic functional processes of animals in the life cycle. - Students are able to understand and present basic knowledge of ecology. - Students are able to understand and present the meaning of biodiversity and the role of biodiversity conservation for Vietnam and the world.
Content	- Plant Morphology and Function - Animal Morphology and Function - Ecology
Examination forms	- Attendance: 5% - Exercise: 25% - Mid term exam: 20%

	- Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Duong Huu Thoi (1998), Basis of ecology, VNUHN Publishing House. 2. Stiling P. D. (2002), Ecology: Theories and Applications (4th edition), Prentice-Hall Inc.

Module designation:	**Name: General Chemistry 1** **Code: CHE00001**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	DOAN Le Hoang Tan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture: 30, execise: 30 Private study: 90
Credit points	3 Credits (5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Describe the structure of atoms and molecules - Explain periodic changes in some properties of chemical elements - Identify and distinguish basic types of chemical bonds - Identify and explain the relationship between the fundamental forces of interaction in matter and the physical properties of matter
Content	The course deals with the theoretical foundations of Chemistry related to the basic models of the atomic structure, the periodic changes in the properties of chemical elements, the fundamental forces of interaction in matter, and the influence of chemical elements. their influence on the properties of matter in the solid, liquid, and gaseous states.
Examination forms	- Attendance: 5% - Exercises: 10% - Mid term exam: 25% - Final exam: 60%

Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Dinh Chi (2007), General chemistry, Education Publishing House. 2. Nguyen Dinh Soa (2000), General chemistry, VNUHCM Publishing House. 3. Petrucci, R.H; Harwood, W.S; Herring, F.G (2002), General Chemistry (8th Ed), Prentice Hall.

Module designation:	**Name: General Chemistry 2** **Code: CHE00002**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	NGUYEN Tuyet Phuong
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 150 Contact hours: lecture: 30, exercise:30 Private study: 90
Credit points	3 Credits (5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Students are able to calculate the thermal effects associated with chemical and physical changes - Students are able to determine the conditions for the reaction to occur naturally and for stoichiometry; students are able to analyse and calculate the factors affecting chemical balance. - Students are able to set up the velocity expression and calculate the factors affecting the speed. - Students are able to identify equilibria in the solution. Calculate the pH of solutions. - Students are able to calculate the electromotive force of electrochemical battery systems and predict the direction of redox reactions. Students are able to describe and explain the natural processes of corrosion.
Content	- Thermochemistry, energy exchange, and chemical transformation - Thermodynamics: entropy, free energy, and direction of Chemical Reaction - Chemical equilibrium - Chemical kinetics: rate and mechanism of chemical

	reactions - Solution and colloidal solution - Acid-base balance - Ion balance in solution - Electrochemistry
Examination forms	- Attendance: 5% - Exercises: 10% - Mid term exam: 25% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Martin S. Silberberg (2000), Chemistry, The Molecular Nature of Matter and Change (2nd edition), McGraw-Hill Higher Education. 2. Raymond Chang (2006), Chemistry (5th edition), McGrawHill.

Module designation:	**Name: Introduction to Informatics** **Code: CSC00003**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	- Students have the general knowledge of computers as well as the fundamentals of working with the Windows operating system and Internet services. - Students have the ability to working with common software on computers. - Students have the ability to prepare text, presentation and data calculation with calculators. - Students can build electronic information pages.
Content	- Basic understanding of information technology - Basic computer usage - Basic Microsoft Word - Basic Microsoft PowerPoint - Basic Microsoft Excel - Internet usage - Web image processing - Web design with HTML & CSS3
Examination forms	- Attendance: 10% - Exercise: 10% - Midterm exam: 30%

	- Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80% Full attendance in practical, on time.
Reading list	1. Microsoft Office MOS Document, IIG Vietnam. 2. IC3 Spark Document, IIG Vietnam.

Module designation:	**Name: Fundamental of Environment Science** **Code: ENV00001**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	LE Ngoc Tuan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Group activities
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students are able to: - Knowledge: Understand the basic concepts of environment and natural resources, environment issues in the world and Vietnam. Have positive attitude about the interaction between people and the environment. - Competences: to improve personal skills and attitudes and communication skills;
Content	- Introduction on environmental concepts - Natural resources - Human impact on the environment - Sustainable development - Environmental management and Environmental Education
Examination forms	- Team works: 20% - Mid-term exam: 30% - Final exam: 50%
Study and examination requirements	Students must attend at least 80% of the lectures to sit for the final test
Reading list	Le Van Khoa (2004), Environmental Science, The Education Publisher.

Module designation:	**Name: Calculus 1B** **Code: MTH00003**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	NGUYEN Van Thuy
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Introduction to Calculus, with two major contents of differential and integral calculus. - Knowledge: visual, quantitative, conceptual understanding of essential definitions, theorems, and properties in calculus - Skills: understanding of concepts, ability of using calculus in practical problems, ability to solve calculus problems, ability to use computer computation softwares - Attitude: diligence
Content	The course provides basic knowledge of calculus for non-majors, including IT, physics, electronics and telecommunications, material science, oceanology, meteorology and hydrology, ..., helping students to acquire necessary background for professional study. Content includes real numbers, sequences and series of numbers, continuity, convergence, derivative, Riemannian integral of functions of one real variable.
Examination forms	- Exercise: 25% - Midterm exam: 25% - Final exam: 50%

Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. J. Stewart (2012), Calculus, Brooks/Cole Cenage Learning. 2. Duong Minh Duc (2006), Textbook of Calculus 1, Ho Chi Minh City Statistics Publishing House. 3. K.A. Stroud and D.J. Booth (2001), Advanced Engineering Mathematics, Palgrave Macmillan.

Module designation:	**Name: Calculus 2B** **Code: MTH00004**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	NGUYEN Thi Hoai Thuong
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Introduction to Calculus, with two major contents of differential and integral calculus of functions of several variables. - Knowledge: visual, quantitative, conceptual understanding of essential definitions, theorems, and properties in calculus - Skills: understanding of concepts, ability of using calculus in practical problems, ability to solve calculus problems, ability to use computer computation softwares - Attitude: diligence, ask questions
Content	The course provides basic knowledge of calculus for non-majors, including IT, physics, electronics and telecommunications, material science, oceanology, meteorology and hydrology, ... , helping students to acquire necessary background for professional study. Content includes: The set of R^n, functions of several real variables, continuity, partial derivatives, extrema, multiple integrals, line integrals, Green theorem, surface integrals, Stokes and Gauss–Ostrogradski theorem, differential equations.
Examination forms	- Exercise: 25%

	- Midterm exam: 25% - Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. J. Stewart (2012), Calculus, Brooks/Cole Cenage Learning. 2. Duong Minh Duc (2006), Textbook of Calculus 1, Ho Chi Minh City Statistics Publishing House. 3. K.A. Stroud and D.J. Booth (2001), Advanced Engineering Mathematics, Palgrave Macmillan.

Module designation:	**Name: Linear Algebra** **Code: MTH00030**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	NGUYEN Kim Ngoc
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Introduction to higher mathematics. - Knowledge: solid grasp of knowledge on matrices on number fields and applications to solving systems of linear equations; determinants and applications; vector spaces and linear maps. - Skills: computation on matrices; solving systems of linear equations; computing coordinates of vectors in a linear basis; change of coordinates following change of bases; presentation of linear operators by matrices; computing images and kernels of linear operators; using MAPLE computation software. - Attitude: diligence, participating in discussions
Content	The course leads first year students to higher mathematics. Aside from fundamental knowledge for all students, the course lays foundation for later study for all majors.
Examination forms	- Assignment: 10% - Midterm exam: 20% - Final exam: 70%

Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Bui Xuan Hai, Tran Ngoc Hoi, Trinh Thanh Deo, Le Van Luyen (2009), Linear Algebra and Its Applications, Volume 1, VNUHCM Publishing House. 2. Ngo Viet Trung (2001), Textbook of Linear Algebra, VNUHCM Publishing House.

Module designation:	**Name: Probability and Statistics** **Code: MTH00040**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	NGUYEN Thi Hien
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course provides basic knowledge of the theory of probability and mathematical statistics. The theory of probability studies random phenomena, while the theory of mathematical statistics proposes general models and statistical decisions. - Knowledge: the course provides the most basic knowledge and notions of probability and statistics to be background knowledge for later courses. - Skills: employs probability and statistics to solve some real-world problems related to analysis and presentation of data. - Attitude: the course helps students acquire initial knowledge of probability and statistics, and recognition of the role of probability and statistics in science and in life, from which an enthusiasm for science can be formed, then a serious and proactive attitude in study.

Content	- Combinatorics - Probability Basics - Random Variables - Descriptive Statistics - Hypothesis testing - Regression and correlation
Examination forms	- Attendance: 10% - Exercise: 10% - Midterm exam: 20% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Thi Mong Ngoc (2018), Probability Statistics, VNUHCM Publishing House. 2. Dang Duc Trong (2016), Statistical theory, VNUHCM Publishing House.

Module designation:	**Name: Calculus Laboratory 1B** **Code: MTH00081**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	NGUYEN Van Thuy
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, Practice
Workload (incl. contact hours, self-study hours)	Total workload: 60 Contact hours: practice: 30 Private study: 30
Credit points	1 Credits (2 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students are guided through exercises on differential calculus and integral calculus of functions of one variable, in order to understand and apply these concepts. Knowledge: Students practice calculating problems to understand and apply definitions, theorems and properties in calculus. Skills: understand and do exercises in applied calculus in practical problems, solve calculus problems, know how to use calculation software. Attitude and Diligence: Students need to fully participate in class hours, be able to ask questions they don't understand, and answer questions and assignments from lecturers.
Content	The subject plays the role of providing basic knowledge of differential mathematics for the fields of Information Technology, Electronics and Telecommunications, Physics, Oceanology, Meteorology and Hydrology, Materials Science to help students have a background Math foundation for specialized subjects. Knowledge will equip students: Sets of real numbers, Sequences and series of real numbers, Continuity, Limits, Derivatives and Reimann integrals of one-variable real

	functions, Differential equations, Matlab applications for calculation calculus.
Examination forms	- Attendance: 10% - Assignment: 30% - Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. J. Stewart (2012), Calculus, Brooks/Cole Cenage Learning. 2. Duong Minh Duc (2006), Textbook of Calculus 1, Ho Chi Minh City Statistics Publishing House. 3. K.A. Stroud and D.J. Booth (2001), Advanced Engineering Mathematics, Palgrave Macmillan.

Module designation:	**Name: General Physics 1 (Mechanics - Thermodynamics)** **Code: PHY00001**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	NGUYEN Duy Thong
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Group activities
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers the principles of kinematics, dynamics, statics, work, energy, linear momentum, gravitation, and thermodynamics. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply laws of mechanics to explain physical phenomena and solve problems; Be able to understand and apply mechanisms of heat transfer, equations of state, the first and the second law of thermodynamics. - Skills: Be able to work at individual level and group work. - Competences: Ability to apply mechanics and thermodynamics knowledge to analyze physical situations. - Attitude: Honest
Content	1. Physics and measurement 2. Kinematics of particles 3. Force and Newton's laws 4. Conservation laws in classical mechanics 5. Kinetics of rigid bodies

	6. The ideal gas 7. The first law of thermodynamics 8. The first law of thermodynamics
Examination forms	1. Assignment = 10% 2. Quizzes and Projects (teamwork) = 10% 3. Midterm exam = 30% 4. Final exam = 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Nhat Khanh (2005), Mechanics and thermodynamics lectures, VNUHCM Publishing House, Vietnam. 2. Nguyen Thanh Van (2013), General Physics 1, VNUHCM Publishing House, Vietnam. 3. Raymond A. Serway, John W. Jewett, Sr, (2014), Physics for Scientists and Engineers with Modern Physics, Brooks/Cole Publishing Company, USA. 4. Alan Giambattista, Betty McCarthy Richardson, Robert C. Richardson, (2010), Physics, McGrawHill Companies, Inc, USA.

Module designation:	**Name: General Physics 2 (Electromagnetic - Optics)** **Code: PHY00002**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	LE Van Anh Cuong
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	Calculus 1B, General physics 1
Module objectives/intended learning outcomes	This module provides basic knowledge of electric and magnetic fields and thereby an understanding of the laws and phenomena of light optics. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of electromagnetism and optics in science and life. - Skills: Be able to work at individual level and teamwork. - Competences: Ability to apply electromagnetism and optics knowledge to analyze physical situations. - Attitude: Honesty and diligence
Content	1. Electric charge and electric field 2. Conductors in an electric field 3. Electric current and magnetic field 4. Electromagnetic induction and applications 5. The background of light optics 6. Interference of light 7. Diffraction of light 8. Polarization of light

Examination forms	1. Assignment: 10% 2. Projects: teamwork, oral presentation: 10% 3. Midterm exam: 30% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Thanh Van (2015), General Physics 2, VNUHCM Publishing House, Vietnam. 2. Le Vu Tuan Hung (2015), Optics, VNUHCM Publishing House, Vietnam. 3. Raymond A. Serway, John W. Jewett, Sr (2014), Physics for Scientists and Engineers with Modern Physics. Ninth Edition, BROOK/COLE, USA. 4. Alan Giambattista, Betty McCarthy Richardson, Robert C. Richardson (2010), Physics, Second Edition. McGrawHill, USA.

Module designation:	**Name: Labwork on General Physics** **Code: PHY00081**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	HUA Thi Hoang Yen
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Exercise, Practice
Workload (incl. contact hours, self-study hours)	Total workload: 120 Contact hours: practice: 60 Private study: 60
Credit points	2 Credits (4 ETCS Credits)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course is a practical subject in the laboratory. This course helps students understand how to measure some physical quantities, experimental errors, analyze and evaluate measurement results. Students who complete this module could be achieved the following: - Knowledge: Be able to describe the process, how to measure fundamental physical quantities in the laboratory. Be able to use instruments and equipment to measure experimental data of physical quantities correctly. Be able to determine (calculate) physical quantities from measured experimental data. Be able to determine the error of experimental measurement of physical quantities. - Skills: Be able to work in individual, group work, self-study, and problem solving. - Competences: Be able to analyze, process and write experimental data reports. - Attitude: be honest, responsible, respect for colleagues.

Content	1. Density of liquid and solids. The private mass of the metals 2. Viscosity. Viscosity is dependence of different temperature 3. Reversible pendulum. The Mathematical pendulum 4. Heat of function for ice. Determination of heat 5. Mechanical equivalent of heat. The heat capacity of metals 6. Wheatstone Bridge. Resistor is dependence of different temperature 7. Voltmeter and Amperemeter DC. Voltmeter and Amperemeter AC 8. AC circuit. RLC circuit 9. Diode characteristics 10. Transistor characteristics 11. Microscope. To measure diameter of other small object 12. Refraction by a prism. Dispersion and resolving power of the prisms 13. Polarization of light Rotatory power
Examination forms	1. Homework assignment (Practice report): 20% 2. Final test: 80%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	Dang van Liet, Do Dinh Luyen, Nguyen Van Nghia, Tran Thi Kim Phuong (2008), General Physics Experiments, University of Science – VNUHCM.

Module designation:	**Name: Functions of a Complex Variable** **Code: PHY10001**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	VO Quoc Phong
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	Calculus 1B
Module objectives/intended learning outcomes	This module provides the basics for solving a number of physics problems. These methods are concerned with complex integrals, complex series expansions and integral transformations as well as the theory of residues. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of functions of a complex variable and Complex integrals. - Skills: Be able to work in individual, group work. - Competences: Using functions of a complex variable to solve real and complex integration problems and differential equations in Physics. - Attitude and Ethic: Honesty, diligence, and responsibility.
Content	1. Complex numbers and their properties 2. Functions of complex variable 3. Basic Complex Functions 4. Integration of functions of complex variable 5. Residue theorems 6. Fourier transform and Laplace transform

	7. Using complex variable functions to solve differential equations.
Examination forms	1. Homework assignment: 10% 2. Projects: Individual activities: 10% 3. Midterm exam: 35% 4. Final exam: 45%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. W. Kaplan (1966), Introduction to analytic functions, Addison Wesley Company Inc. 2. Nguyen Kim Dinh (2012), Complex functions and applications (in Vietnamese), VNUHCM Publishing House, Vietnam. 3. A. David Wunsch (2004), Complex Variables with applications, Pearson. 4. Richard A. Silverman (1967), Introductory complex analysis, Prentice-hall Inc.

Module designation:	**Name: Introduction to Oceanology, Meteorology and Hydrology** **Code: OMH00001**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	VO Luong Hong Phuoc LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise, Group report
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)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This module provides basic knowledge of the Oceanology, Meteorology and Hydrology. Students who complete this module could be achieved the following: *- Knowledge: Be able to understand and apply knowledge of the Oceanography, Meteorology and Hydrology 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 Oceanography, Meteorology and Hydrology. Have the capacity to learning in the next periods.*
Content	This module includes the following topics: 1. Scientific research method 2. An introduction to the field of oceanography 3. An introduction to the field of meteorology 4. An introduction to the field of hydrology 5. Research trends in oceanography, meteorology, and

	hydrology: a global and Vietnamese perspective
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. Sverdrup K. S., Duxbury A. C, Duxbury A. B (2005), An introduction to the World's oceans, McGraw-Hill. 2. Jacques C. J. Nihoul, (1990), Coupled Ocean-Atmosphere Modeling, Elsevier. 3. Lynne D. Talley, George L. Pickard, William J. Emery, James H. Swift (2011), Descriptive Physical Oceanography. An introduction, Sixth Edition, Elsevier. 4. Garrison Tom (2005), Oceanography: An Invitation to Marine Science, Brooks Cole.

Module designation:	**Name: Computational Methods** **Code: OMH10001**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	DANG Truong An LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate.
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)
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course equips students with basic knowledge about representing numbers in decimal, binary and in computers. In addition, learners are also taught different methods to solve nonlinear equations as well as systems of nonlinear equations. Knowledge of interpolation, derivative and numerical integration, methods of correlation and regression, and methods of solving differential equations are also provided to learners. Students who complete this module could be achieved the following: - Knowledge: Be able to apply the calculation methods that serve well for students' study of Oceanography, Meteorology and Hydrology in the future. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to solve base differential equations.

Content	This module includes the following topics: 1. Solution of nonlinear equations and systems of nonlinear equations 2. Interpolation methods 3. Derivatives and integrals with numbers 4. Matrix and system of linear equations 5. Ordinary differential equations and applied problems 6. Practical application problems
Examination forms	1. Paper 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. Dang Van Liet (2004), Numerical Calculus, VNU Publishing (Vietnamese). 2. G.R. Lindfield, J.E.T Penny. (2017), Numerical methods: Using MATLAB (3rd edition), Academic Press.

Module designation:	**Name: Mathematical Methods for Physics** **Code: OMH10002**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	VO Luong Hong Phuoc TRINH Hoa Lang
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Proactive lecturing, brainstorming, Q&A
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	• Calculus B1 • Calculus B2 • Algebra B1 • Complex functions
Module objectives/intended learning outcomes	The course aims to develop mathematical knowledge and problem-solving skills that are directly applicable to undergraduate physics education and applications in the fields of oceanography, meteorology, and hydrology. Students who complete this module could be achieved the following: - Knowledge: Be able to develop conceptual understanding of mathematical techniques used in physics such as differential equations, Fourier analysis, special functions etc. Learn specific methods for solving differential equations that model physical systems like separation of variables, reduction to canonical form etc., Gain competency in applying mathematical methods to analyze and solve problems in physics domains. - Skills: Be able to work in individual 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. Differential equations in Physics 2. 1D wave equations (Hyperbolic) 3. Laplace's equation (Elliptic) and Heat equation (Parabolic) 4. Reduction to canonical form method 5. Separation of variables method 6. Fourier series 7. Dirac delta function 8. Properties of special functions
Examination forms	1. Individual activities: 20% 3. Midterm exam: 30% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. John A. Trangenstein (2013), Numerical Solution of Elliptic and Parabolic Partial Differential Equations with CD-ROM, Cambridge University Press. 2. Vu Van Thanh, Nguyen Nhat Khanh (2000), Partial Differential Equations in Physics, VNUHCM Publishing (Vietnamese). 3. Erich Miersemann (2012), Linear Elliptic Equations for Second Order, Leipzig University Publisher. 4. Tyn Myomt U, Lokenath Debnath (2000), Linear Partial Difference Equations for Scientists and Engineers, Birkhauser. 5. Arnold Vladimir (2000), Lectures on Partial Difference Equations, Springer.

Module designation:	**Name: Application Programming** **Code: OMH10003**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	NGUYEN Hoang Phong NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Students completing this course will be able to: + Apply Fortran programming language in calculations. + Capture ideas for solving problems related to the major you are studying. + Have skills in determining requirements and suitable algorithms to solve problems. + Have independent, creative thinking
Content	Provide students with knowledge of: - Basic Fortran programming language - Use data processing and presentation tools - Use specialized tools in Matlap
Examination forms	1. Individual activities (Exercise and Practice): 45% 2. Final exam: 55%
Study and examination requirements	Minimum attendance at lectures is 80%

Reading list	1. Dragos B. Chirila, Gerrit Lohmann (2015), Introduction to Modern Fortran for the Earth System Sciences, Berlin, Heidelberg: Springer. 2. Ian Chivers, Jane Sleightholme (2015), Introduction to Programming with Fortran: With Coverage of Fortran 90, 95, 2003, 2008 and 77, Springer. 3. Ed Jorgensen (2013), Introduction to Programming using Fortran 95/2003/2008, University of Nevada.

Module designation:	**Name: Fluid Mechanics** **Code: OMH10004**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of ideal and real fluids. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of fluid mechanics in science and life. - Skills: Be able to work individually, self-study, lifelong learning, and problem-solving. - Competences: Be able to explain the basic characteristics of fluids and understand hydrostatics and fluid dynamics. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Basic concepts of fluids 2. Hydrostatics 3. Fluid kinematics 4. Dynamics of ideal fluids 5. Dynamics of real fluids 6. Basic concepts of pathlines, streamlines and streak lines
Examination forms	1. Paper assignment: 40%

	2. Midterm exam: 20% 3. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Tran Chan Chinh, Le Thi Minh Nghia (1992), Engineering fluid mechanics, Publishing House of University of Technology, Vietnam. 2. Tran Van Cuc (2004), Fluid Mechanics. Fifth Edition, VNU Publishing House, Vietnam. 3. Robert W. Fox (2012), Fluid Mechanics, John Wiley & Sons. 4. Merle C. Potter, David C. Wiggert (2008), Fluid Mechanics, McGraw – Hill.

Module designation:	**Name: General Astronomy** **Code: OMH10005**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	NGUYEN Nhat Kim Ngan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module offers fundamental knowledge of Astronomy, covering topics such as the Solar system, stars, galaxies, nebulas, and more. Upon completion of this module, students can expect to achieve the following outcomes: Knowledge: Students will gain the ability to comprehend and apply the principles of Astronomy in scientific contexts as well as in their daily lives. Skills: Students will develop skills in independent study, self-learning, lifelong learning, and problem-solving, enabling them to work effectively on their own. Competencies: Students will be able to explain the fundamental concepts of Astronomy related to the Solar system, stars, galaxies, and nebulas. They will also possess the capacity to continue learning and expanding their knowledge in subsequent periods or courses. By successfully completing this module, students will acquire a solid understanding of Astronomy and acquire the necessary skills and competencies to succeed in their academic and professional endeavors.

Content	This module includes the following topics: 1. The sky and celestial sphere 2. Movement of the Sun 3. Spherical trigonometry 4. Basics of practical astronomy 5. Movement of the moon 6. Motion and Gravity 7. The Sun and Solar system 8. Stars 9. Galaxies 10. Nebulas
Examination forms	1. Paper assignment: 20% 2. Midterm exam: 20% 3. Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Pham Viet Trinh, Nguyen Dinh Noan (2002), Astronomy, Vietnam Education Publishing House, Vietnam. 2. Vo Thanh Lam (2021), General Astronomy, VNUHCM Publishing House, Vietnam. 3. Hannu Karttunen, Pekka Kröger, Heikki Oja, Markku Poutanen, Karl Johan Donner (2016), Fundamental Astronomy, Springer. 4. Stuart J Inglis (1967), An Introduction to astronomy: Planets, stars, and galaxies, John Wiley and Son. 5. Cecilia Payne-Gaposchkin (1961), Introduction to astronomy, Hermes.

Module designation:	**Name: Introduction to Oceanography** **Code: OMH10006**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	VO Luong Hong Phuoc
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Proactive lecturing, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course aims to provide students with fundamental knowledge about oceanography, enable them to explain ocean phenomena, and develop skills to apply oceanography concepts. Students should also demonstrate a scientific attitude. Students who complete this module could be achieved the following: - Knowledge: Be able to distinguish basic concepts in earth sciences; Explain basic phenomena related to oceanography and earth science; Discuss and explain phenomena occurring in reality - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Attitudes: Be able to apply knowledge to understand phenomena in the ocean - Behaviors: Demonstrate seriousness and honesty in learning, examinations

Content	This module includes the following topics: 1. History of oceanography - Overview of the development of oceanography as a field of study 2. Geological oceanography - Study of the geology and geophysics of the ocean floor including plate tectonics 3. Physical oceanography - Study of the physical attributes and dynamics of the ocean such as currents, waves, tides 4. Chemical oceanography - Study of the chemical composition and processes in the ocean like salinity, ocean acidification 5. Hydrodynamics of oceanography – Study of ocean waves, tides and oceanic circulation 6. Biological oceanography - Study of the plants, animals and microbes in the marine ecosystems 7. Meteorological oceanography - Study of the interplay between the atmosphere and the ocean, including weather patterns
Examination forms	1. Individual and group activities:20% 2. Midterm exam (seminars): 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Sverdrup, K.S., Duxbury, A.C., & Duxbury, A.B. (2005), An Introduction to the World's Oceans (8th Edition), McGraw-Hill. 2. Robin Davidson-Arnott, Bernard Bauer, and Chris Houser (2019), Introduction to Coastal Processes and Geomorphology, Cambridge University Press. 3. Le Quang Toại (2009), Fundamentals of Oceanography Vol. 1, VNUHCM Publishing House (in Vietnamese). 4. Garrison, T.S. & Ellis, R. (2001), Essentials of Oceanography (2nd edition), Brooks/Cole Pub Co. 5. Williams, J. (1962), Oceanography (4th edition), Little, Brown. 6. Sverdrup, K.A., Duxbury, A.B., & Duxbury, A.C. (2006), Fundamentals of Oceanography (5th edition), McGraw-Hill. 7. Nguyen Chu Hoi (2005), Fundamentals of Marine Resources and Environment, VNUHN Publishing House

	(Vitenamese). 8. Nguyen Van Phong (1997), Oceanography and Seas of Vietnam, Education Publishing House. (Vietnamese)

Module designation:	**Name: Introduction to Meteorology** **Code: OMH10007**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of meteorology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of meteorology 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 meteorology phenomena from a physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Introduction 2. Air and Earth's atmosphere 3. Atmospheric radiation 4. Thermal regime of the atmosphere 5. Water in atmosphere 6. Pressure and wind fields 7. Atmospheric circulations 8. Climate and climate zones

Examination forms	1. Paper assignment: 10% 2. Individual activities: 10% 3. Midterm exam: 20% 4. Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Ahrens, C. Donald (2007), Meteorology today: An introduction to weather, climate, and the environment, Thomson Brooks/Cole. 2. Frederick K. Lutgens, Edward J. Tarbuck, Redina Herman, Dennis G. Tasa (2018), The atmosphere: an introduction to meteorology, Pearson. 3. Virginia B. Silverstein, Laura Silverstein Nunn (1992), Weather & climate, Time-Life. 4. Thomas D. Potter, Bradley R. Colman (2003), Handbook of weather, climate, and water: Dynamics, climate, physical meteorology, weather systems, and measurements, John Wiley & Sons.

Module designation:	**Name: Introduction to Hydrology** **Code: OMH10008**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	DANG Truong An
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course equips students with knowledge of the processes of condensation, evaporation, precipitation, soil water, groundwater, and flow formation processes including surface, subsurface, and underground flows. The focus of this course will be on the physical processes that make up the hydrologic cycle, methods for calculating precipitation distribution and surface runoff. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the hydrologic cycle, methods for calculating precipitation distribution and surface runoff. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and calculate some calculating precipitation distribution and surface runoff.

Content	This module includes the following topics: 1. Introduction to hydrology 2. Hydrology in the age of computers and hydrological mathematical models 3. Precipitation, precipitation classification and precipitation characteristics 4. Evaporation, seepage, and their processes in the globe 5. The concept of rivers, river flows and the causes of river formation
Examination forms	1. Paper assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 20% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Van Tuan, Nguyen Thi Phuong Loan, Nguyen Thi Nga, Nguyen Thanh Son (2014), Introdution of hydrology, Science and technology Publishing House (Vietnamese). 2. Tim Davie (2019), Fundamentals of Hydrology (3rd Edition), Routledge Publishing House. 3. M. Robinson, R. C. Ward (2017), Hydrology: Principles and Processes Introduction to Physical Hydrology, IWA Publishing.

Module designation:	**Name: Random Data Measurement and Analysis** **Code: OMH10009**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the basic knowledge of sampling and measurement methods in oceanology, meteorology and hydrology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of data collection and analysis. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and interpret data in oceanology, meteorology and hydrology phenomena. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Sampling method 2. Data measurement methods 3. Data analysis method in oceanology, meteorology and hydrology 4. Data visualization 5. Data interpretation

Examination forms	1. Paper 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. La Thi Cang (1996), Random data measurement and analysis (Vietnamese), VNU Publishing House. 2. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 3. Julius S. Bendat, Allan G. Piersol (2010), Random Data: Analysis and Measurement Procedures (4th Edition), Willey. 4. Tony Fischetti (2018), Data analysis with R.: A comprehensive guide to manipulating, analyzing, and visualizing data in R, Packt. 5. Nguyen Van Tuan (2014), Data analysis with R (Vietnamese), Ho Chi Minh City General Publishing House.

Module designation:	**Name: Introduction to Ocean-Atmosphere Interaction** **Code: OMH10010**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Vinh Xuan Tien LE Nguyen Hoa Tien
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of ocean-atmosphere interaction. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the ocean-atmosphere interaction 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 ocean-atmosphere interaction. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. The climate system 2. Physical interaction between the ocean and atmosphere 3. Chemical interaction between the ocean and atmosphere 4. Biogeochemical interaction between the ocean and atmosphere

	5. Large-scale air-sea interaction
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. Bigg, G. R. (2003), The Oceans and Climate, Cambridge University Press. 2. Jacques C. J. Nihoul (1990), Coupled Ocean-Atmosphere Modeling, Elsevier. 3. Moran Joseph M, Morgan Micheal D, Pauley Patricia M, (1997), Meteorology: the atmosphere and the Science of Weather, Prentice-Hall. 4. Wells, N. C. (2012), The Atmosphere and Ocean: A Physical Introduction, Wiley- Blackwell.

Module designation:	**Name: Introduction to Geophysical Fluid Dynamics** **Code: OMH10011**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	TRAN Xuan Dung LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise, Group Report
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of geophysical fluid dynamics, equations governing geophysical flows, processes of fluids in the atmosphere and ocean such as geostrophic flows and vorticity dynamics, the Ekman layer, barotropic waves … Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of geophysical fluid dynamics in the fields of oceanography, meteorology and hydrology and life. - Skills: Be able to work in individual, group work, self-study, and problem solving. - Competences: Be able to solve and analyze some specific cases related to geophysical fluid dynamics processes in the air and water. Have the capacity to learn in the next periods.
Content	This module includes the following topics: - Overview of geophysical fluid dynamics - The Coriolis Force

	- Equations of Fluid Motion - Equations Governing Geophysical Flows - Geostrophic Flows and Vorticity Dynamics - The Ekman Layer - Barotropic Waves
Examination forms	1. Individual activities and exercise: (20%) 2. Group report: (10%) 3. Midterm exam: (20%) 4. Final exam: (50%).
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. La Thị Cang (2005), Introduction to geophysical fluid dynamics, VNUHCM Publishing House, Vietnam. 2. Cushman-Roisin, B., J.-M. Beckers (2011), Introduction to geophysical fluid dynamics: Physical and numerical aspects, Elservier 3. James C. McWilliams (2006), Fundamentals of Geophysical Fluid Dynamics, Cambridge University Press. 4. Joseph Pedlosky (1987), Geophysical Fluid Dynamics, Springer.

Module designation:	**Name: Numerical Modeling for Geophysical Flows** **Code: OMH10012**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	TRAN Xuan Dung NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice, Group Report.
Workload (incl. contact hours, self-study hours)	Total workload: 1055 Contact hours: lecture: 15, practice: 30 Private study: 60
Credit points	2 Credits (3.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides Introduction to numerical methods and their applications in various fields, especially in Oceanography, Meteorology, Hydrology. The students learn about the finite difference method and applying to geophysical fluid flow problems. In addition, students are introduced to other methods and their applicability. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the finite difference method. - Skills: Be able to work in individual, group work, independent and creative thinking. - Competences: Be able to calculate and simulate some geophysical fluid flow problems using the finite difference method. Have the capacity to learn in the next periods.

Content	This module includes the following topics: - Overview of the numerical method - The finite difference method: Explicit scheme - The finite difference method: Implicit scheme - Iteration method - Stability Analysis - Geophysical fluid flow problems: hyperbolic partial differential equation, inertial motion, shallow water equations, Kelvin wave
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. Nguyen Ky Phung, Nguyen Thi Bay (2007), Numerical methods and applied mathematics for environment, VNUHCM Publishing House, Vietnam. 2. Nguyen Ky Phung, Nguyen Thi Bay (2007), Surface Water Quality Modeling, VNUHCM Publishing House, Vietnam. 3. G.F. Smith (1974), Numerical Solutions of Partial Differential Equations, Oxford University Press. 4. Klaus A. Hoffmann, Steve T. Chiang (2000), Computational Fluid Dynamics, Engineering Education System.

Module designation:	**Name: Methods of Data Mining 1** **Code: OMH10013**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	VO Luong Hong Phuoc LE Nguyen Hoa Tien NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Proactive lecturing, brainstorming, Q&A, group discussion, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course aims to acquire a fundamental understanding of data mining applications in the fields of oceanography, meteorology, and hydrology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the data mining processes, to apply data mining using statistical methods and spectral methods. Understand the principles of measurements of instruments in 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 including Concept of Data Mining, Data Collection, Data Recording, Data Preparation, Data Quality Assessment and Data Analysis 2. Analysis of Data including Data Normalization, Filtering Out Trends; Filtering Data 3. Basic Sampling Processes including Sampling in Distance, Sampling in time, Sampling Accuracy, Pulse Sampling and Continuous Sampling, Uniform and Non-Uniform Sampling, Independent Steps in the Sampling Process. 4. Statistical Methods in Data Mining including Sample Distributions, Moments and Expected Values, Probability Functions and Probability Density Functions, Central Limit Theorem, Spectral Functions. 5. Monitoring and Data Collection Methods in Meteorology, Hydrography and in Oceanology, Other Measurement and Survey Techniques. 6. Practices in computer lab: Exercise E1: Practical Data Calculation using Statistical Methods: Mean Value, Probability, Distribution Function, Frequency Exercise E2: Practical Data Calculation using Spectral Methods Exercise E3: Trend Removal Techniques Exercise E4: Interpolation Methods from Sequential Measurement Data
Examination forms	1. Assignment: 15% 3. Practice Exercise: 30% 4. Final exam: 55%
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. Pham Van Huan (2003), Calculations in Oceanography, VNUHN Publishing House (Vietnamese). 4. Thomson, R.E. & Emery, W.J. (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 5. Nguyen Van Tuan (2014), Data Analysis with R, Ho Chi Minh City General Publishing House (Vietnamese). 6. Massel, S.R. (1999), Fluid Mechanics for Marine Ecologists, Springer.

Module designation:	**Name: Remote Sensing and GIS** **Code: OMH10014**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	HO Dinh Duan LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
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: Practical Oceanography, Meteorology and Hydrology** **Code: OMH10015**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	NGUYEN Hoang Phong TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 60 Contact hours: practice: 30 Private study: 30
Credit points	1 Credits (2 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	By the end of the course, students will have gained a solid understanding of field surveying techniques, acquired knowledge of different approaches to data processing, demonstrated proficiency in working collaboratively within groups, and cultivated personal development skills that contribute to their overall growth and success. Upon completion of this course, students will have the ability to: - Comprehend field surveying skills. - Understand various methods of data processing. - Demonstrate effective teamwork and collaboration. - Develop personal skills for growth and self-improvement.
Content	This course is divided into three parts, focusing on specific aspects related to oceanography, meteorology, and hydrology. The first part guides students in engaging with practical activities at specialized agencies and units dedicated to these fields.

	The second part of the course delves into the study of hydrodynamic processes occurring in coastal areas and mangroves. The third part focuses on equipping students with the necessary methods and techniques for measuring and surveying hydrodynamic factors in coastal areas and mangrove forests. Overall, this course provides students with a comprehensive understanding of practical applications, hydrodynamic processes in coastal areas and mangroves, as well as the necessary skills to measure and survey hydrodynamic factors.
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. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 2. Elizabeth Kay Berner, Robert A. Berner (2012), Global Environment - Water, Air, and Geochemical Cycles (2nd edition), Princeton University Press. 3. Julius S. Bendat, Allan G. Pierso (2010), Random Data: Analysis and Measurement Procedures (4th Edition), Wiley.

Module designation:	**Name: Environmental Pollution** **Code: OMH10016**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
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	5th semester
Person responsible for the module	VO Luong Hong Phuoc LE Nguyen Hoa Tien NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Compulsory
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)
Requirements and recommended prerequisites for joining the module	
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 Geography** **Code: OMH10101**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	HO Dinh Duan PHAM Thi Mai Thy
Language	Vietnamese
Relation to curriculum	Elective
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of geography. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of geography 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 problems about geography from a physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Introduction to geography 2. Sun-Earth relationship 3. Global climate 4. The structure of the Earth and Plate Tectonics 5. Volcanic geomorphology 6. Weathering and erosion 7. Groundwater and Karst Geomorphology

Examination forms	1. Paper assignment: 20% 2. Individual activities: 15% 3. Midterm exam: 15% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Edgar W. Spencer (2003), Earth science: Understanding environmental systems, McGraw-Hill. 2. Vu Tu Lap (2006), Geography of Vietnam, Publishing House of Pedagogical University (Vietnamese) 3. Edward J. Tarbuck; Frederick K. Lutgens (1988), Earth Science, Merrill.

Module designation:	**Name: Introduction to Marine Geomorphology and Geology** **Code: OMH10102**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the basic knowledge of formation and evolution of geomorphology, especially the coastal geomorphology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of ecosystem in coastal areas and the land-ocean forms as well as the geo-hydrodynamic processes forming geo-morphological land-ocean forms. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and interpret data geomorphological fields. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Introduction to geo-morphology 2. Geo-morphology of the seafloor 3. Geo-morphology of coastal landforms

Examination forms	1. Paper 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. Stephen Marshak (2002), Earth portrait of a planet, Norton. 2. Donald R. Prothero and Robert H. Dott (2002), Evolution of the earth (6th Edition), McGraw-Hill. 3. Diane H. Carlson (2006), Physical geology: Earth revealed, McGraw-Hill. 4. Mai Thanh Tan (2009), The East Sea III: Marine geology and geophysics, Natural Science Publishing House (Vietnamese)

Module designation:	**Name: Introduction to Estuaries** **Code: OMH10103**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course aims to provide students with a fundamental understanding of the physical processes that take place in coastal and estuarine environments. These include the mixing of fresh and saltwater, disturbance and sedimentation processes, alluvium, and the transmission of tides within estuaries. The primary focus of the course will be on hydrodynamic processes such as currents, tides, turbidity, and water density variations across aquifers. In addition, the course will cover the classification of estuaries and provide detailed explanations on their characteristics. Upon completion of this module, students will have achieved the following: - Knowledge: Students will be able to comprehend the physical processes occurring in coastal and estuarine environments, including the mixing of fresh and saltwater, disturbance, and sedimentation processes. - Skills: Students will develop the ability to work effectively both individually and in groups, engage in self-study and lifelong learning, and apply problem-solving techniques.

	- Competences: Students will acquire the competence to analyze various physical properties of water, as well as understand the mixing of fresh and saltwater, disturbance, and sedimentation processes. By the end of the course, students will have gained a solid understanding of the physical dynamics in coastal and estuarine environments, enabling them to apply their knowledge and skills to analyze and interpret related phenomena.
Content	This module covers the following topics: - An overview of estuaries and their significance. - Salt balance and dynamic equilibrium in estuaries. - Mixing and stratification phenomena within estuaries. - Hydrodynamic characteristics specific to river mouths. - Processes involved in solid transport within estuaries. Throughout this module, students will gain insights into the importance of estuaries, understanding the salt balance and dynamic equilibrium within these ecosystems. They will also explore the intricate mixing and stratification processes that occur within estuaries, as well as the hydrodynamic characteristics observed at river mouths. Additionally, students will learn about the transportation mechanisms of solid materials within estuaries. By studying these topics, students will develop a comprehensive understanding of estuaries, their dynamic nature, and the various processes that shape their hydrodynamics and sediment transport.
Examination forms	1. Paper 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. Nguyen Manh Hung (2014), Changes in the coast and estuaries of Vietnam, Natural Science and Technology Publishing (Vietnamese). 2. H.H.G. Savenije. (2017), Salinity and Tides in Alluvial Estuaries (1st Edition), Elsevier Science.

Module designation:	**Name: Oceanic Currents and Water Circulation** **Code: OMH10104**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	LE Quang Toai TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module offers fundamental knowledge about ocean circulation, including the various types of ocean currents and the forces that contribute to their formation. Additionally, it enhances students' understanding of surface and bottom flow theories, as well as the processes of salt and heat transfer within the ocean. Students who complete this module can expect to achieve the following outcomes: - Knowledge: Students will be capable of identifying different ocean circulations and their key characteristics. They will also be able to distinguish between various types of currents. - Skills: Students will develop skills in data analysis, problem evaluation, and the practical application of acquired knowledge. - Competences: Students will possess the capacity to continue learning and expanding their understanding of ocean circulation in future periods or courses.

Content	The module covers the following topics: - Basic equations and concepts related to ocean circulation. - Geostrophic current, which is influenced by the balance between pressure gradient and the Coriolis effect. - Stable wind current in homogeneous sea, Ekman's theory. - Ocean wind circulation, encompassing the large-scale patterns driven by atmospheric conditions. - Thermohaline circulation involves the vertical movement of water masses based on temperature and salinity differences. By studying these topics, students will acquire a solid foundation in understanding ocean circulation, allowing them to analyze data, solve problems, and apply their knowledge effectively. Furthermore, this module sets the groundwork for continuous learning and growth in subsequent periods or courses.
Examination forms	1. Individual activities (Exercise and Practice): (30%) 2. Midterm exam: (20%) 3. Final exam: (50%)
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Le Quang Toai (2009), Principle of oceanography, Volume.1, VNUHCM Publishing House. 2. Open University Course Team (1998), Ocean Circulation, Butterworth-Heinemann. 3. John A Knauss (1997), Introduction to physical oceanography (2nd Edition.), Prentice-Hall. 4. Joseph Pedlosky (2013), Ocean Circulation Theory, Springer. 5. Miller, Robert N. (2007), Numerical Modeling of Ocean Circulation, Cambridge University Press.

Module designation:	**Name: Water Wave Mechanics** **Code: OMH10105**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	LA Thi Cang LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Students completing this course will be able to: + Understand the formation and change of waves in coastal areas + Have skills in forecasting wave propagation from offshore to coastal areas + Have the skill to calculate sea wave characteristics + Have independent, creative thinking
Content	Provide students with knowledge of: - Basic characteristics, dynamic equations describing water wave oscillations. - Wave propagation from deep water to shallow coastal waters. - Wave energy. - Wave spectrum. - Extreme phenomenon. - Material transfer. - Wave field forecast.
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. Stanislaw Ryszard Massel (2018), Ocean Surface Waves: Their Physics and Prediction (3rd Edition), World Scientific. 2. La Thi Cang (2015), Hydrodynamic processes in marine ecosystems, VNUHCM Publishing House. 3. Miller, Robert N. (2007), Numerical Modeling of Ocean Circulation, Cambridge University Press. 4. Leo H. Holthuijsen (2007), Waves in Oceanic and Coastal Waters, Cambridge University Press.

Module designation:	**Name: Tides** **Code: OMH10106**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	VO Luong Hong Phuoc TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
Teaching methods	Proactivelecturing, brainstorming, Q&A, group discussion, seminar, 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)
Requirements and recommended prerequisites for joining the module	Mathematical Methods in Physics Numerical Models in Geophysical Fluid Dynamics Introduction of Oceanography
Module objectives/intended learning outcomes	The course aims to provide students with a comprehensive understanding of tides, enabling them to apply their knowledge to various fields and contribute to informed decision-making related to coastal and marine environments. Students who complete this module could be achieved the following: - Knowledge: Be able to recognize the fundamental theories of tides involves understanding the key principles and concepts related to tidal phenomena; to apply the method of harmonic analysis to tidal oscillations and differentiate between various tidal models; to Calculate basic tidal problems involves applying the principles of tidal theory to solve practical problems related to tidal phenomena. - Skills: Be able to analyze and evaluate data and issues, data analysis and evaluation skills; Programming skills, work in individual 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, follow the Standards and ethical principles. - Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Introduction to Tides on Earth 2. Newton's Tide Theory 3. Dynamics of Tides - Dimensional Tidal Models - Dimensional Tidal Models and Applications 4. Harmonic Analysis 5. Tides in the South China Sea and Vietnam Practical Exercises: 1. Tidal Wave Propagation Problem 2. WXTIDE, Tidal Data Processing 3. Tidal Oscillation Analysis 4. Student Seminar: Tides in River Estuaries
Examination forms	1. Individual and group activities:30% 3. Projects: 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. Thomson, R. E., Emery, W. J., & Waltham (2014), Data Analysis Methods in Physical Oceanography (3rd edition), Elsevier Science 3. Pham Van Huan (2002), Marine Dynamics. Part III Tides, VNUHN Publishing (Vietnamese). 4. Ha Noi National University (2003), Research Program KHCN-06, East Sea, Ha Noi. 5. M. Hopper (Version 4.7, www.wxtide32.com), Wxtide32. 6. G. Godin (1988), Tides, Anadyomene. 7. S. Massel (1999), Fluid Mechanics for Marine Ecologists,

	Springer. 8. USACE (2006), Coastal Engineering Manual (CEM), Part II Coastal Hydrodynamics, Washington. 9. H. G. Savenije (2005), Salinity and Tides in Alluvial Estuaries, Elsevier.

Module designation:	**Name: Special Topics in Oceanography** **Code: OMH10107**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An NGUYEN Hoang Phong
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Proactivelecturing, brainstorming, Q&A, group discussion, seminar, 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)
Requirements and recommended prerequisites for joining the module	Introduction of Oceanography
Module objectives/intended learning outcomes	The course aims to delve into various topics related to oceanography, meteorology, and the process of solving real-world problems. It combines theoretical knowledge with practical application, including hands-on experiments in a laboratory setting and computational modeling. In addition to fundamental theories, the course also incorporates real-world practical exercises and laboratory work. Students who complete this module could be achieved the following: - Knowledge: Be able to Understand basic concepts related to waves, currents, and tides, as well as the methods and principles of measurement, analysis, and data processing for these phenomena; Apply data processing techniques to analyze wave, current, and tide data; Comprehend the characteristics of sedimentation and sediment consolidation, including the determination of particle size and settling velocity; Master the analysis and processing of fundamental hydrological data; Apply data processing tools effectively.

	- Skills: Be able to analyze and evaluate data and issues, data analysis and evaluation skills; Programming skills, work in individual 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, follow the Standards and ethical principles. - Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Hydrodynamic Waves, Currents, and Tides 2. Sediment Dynamics 3. Measurement, Analysis, and Processing of discharge data.
Examination forms	1. Individual and group activities: 30% 3. Projects: 40% 4. Final exam: 30%
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. Thomson, R. E., Emery, W. J., & Waltham (2014), Data Analysis Methods in Physical Oceanography (3rd edition), Elsevier Science. 3. Kris Jamsa (2020), Introduction to Data Mining and Analytics, Jones & Bartlett. 4. Landau, L. D., & Lifshitz, E. M. (2001), Hydrodynamics, Science and Technology Publishing House. 5. Pierson, W. J., Neumann, G., & James, R. W. (1971), Practical Methods for Forecasting Ocean Waves by means of Wave Spectra and Statistics, The U. S. Naval Oceanographic Office. 6. Dean, R. D., & Dalrymple, R. A. (2002), Coastal Processes with Engineering Applications, Cambridge University Press. 7. Young, I. R. (1999), Wind-generated Ocean Waves, Elsevier.

	8. Hughes, S. A. (1993), Physical Models and Laboratory Techniques in Coastal Engineering, World Scientific. 9. Rowell, B. F., & Ryan, W. L. (1996), Methods in Introductory Oceanography, McGraw-Hill.

Module designation:	**Name: Practical Oceanography** **Code: OMH10108**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	NGUYEN Hoang Phong LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
Teaching methods	Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 240 Contact hours: practice: 120 Private study: 120
Credit points	4 Credits (8 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Upon completion of this course, students will have the ability to: - Understand the process of conducting a survey trip, including the necessary steps and considerations involved. - Demonstrate proficiency in using various measuring equipment commonly employed in surveying. - Possess the skills to accurately measure and perform calculations related to surveying tasks. - Exhibit independent, creative, and honest thinking in approaching surveying challenges and problem-solving. By the end of the course, students will have gained a comprehensive understanding of surveying methodologies, acquired practical skills in using measuring equipment, developed proficiency in measurement and calculation techniques, and cultivated independent and creative thinking abilities. These skills and knowledge will equip students to effectively participate in surveying activities and contribute to the field with integrity and innovation.

Content	This topic aims to provide students with the following knowledge: - Practical surveying techniques in both terrestrial and marine environments. - Developing a research plan for collecting and analyzing data related to marine biology, chemistry, and physics during field trips. - Conducting data collection, analysis, and presentation based on the research plan. - Writing essays and reports summarizing the findings and experiences gained during the internship. Through this module, students will gain hands-on experience in surveying practices, both on land and at sea. Students will learn how to design and execute research plans to collect data on various aspects of marine biology, chemistry, and physics during field trips. Additionally, students will develop skills in analyzing and presenting the collected data effectively. After the completion of this module, students will be expected to write essays and reports that summarize their findings and reflect on their internship experiences.
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. Pham Van Huan (2003), Computation in oceanography, VNUHN Publishing House. 2. Ministry of Natural Resources and Environment (2019), Hydrometeorological monitoring - Part 3: Hydrometeorological monitoring, General Department of Hydrometeorology. 3. Robert Jagodzinski (2005), Petrography and geochemistry of surface sediments from Sunda and Vietnamese shelves, Wydawnictwo Naukowe Uam. 4. Bruce F. Rowell, Wendy L. Ryan (1996), Methods in introductory oceanography, McGraw-Hill.

Module designation:	**Name: Modelling Tools for Oceanographers** **Code: OMH10109**
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	NGUYEN Hoang Phong NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Upon completion of this course, students will have the ability to: -Utilize various calculation tools commonly used in oceanography. -Apply calculations to solve simple problems related to oceanography. -Reading and comprehending relevant documents and literature in the field of oceanography. -Demonstrate independent, creative, and honest thinking in approaching oceanographic problems and tasks. By the end of the course, students will have gained proficiency in using calculation tools specific to oceanography, enabling them to apply their knowledge to solve basic problems in the field. They will also develop the skills to read and understand relevant documents, such as research papers and reports, essential for staying informed and engaging with the current knowledge in oceanography.

Content	In addition to field surveys, computational models for calculating waves, currents, and sediment transport play a crucial role in research and analysis worldwide, including in Vietnam. Proficiency in utilizing these computational models provides a distinct advantage for students when interviewing with companies and research agencies. These models serve as powerful tools for simulating and predicting oceanic processes, allowing researchers to gain insights into complex phenomena and make informed decisions.
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. Nguyen Manh Hung, Duong Cong Dien, Tran Quy, Hoang Xuan Co (2009), Ocean wave energy in the East Sea and Vietnamese waters, Natural Science and Technology Publishing House. 2. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 3. Mei, Chiang C., Stiassnie, Michael, Yue, Dick K.-P (2005), Theory and Applications of Ocean Surface Waves, World Scientific Publishing Company. 4. Torsvik, T (2013), Introduction to Computational Fluid Dynamics and Ocean Modelling, Springer International Publishing.

Module designation:	**Name: Sediment Transport** **Code: OMH10110**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module offers both basic and advanced knowledge of sediment transport in rivers, estuaries, and coastal areas. Upon completion of this module, students will be able to achieve the following: - Knowledge: Students will develop a comprehensive understanding of sediment transport processes in rivers, estuaries, and coastal areas. - Skills: Students will acquire the skills necessary to work both individually and collaboratively in group settings. They will also develop self-study and lifelong learning skills, enabling them to continually enhance their knowledge in the field. - Competences: Students will be capable of analyzing, computing, modeling, and interpreting results related to sediment transport in the designated environments. Furthermore, students will have the capacity to continue learning and expanding their knowledge in subsequent periods or courses. By completing this module, students will have a solid understanding of sediment transport processes in rivers, estuaries, and coastal areas. They will be equipped with

	essential skills and competences to analyze, compute, model, and interpret sediment transport data.
Content	This module includes the following topics: 1. Introduction to sediment transport 2. Governing hydrodynamic processes driving sediment transport in coastal areas 3. Computation and modeling of sediment transport in coastal areas
Examination forms	1. Paper 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. Dang Truong An (2018), Sediment transport, VNUHCM Publishing House (Vietnamese). 2. Ashish J. Mehta (1993), Nearshore and Estuarine Cohesive Sediment Transport: Coastal and Estuarine Studies, American Geophysical Union. 3. Dominic Reeve, Andrew Chadwick and Christopher Fleming (2014), Coastal Engineering: Processes, Theory and Design Practice, CRC Press. 4. Mai Thanh Tan (2009), The East Sea III: Marine geology and geophysics, Natural Science Publishing House (Vietnamese). 5. Nguyen Manh Hung (2014), Hydrodynamic processes in Vietnamese coastal zones: Water level fluctuations, waves, currents and sediment transport, Ministry of Science and Technology (MOST) (Vietnamese). 6. Le Dinh Mau (2014), Erosion and deposition characteristics in coastal zone of Quang Nam Province, Natural Science and Technology Publishing House (Vietnamese).

Module designation:	**Name: Chemical Oceanography** **Code: OMH10111**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	BUI Thi Ngoc Oanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module offers basic knowledge of chemical oceanography and its impact on ocean water. Students who complete this module could be achieved the following: - Knowledge: Be able to classify the knowledge of concept of chemistry of water and its important to the ocean - Skills: Be able to work in individual, group work, self-study, and problem solving. - Competences: be able to know, solve the issue in the ocean water.
Content	1. Water, seawater and approaching to the research 2. Chemical characteristics of ocean water 3. Characteristics of chemical processes 4. Applied chemical problems
Examination forms	1. Paper 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 Tac An, Hoang Trung Du (2009), Marine chemistry, biological productivity and issues in Vietnam's marine environment, Hanoi Science and Technology Publishing House. 2. Doan Van Bo (2001), Methods of chemical analysis of sea water, Hanoi National University Publishing House. 3. Open University Course Team, Ocean Chemistry and Deep-Sea Sediments, Pergamon.

Module designation:	**Name: Marine Ecosystem** **Code: OMH10112**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DO Huu Hoang
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of biological oceanography and its effect on aquatic environments. Students who complete this module could be achieved the following: - Knowledge: Be able to classify the knowledge of the concept of the marine ecosystem and its importance in the ocean - Skills: Be able to work in individual, group work, self-study, and problem-solving. - Competences: be able to know and solve the issue in marine ecology.
Content	1. Concepts of the ecosystem in the coastal and in the ocean 2. Concepts of Different ecosystems: 3. Influence and impact of Marine ecosystem on nature and human 4. Assessment of marine ecosystems to aquatic ecosystem and aquatic environments.
Examination forms	1. Paper 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. R. S. K. Barnes, R. N. Hughes (1999), An Introduction to Marine Ecology (3rd Edition), Wiley-Blackwell. 2. S. J. Hawkins, A. L. Allcock, A. E. Bates, L. B. Firth, I. P. Smith, S. E. Swearer, P. A. Todd (2019), Oceanography and Marine Biology: An Annual Review, Volume 57, CRC Press 3. Sean D. Connell, Bronwyn M. Gillanders (2007), Marine ecology, Oxford University Press

Module designation:	**Name: Physical Oceanography in The East Sea** **Code: OMH10113**
Semester(s) in which the module is taught	7th Semester
Person responsible for the module	LE Dinh Mau
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	7th semester
Person responsible for the module	LE Dinh Mau
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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 Physics** **Code: OMH10115**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	LE Quang Toai
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Proactivelecturing, brainstorming, Q&A, group activities
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	Introduction of Oceanography
Module objectives/intended learning outcomes	The course aims to provide students with a comprehensive understanding of the physical processes that occur in marine and coastal environments. It covers various aspects of seawater properties, optical properties, acoustics, and the dynamic interactions at the sea surface. Students who complete this module could be achieved the following: - Knowledge: Be able to explore the physical processes occurring in the marine environment. It delves into the applications and explanations stemming from these physical properties, as well as calculations related to real-world phenomena and problems. - Skills: Be able to analyze and evaluate data and issues, data analysis and evaluation skills; work in individual 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, follow the Standards and ethical principles.

	- Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Overview of Physical Processes in the Ocean 2. Physical Properties of Seawater 3. Interaction of Light and Other Electromagnetic Radiation with Water 4. Solar Radiation and Apparent Optical Properties of Seawater 5. Acoustic Properties in the Ocean
Examination forms	1. Individual and group activities: 30% 3. Projects: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Dinh Van Uu, Nguyen Minh Huan (2003), Marine Physics, VNUHN Publishing (Vietnamese). 2. Arnoldo Valle-Levinson (2018), Contemporary Issues in Estuarine Physics, Cambridge University Press. 3. Tom S. Garrison, Robert Ellis (2001), Essentials of Oceanography (2nd edition), Brooks/Cole Pub Co. 4. Harold V. Thurman (1991), Introductory Oceanography, Macmillan. 5. Albert Defant (1961), Physical Oceanography, Pergamon. 6. John A. Knauss (1997), Introduction to Physical Oceanography (2nd edition), Prentice-Hall.

Module designation:	**Name: Ocean Surface Waves** **Code: OMH10116**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	LA Thi Cang LAM Van Hao
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Proactivelecturing, brainstorming, Q&A, group discussion
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	Introduction of Oceanography
Module objectives/intended learning outcomes	The course aims to delve deeper into the dynamics of ocean waves, both in deep and shallow waters. Additionally, it covers various methods for wave forecasting and computational techniques. Students who complete this module could be achieved the following: - Knowledge: Be able to understand deeper ocean wave dynamics, apply wave forecasting in deep and shallow water areas, and utilize various measurement and wave modeling techniques. - Skills: Be able to analyze and evaluate data and issues, data analysis and evaluation skills; programing, work in individual 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, follow the Standards and ethical principles.

	- Behaviors: Demonstrate seriousness and honesty in learning, data analysis and examinations
Content	1. Ocean Waves and Their Significance 2. Wind-Wave Interaction in the Ocean 3. Characteristics of Ocean Waves 4. Deep-Water Wave Forecasting 5. Shallow-Water Wave Forecasting 6. Some Measurement and Wave Modeling Techniques 7. Remote Sensing Techniques 8. Some Numerical Wave Modeling Techniques
Examination forms	1. Individual and group activities: 30% 3. Projects: 30% 4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Massel, S. R (2013), Ocean Surface Waves, World Scientific. 2. La Thi Cang (2016), Dynamics Processes in the Marine Ecosystem, National University of Ho Chi Minh City. 3. Arash Karimpour (2018), Ocean Wave Data Analysis: Introduction to Time Series Analysis, Signal Processing, and Wave Prediction, Arash Karimpour. 4. Mei, Chiang C., Stiassnie, Michael, Yue, Dick K.-P (2005), Theory and Applications of Ocean Surface Waves, World Scientific Publishing Company. 5. I. R. Young (1999), Wind Generated Ocean Waves, Elsevier. 6. Babanin, Alexander V. (2011), Breaking and Dissipation of Ocean Surface Waves, Cambridge University Press. 7. Y. Toba, H. Mitsuyasu (1985), The Ocean Surface: Wave Breaking, Turbulent Mixing and Radio Probing, Springer.

Module designation:	**Name: Marine Environmental Resources and Climate Change** **Code: OMH10117**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	BUI Thi Ngoc Oanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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: Biogeochemical Cycles** **Code: OMH10018**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	BUI Thi Ngoc Oanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of biogeochemical process in atmosphere, hydrosphere and biosphere. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of biogeochemical cycles in science and life. Be capable of using STELLA model to simulate biogeochemical cycles. - Skills: Be able to work in individual, teamwork, self-study, lifelong learning, and problem-solving. - Competences: Be able to understand the basic processes of biogeochemical cycle. Have the capacity to learning in the next periods.
Content	This module covers the following topics: -Introduction to biogeochemical cycles -Carbon, Oxygen, Nitrogen, Phosphorus and Sulfur cycles -Introduction to dynamic modeling of environmental systems By studying these topics, students will develop a comprehensive understanding of the major biogeochemical cycles, including carbon, oxygen, hydrologic, nitrogen,

	phosphorus, and sulfur cycles.
Examination forms	1. Individual activities: 35% 2. Group activities: 15% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. K. Ramesh Reddy, Ronald D. DeLaune (2008), Biogeochemistry of Wetlands: Science and Applications, CRC Press. 2. Michael L. Deaton, James I. Winebrake (2000), Dynamic modeling of environmental systems, Springer. 3. Susan Libes (2009), Introduction to Marine Biogeochemistry, Academic Press. 4. Martin Paegelow, María Teresa Camacho Olmedo (2008), Modelling Environmental Dynamics: Advances in Geomatic Solutions, Cambridge Springer. 5. Garbe, Christoph S. et al. (2014), Transfer Across the Air-Sea Interface, Springer Berlin Heidelberg.

Module designation:	**Name: Data Mining Method 2** **Code: OMH10119**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Hoang Phong LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the basic and advance knowledge of data measurement and analysis in oceanology, meteorology and hydrology to better exploring and understanding those related phenomena. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of data analysis to explore in depth the related phenomenon. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyzing, programing, computing the data of oceanology, meteorology and hydrology. Have the capacity to learning in the next periods.

Content	This module includes the following topics: 1. Advanced data analysis methods in oceanology 2. Advanced data analysis methods in meteorology 3. Advanced data analysis methods in hydrology
Examination forms	1. Paper 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. Joseph F Hair, Ronald L Tatham, Rolph E Anderson (2010), Multivariate data analysis (2nd edition), Macmillan. 2. Nguyen Van Tuan (2014), Data analysis with R, Ho Chi Minh City General Publishing House (Vietnamese). 3. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 4. Trauth Martin (2015), Data Analysis in Earth Sciences, Springer Berlin Heidelberg

Module designation:	**Name: Data Management and Analysis in Oceanology, Meteorology and Hydrology** **Code: OMH10120**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the basic and advanced knowledge of data analysis and management methods for oceanography, meteorology and, hydrology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of data analysis and management for oceanography, meteorology and, hydrology. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze, interpret and management oceanographical-meteorological-hydrological data. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Insight understanding oceanographical-meteorological-hydrological data. Regression data analysis and applications 2. Data analysis and classification of main driving processes in oceanography, meteorology and hydrology 3. Basic and advanced statistical data analysis. Data

	management methods.
Examination forms	1. Paper 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), Computational methods in Oceanography (Vietnamese), VNUHN Publishing. 2. Richard E. Thomson, William J Emery (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 3. Martin Trauth (2015), Data Analysis in Earth Sciences, Springer Berlin Heidelberg. 4. Julius S. Bendat, Allan G. Piersol (2010), Random Data: Analysis and Measurement Procedures (4th Edition), Willey.

Module designation:	**Name: Special Topics in Sea – Air Interaction** **Code: OMH10121**
Semester(s) in which the module is taught	8th Semester
Person responsible for the module	BUI Thi Ngoc Oanh NGUYEN Cong Thanh NGUYEN Hoang Phong
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Students completing this course will be able to: + Understand the knowledge of weather radar + Gain knowledge of atmospheric circulation and interactive data processing + Seriousness and honesty: seriousness and honesty in studying and taking exams
Content	The course introduces students to some specific topics on meteorology and hydrology. Each topic includes a theoretical part and a practical part to give students a more specific look at the theories being taught.
Examination forms	1. Exercise: 25% 2. Practice: 25% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Peter S. Liss Martin T. Johnson (2014), Ocean-Atmosphere Interactions of Gases and Particles, Springer. 2. Neil C. Wells (2012), The Atmosphere and Ocean: A

	Physical Introduction, Wiley. 3. W. Perrie. (2002), Atmosphere-ocean interactions. Vol.1, WIT Press. 4. Frank J. Millero (2013), Chemical Oceanography, CRC Press.

Module designation:	**Name: Introduction to Thermodynamics of the Atmosphere** **Code: OMH10201**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	LE Nguyen Hoa Tien
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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: An Introduction to Dynamics Meteorology** **Code: OMH10202**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	LA Thi Cang NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Compulsory Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The module provides initial applications of basic equations in atmosphere, circulation, vortex, planetary boundary layer, quasi-geodiaphragm analysis. Students who complete this module could be achieved the following: - Knowledge: Understand the basic applications of key equations in dynamic meteorology; Recognize the characteristics of circulation and vortex; Grasp the analysis like a diaphragm. - Skills: Ability to form groups and assign tasks to group members; Ability to read and understand specialized documents. - Competences: Serious and honest in studying and testing.
Content	This module includes the following topics: 1. Introduction 2. Basic conservation laws 3. Applications of basic equations 4. Circulation and vortex 5. Planetary boundary layer

	6. Introduction to quasidiaphragm analysis By studying these topics, students will acquire a foundational understanding of fluid dynamics. Students cwill learn about key principles, equations, and conservation laws governing fluid flow, as well as their practical applications. Additionally, students will explore topics such as circulation, vortices, planetary boundary layers, and quasidiaphragm analysis, which are essential in comprehending and analyzing fluid behavior in various contexts.
Examination forms	1. Individual activities (Exercise): 25% 2. Midterm exam: 25% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Holton J. M., (2004), An Introduction to Dynamic Meteorology, Elsevier. 2. La Thi Cang, (2005), Introduction to Geophysical Fluid Dynamics. Volume 1, VNU-HCM Publishing House. 3. La Thi Cang, (2007), Introduction to Geophysical Fluid Dynamics. Volume 2, VNU-HCM Publishing House. 4. Wallace J., Hobbs P. V., (2006), Atmospheric science: An Introductory survey, Elsevier. 5. Lynch A.H., Cassano J.J., (2006), Applied Atmospheric Dynamics, John Wilet &Sons.

Module designation:	**Name: Synoptic Meteorology** **Code: OMH10203**
Semester(s) in which the module is taught	6th Semester
Person responsible for the module	NGUYEN Minh Giam LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The module provides students with knowledge about typical weather and meteorological factors and the relationships between these factors. Students who complete this module could be achieved the following: - Knowledge: Distinguish between characteristic meteorological elements and phenomena. - Skills: Ability to read and understand synoptic maps; Ability to read and understand specialized documents. - Competences: Serious and honest in studying and testing.
Content	This module includes the following topics: 1. The object and general knowledge of synoptic meteorology 2. The field of meteorological elements 3. Air masses and atmospheric fronts 4. Cyclones and anticyclones 5. Weather systems affecting Vietnam By studying these topics, students will gain a comprehensive understanding of synoptic meteorology,

	including the analysis and prediction of large-scale weather patterns. They will become familiar with meteorological elements, air masses, atmospheric fronts, cyclones, and anticyclones. Additionally, students will explore the specific weather systems that affect Vietnam, enabling them to comprehend and analyze the weather conditions and climate patterns in the region.
Examination forms	1. Individual activities (Exercise): 25% 2. Midterm exam: 25% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Tran Cong Minh (2009), Synop Meteorology, VNUHN Publishing House. 2. Mak, Mankin (2011), Atmospheric Dynamics, Cambridge University Press 3. B.M. Jamart, J.C.J. Nihoul (1989), Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence, Elsevier Science

Module designation:	**Name: Climatology and Climate in Vietnam** **Code: OMH10204**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Climatology and Climate In Vietnam Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the factors affecting the formation and change of climate. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the climate characteristics of regions in Vietnam. Have the capacity to learning in the next periods.
Content	This module covers the following topics: -Understanding the factors affecting the formation and change of climate. -Distinguishing between climate zones and climate shapes. -Understanding climate classification methods. -Understanding the conditions that form Vietnam's climate. -Identifying climate characteristics of regions in Vietnam.

	By studying these topics, students will acquire knowledge about the factors influencing climate formation and change. Studnets will develop the ability to distinguish between climate zones and shapes, and understand the methods used for climate classification.
Examination forms	1. Paper assignment: 20% 2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Pham Ngoc Toan, Phan Tat Dac (1993), Climate of Vietnam, Science and Technology Publishing House. 2. Tran Cong Minh (2007), General climate and meteorology, Hanoi National University Publishing House. 3. Le Huy Ba, Nguyen Thi Phu, Nguyen Duc An (2009), Climate change environment - a global threat, National University Publishing House, Ho Chi Minh City.

Module designation:	**Name: Special Topics in Meteorology** **Code: OMH10205**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An LE Thi Xuan Lan LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the knowledge of special topics in meteorology Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of meteorology 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 special topics about meteorology from physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Weather radar data mining 2. Tropical atmospheric circulation 3. Tropical cyclone 4. Measuring, analyzing and processing hydrological data

Examination forms	1. Paper assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 20% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. J. C. J. Nihoul (1990), Coupled Ocean-Atmosphere Modeling, Elsevier. 2. John A. Day (1966), The Science of Weather, Addison-Wesley. 3. Peter Meischner (2013), Weather Radar: Principles and Advanced Applications, Springer. 4. Pham Van Huan (2005), Fortran programming language and applications in hydrometeorology, Agricultural Publishing House (Vietnamese). 5. Jürgen Willebrand, David L.T. Anderson (2013), Modelling Oceanic Climate Interactions, Springer.

Module designation:	**Name: Practical Meteorology** **Code: OMH10206**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	NGUYEN Hoang Phong LE Thi Xuan Lan LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 180 Contact hours: practice: 90 Private study: 90
Credit points	3 Credits (6 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides skills in collecting, analyzing and presenting data in meteorology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of forecast tool, analysis data in Meteorology in work at research institutes. - Skills: Be able to analyze and predict the weather events in individual, teams in practical's - Competences: Be able to conduct the prediction. Have the ability to learn in the next stages.
Content	This module includes the following topics: 1. Forecast Tools in Meteorology 2. Analysis and forecast - some forecast weather systems in Vietnam 3. Regulations for observation of methodological factors 4. Practical observations

Examination forms	1. Paper 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. Tran Tan Tien, Nguyen Dang Que (2004), Processing meteorological data and weather forecasting using physical statistics, VNU-HN Publishing (Vietnamese). 2. Phan Van Tan (2003), Statistical methods in climate, VNU-HN Publishing (Vietnamese) 3. Manfred Kurz (1998), Synoptic Meteorology (2nd Edition), Training Guidelines of the German Meteorological Service.

Module designation:	**Name: Modeling Tools in Meteorology** **Code: OMH10207**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the modeling tools in Meteorology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of some basic components of a digital weather forecast model through the theoretical basis and the available source code. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain and applying predictive models to specific cases.
Content	This module includes the following topics: 1. Generalizing some basic components of a digital weather forecasting model through theoretical basis Random model 2. Apply available code snippets 3. Generalization of the WRF model 4. Applying predictive models to specific cases

Examination forms	1. Individual activities (Exercises and Practice): 30% 2. Midterm exam: 20% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. J. C. J. Nihoul (1990), Coupled Ocean-Atmosphere Modeling, Elsevier. 2. Tran Tan Tien (2002), Processing meteorological data and weather forecasting by means of physical statistics, VNUHN Publishing House. 3. Coiffier, Jean (2011), Fundamentals of Numerical Weather Prediction, Cambridge University Press 4. J.N. Sharma (2007), Numerical methods for engineers and scientists, Alpha Science International. 5. Warner, Thomas T. (2011), Numerical Weather and Climate Prediction, Cambridge University Press

Module designation:	**Name: Introduction to Boundary Layer Meteorology** **Code: OMH10208**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	LE Quang Toai
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of boundary layer meteorology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of boundary layer meteorology 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 problems about boundary layer meteorology from physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Fundamentals of boundary layer dynamics 2. The planetary boundary layer 3. The layer thin & closest to Earth's surface (thickness = 10 - 100m)
Examination forms	1. Paper assignment: 15% 2. Individual activities: 10%

	3. Midterm exam: 25% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Pham Ngoc Ho, Le Dinh Quang (2009), Textbook of environmental dynamics of atmospheric boundary layer, Vietnam Education Publishing House. (Vietnamese) 2. Richard A. Craig (1965), The Upper Atmosphere: Meteorology and Physics, Academic Press. 3. Roland B. Stull (2009), An Introduction to Boundary Layer Meteorology, Springer. 4. Adrian Gordon, Warwick Grace, Roland Byron-Scott, Peter Schwerdtfeger (2016), Dynamic Meteorology, Routledge. 5. Panchev, S. (2012), Dynamic Meteorology, Springer.

Module designation:	**Name: Numerical Prediction** **Code: OMH10209**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	LA Thi Cang NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Numerical weather prediction Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of weather, climate, air pollution, atmospheric processes and the knowledge related to numerical modeling and forecasting. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the basic knowledge related to motion scale, atmospheric processes
Content	This module includes the following topics: 1. General introduction 2. Mathematical numerical simulation appearance 3. Numerical methods in geophysical modeling 4. Numerical modeling and forecasting
Examination forms	1. Paper assignment: 20%

	2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. La Thi Cang (2005), Introduction to Geophysical Dynamics, Volume 1, Ho Chi Minh City National University Press. 2. La Thi Cang (2007), Introduction to Geophysical Dynamics, Volume 2, Ho Chi Minh City National University Press. 3. Jacobson, M. Z. (2005), Fundamentals of Atmospheric Modeling, Cambridge Univ Press. 4. Kalnay, E. (2003), Atmospheric Modeling, Data Assimilation and Predictability, Cambridge Univ Press. 5. Roger, A. and Pielke, Sr. (2002), Mesoscale Meteorelogical Modeling, Academic Press

Module designation:	**Name: Agricultural Climate** **Code: OMH10210**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course aims to provide students with knowledge and skills related to the dynamic processes of rivers, sediment transport, and river morphological processes. The primary focus of the course will be on understanding the general principles governing the transformation of riverbeds under the influence of water flow and other factors. By completing this module, students will be able to achieve the following: Knowledge: Students will gain an understanding of the dynamic processes involved in rivers, including the movement of water, sediment transport, and the morphological changes that occur in riverbeds. Skills: Students will develop practical skills necessary for working individually, in groups, and engaging in self-study and lifelong learning. Students will also enhance their problem-solving abilities, enabling them to analyze and address challenges related to river dynamics, sediment transport, and river morphology.

	Competences: Students will acquire the competence to analyze and assess the dynamic processes of rivers, sediment transport, and river morphological changes.
Content	The module includes the following topics: -Introduction to an overview of river hydrodynamic processes. - Classification of flow in open canals and in rivers. - Riverbed evolution in the natural state and under the influence of human factors. - River morphology in relation to hydrodynamic features. By studying these topics, students will gain a comprehensive understanding of the dynamic processes of rivers, sediment transport, and river morphological changes. They will develop practical skills for individual and group work, self-study, and problem-solving. Furthermore, students will acquire the competence to analyze and evaluate river dynamics, sediment transport, and river morphology, enabling them to address complex issues and propose appropriate solutions in these areas.
Examination forms	1. Paper 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. Tran Minh Quang (2000), River dynamics and river correction, VNU-HCM Publishing (Vietnamese). 2. Nguyen Thanh Son (2003), Hydrological calculations, VNU-HN Publishing. 3. Zhen - Gang Ji (2008), Hydrodynamics and Water Quality: Modeling Rivers, Lakes, and Estuaries, Wiley – Interscience Publishing.

Module designation:	**Name: Aeronautical Meteorology** **Code: OMH10211**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	PHAM Van Bac
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of aeronautical meteorology which includes an introduction to aeronautical meteorological equipment systems, the influence of meteorological factors and weather conditions on flight operations and monitoring and forecasting at airport. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of aeronautical meteorology 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 aeronautical meteorology. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Introduction 2. Aeronautical meteorological equipment systems 3. The influence of meteorological factors on flight operations 4. The influence of weather conditions on flight operations

	5. Monitoring at the airport 6. Forecasting at the airport 7. Aeronautical meteorological data 8. Predictive analytics based on GRIB data
Examination forms	1. Individual activities: 20% 2. Group activities: 20% 3. Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Theodore Fujita, T., McCarthy, John (1990), The Application of Weather Radar to Aviation Meteorology, Radar in Meteorology. 2. Fahey, T. Wilson, Emily N., O'Loughlin, R., Thomas, M., Klipfel, S. (2016), A History of Weather Reporting from Aircraft and Turbulence Forecasting for Commercial Aviation, Aviation Turbulence. 3. Gill, P. G. (2016), Aviation Turbulence Forecast Verification. Weather, Aviation Turbulence. 4. Nguyen Huong Dien, Ta Van Da (2007), Radar in Meteorology, VNU University of Science, Vietnam. 5. Ismail Gultepe, Wayne F. Feltz (2020), Aviation Meteorology: Observations and Models, Springer.

Module designation:	**Name: Tropical Meteorology** **Code: OMH10212**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Minh Giam LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Tropical meteorology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the mean tropical circulation by zone, the tropics asymmetry, the characteristics of tropical, concepts related to monsoon, the Madden Julian oscillation, El Nino and the Southern Oscillation. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the tropical convergence band and thermal circulation, thermal depression tropical, El Nino
Content	This module includes the following topics: 1. Asymmetrical features of the tropics 2. Tropical Convergence Band 3. Heat Circulation and Monsoon 4. Tropical waves and tropical depressions

	5. Madden Julian Oscillation 6. El Nino and Southern Oscillation
Examination forms	1. Paper assignment: 20% 2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Krishnamutri, T. N., Stefanova and Misra, V. (2013), Tropical Meteorology, An Introduction, Springer. 2. Holton, J. R. (2004), An introduction to Dynamic Meteorology, Academic Press. 3. James, I. N. (1994), Introduction to Circulating Amosphere, Cambridge University Press

Module designation:	**Name: Weather Prediction by Numerical Methods** **Code: OMH10213**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	LA Thi Cang NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecturing, Discussion, Debate, Brainstorming, case study, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides background knowledge of basic equations in weather forecasting models. It also introduces differencing techniques, initial conditions, boundary conditions, and assumptions to set up models. In addition, it also helps learners build a numerical model in weather forecasting, set up conditions for a specific problem, and operate a weather forecasting model. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of numerical weather prediction in science and life. Be capable of using programming language to set up simulation model. - Skills: Be able to work in individual, teamwork, self-study, lifelong learning, and problem-solving. - Competences: Be able to understand the basic characteristics of numerical weather prediction. Have the capacity to learn in the next periods.

Content	This module includes the following topics: 1. Introduction and finite differences 2. Calculation of vertical motion 3. Estimation of stream functions, velocity potential and geopotential height from the wind field 4. Objective analysis 5. Basic physical concepts 6. Cumulus convection and large-scale condensation 7. Planetary boundary layer 8. Radiative transfers 9. The barotropic model 10. The single level primitive equations model 11. Data sets for numerical weather prediction 12. Model Output Diagnostics
Examination forms	1. Individual activities: 15% 2. Group activities: 15% 3. Midterm exam: 20% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Kieu Thi Xin (2000), An introduction to Numerical Weather Prediction Techniques, VNU Publishing House, Vietnam. 2. Tran Tan Tien (2007), Numerical method of weather forecasting, VNU Publishing House, Vietnam. 3. Hayes, A. (2018), Meteorology and Forecasting the Weather, Power Kids Press. 4. Pielke, Sr., Roger. A (2015), Mesoscale Atmospheric Modeling, Elsevier.

Module designation:	**Name: Introduction to Ocean Climate and Air-Sea Interaction** **Code: OMH10214**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	BUI Thi Ngoc Oanh NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of ocean climate and air-sea interactions. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of ocean climate and air-sea interactions 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 problems about ocean climate and air-sea interactions from physical perspective. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. The ocean mean state 2. Warm ocean mass 3. Air-sea fluexes from satellite data 4. Coupled atmosphere-ocean Models 5. The storage and transport of excess CO2 in the oceans

Examination forms	1. Paper assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 20% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Perrie, W. (2002), Atmosphere-ocean interactions. Vol.1, WIT Press. 2. Geoffrey K. Vallis (2011), Climate and the Oceans, Princeton University Press. 3. Adrian E. Gill, William L. Donn (2016), Atmosphere - Ocean Dynamics, Academic Press. 4. Neil C. Wells (2012), The Atmosphere and Ocean: A Physical Introduction (3rd Edition), Wiley.

Module designation:	**Name: Microclimatology** **Code: OMH10215**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Minh Giam LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecturing, Discussion, Debate, Brainstorming.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of microclimatology which includes microclimate formation, role of heat balance in microclimatology, microclimate characteristics of boundary layer. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of microclimatology 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 microclimatology. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Formation of microclimatology 2. Study methodology of microclimatology 3. Microclimate characteristics of boundary layer 4. Formation of microclimatology in soil

Examination forms	1. Paper assignment: 20% 2. Midterm exam: 20% 3. Final exam: 60%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Le Van Mai (2001), Microclimatology, VNU Publishing House, Vietnam. 2. Vegetation & Fauna / Ph. Stoutjesdijk, J.J. Barkman (2014), Microclimate, KNNV Publishing. 3. Cach-Pérez, M. J. et al. (2019), Microclimate Management: From Traditional Agriculture to Livestock Systems in Tropical Environments, Routledge. 4. Thomas Foken (2017), Micrometeorology, Springer.

Module designation:	**Name: Statistical Methods in Climate** **Code: OMH10216**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Students completing this course will be able to: + Using statistics to study climate variables + Edit climate data + Analyze climate data series over time
Content	This course aims to provide students with a comprehensive understanding of long-term climate data analysis. By acquiring this knowledge, students will be equipped to apply statistical techniques to draw informed conclusions and gain insights into the functioning of climate features. This module includes the following topics: - Basic Concepts of Probability Theory and Applications in Meteorology and Climate - Numerical Characteristics of Distribution and Problems of Data Analysis - Statistical Hypothesis Testing in Climate - Correlation and Regression Analysis - Data Adjustment in Meteorology and Climate - Data Adjustment in Meteorology and Climate
Examination forms	1. Individual activities: 25%

	2. Midterm exam: 30% 2. Final exam: 45%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Hoang Duc Cuong, Nguyen Trong Hieu (2012), Climate statistics textbook, Natural Science and Technology Publishing House. 2. Tran Tan Tien, Nguyen Dang Que (2002), Processing meteorological data and weather forecasting using physical statistical methods, VNUHN Publishing House. 3. Graham J. Borradaile (2013), Statistics of Earth Science Data: Their Distribution in Time, Space and Orientation, Springer. 4. Visconti, G. (2018), Statistics and Climate, Cambridge Springer International Publishing.

Module designation:	**Name: Atmospheric Convection** **Code: OMH10217**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	LE Quang Toai LE Dinh Quyet
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecturing, Discussion, Debate, Brainstorming.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of atmospheric convection which includes thermodynamic processes, moist convection, dry convection, the characteristics of convective cloud and convective parameterization methods. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of atmospheric convection in science and life. - Skills: Be able to work in individual, self-study, teamwork, lifelong learning, and problem-solving. - Competences: Be able to explain the basic concepts of atmospheric convection. Have the capacity to learning in the next periods.
Content	The module includes the following topics: -Introduction to Atmospheric Convection. -Thermodynamics of Convection. -Convection Initiation. -Convective Clouds and Precipitation.

	- Severe Convective Weather - Mesoscale Convective Systems. - Convection in Climate Systems. Throughout the course, students will engage in theoretical discussions, case studies, and practical exercises to deepen their understanding of atmospheric convection. They will develop the ability to analyze convection-related phenomena, interpret weather patterns, and make connections between convection and larger-scale atmospheric processes.
Examination forms	1. Paper assignment: 20% 2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Tran Tan Tien (2002), Atmospheric convection, VNU Publishing House, Vietnam. 2. Dario B. Giaiotti, Reinhold Steinacker, Fulvio Stel (2007), Atmospheric Convection: Research and Operational Forecasting Aspects, Springer. 3. S. Lavine, David P. DeWitt, and Frank P. Incropera (2007), Fundamentals of Heat and Mass Transfer, John Wiley. 4. Markowski, P. et al (2007), An Overview of Atmospheric Convection, Springer Vienna.

Module designation:	**Name: Data Analysis and Weather Prediction by Statistical Methods** **Code: OMH10218**
Semester(s) in which the module is taught	8th semester
Person responsible for the module	NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the fundamental knowledge of meteorological data analysis methods and statistical weather forecast methods with designed exercises based on the observational data. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of meteorological data analysis and statistical weather forecast methods. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze, interpret meteorological data and perform weather forecast Have the capacity to learning in the next periods.

Content	This module includes the following topics: 1. Weather forecast method 2. Data processing and analysis for meteorology 3. Statistical method and regression analysis for weather forecast 4. Application of weather analysis and forecasts 5. Exercises of weather forecast
Examination forms	1. Paper 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. Tran Tan Tien and Nguyen Dang Que (2002), Meteorological data processing and weather forecast using statistical methods, VNUHN (Vietnamese). 2. Julius S. Bendat, Allan G. Piersol (2010), Random Data: Analysis and Measurement Procedures (4th Edition), Willey. 3. Wendy Martinez, Jeffrey Solka, and Angel Martinez (2011), Exploratory Data Analysis with MATLAB (2nd edition), CRC Press. 4. Kevin Sene (2015), Hydrometeorology: Forecasting and Applications (2nd edition). Springer 5. Hoang Duc Cuong (ed.) Nguyen Trong Hieu (2012), Statistical climate methods (Vietnamese), Natural Science and Technology Publishing House.

Module designation:	**Name: River Dynamics** **Code: OMH10301**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	VO Luong Hong Phuoc
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course aims to equip students with specialized knowledge regarding the dynamic processes of water flow in rivers, sediment transport processes, and the laws and mechanisms governing riverbed evolution. Additionally, it aims to provide general knowledge about the law of channel bed deformation, which occurs due to the reciprocal interaction between water flow and the riverbed. By successfully completing this module, students will be able to accomplish the following: - Knowledge: Upon completion of this course, students will acquire a comprehensive understanding of hydrological processes, including the underlying principles and primary equations governing these processes. - Skills: Students will develop a diverse set of skills that will empower them to excel in various professional contexts. They will demonstrate the ability to work effectively both individually and in group settings, fostering collaboration and efficient teamwork. Furthermore, they will hone their problem-solving skills, equipping them with the capacity to tackle complex challenges and devise innovative solutions.

	- Competences: By the end of the course, students will be equipped with the competence to analyze and evaluate calculation and simulation results derived from numerical models that simulate changes in riverbeds. Overall, the course will enable students to develop a strong foundation of knowledge regarding hydrological processes, including the relevant equations and numerical computational techniques.
Content	This module includes the following topics: 1. Brief history of river dynamics development. 2. Methods of studying river dynamics 3. Overview of open channel flow 4. Introduction to steady flow in the river 5. Introduction to unstable flow in the river 6. Introduction to the secondary flow in the river 7. Evolution of riverbed in natural state By covering these topics, this module provides students with a comprehensive understanding of river dynamics. They will acquire knowledge about the historical development of the field, the methodologies used to study rivers, and the fundamental concepts related to open channel flow, steady flow, unstable flow, secondary flow, and the evolution of riverbeds. This knowledge will form a solid foundation for further exploration and analysis of river dynamics in both research and practical applications.
Examination forms	1. Paper 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. Tran Minh Quang (2000), River dynamics and river management, VNUHCM Publishing (Vietnamese). 2. Zhen - Gang Ji (2008), Hydrodynamics and Water Quality: Modeling Rivers, Lakes, and Estuaries, Wiley – Interscience.

Module designation:	**Name: Hydraulic** **Code: OMH10302**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise.
Workload (incl. contact hours, self-study hours)	Total workload: 135 Contact hours: lecture: 45 Private study: 90
Credit points	3 Credits (4.5 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Hydraulic Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the basic physics of fluid pressure distribution, flows in pipes and channels, the laws of fluid pressure distribution on different types of walls. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain what the equation of momentum means for different types of flow.
Content	This module includes the following topics: - Introduction to computational fluid dynamics and its applications - Fluid forces on surfaces - Flow in open channels: - Uniform flow and Manning's equation - Hydraulic jump and its applications - Applications of hydraulics: This comprehensive list covers the major topics typically

	included in a hydraulics course. It provides a foundation for understanding the behavior of fluids, fluid flow in pipes and open channels, hydraulic machines and systems, and various applications of hydraulics. Additionally, it introduces key concepts related to fluid mechanics and computational fluid dynamics, as well as the forces exerted by fluids on surfaces.
Examination forms	1. Paper assignment: 20% 2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Hoang Thi Nguyet Minh (2011), Textbook of Hydraulics, VNUHN Publishing House. 2. Phung Van Khuong, Tran Dinh Nghien, Pham Van Vinh (2007), Basic hydraulics, Construction Publishing House 3. Brater, E., H. King, J. Lindell và C. Wei (1996), Handbook of hydraulics, McGraw-Hill. 4. Graf W. H (1996), Fluvial hydraulics, New York, NY 10158-0012, USA. ISBN 0471977144.

Module designation:	**Name: Watershed Hydrology** **Code: OMH10303**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The module provides students with basic knowledge about the water cycle, which helps them to understand the systematic mechanisms of water and energy transfer and accumulation in the water cycle. Students who complete this module could be achieved the following: - Knowledge: Ability to understand the processes in the water cycle; ability to understand the role of watersheds in balancing and maintaining water resources. - Skills: Ability to use teamwork skills in discussing course topics; Ability to read and understand specialized documents.
Content	This module includes the following topics: -Watershed Concepts and Characteristics. -Definition and components of a watershed - Precipitation and Evapotranspiration. - Types of precipitation - Measurement and estimation of precipitation -Evapotranspiration processes and estimation methods - Evaporation and transpiration from different surfaces

	- Infiltration and soil water: - Measurement and estimation of infiltration - Soil water storage and movement within the watershed - Hydrograph analysis techniques - Watershed modeling and simulation This comprehensive list covers the major topics typically included in a watershed hydrology course. It provides a thorough understanding of the key concepts and processes related to water movement within a watershed, including precipitation, evapotranspiration, infiltration, runoff generation, streamflow analysis, groundwater hydrology, watershed modeling, water quality, land use impacts, and integrated watershed management.
Examination forms	1. Individual activities (Exercise): 25% 2. Midterm exam: 25% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Lieu Kim Sanh (1974), River hydrology, Volume 2: Inundation and flooding, solid movement, Lua thieng Publishing House. 2. Peter E. Black (1988), Watershed Hydrology, Prentice – Hall. 3. Chow, V.T (1965), Handbook of applied hydrology, McGraw-Hill Book Co. Inc. 4. McGraw-Hill Book Co. Inc (2016), Handbook of Applied Hydrology, McGraw-Hill Education. 5. Haan, C. T., Hayes, J. C., Barfield, Billy J., (1994), Design Hydrology and Sedimentology for Small Catchments, Elsevier.

Module designation:	**Name: Hydrological Topics** **Code: OMH10304**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An LE Xuan Tu
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The module provides students with knowledge about the formation, distribution, and development rules of streamflow characteristics, as well as the knowledge of calculation procedures, simulation of streamflow from rainfall using mathematical hydrological models for medium and small watersheds. Students who complete this module could be achieved the following: - Knowledge: Understand the formation, distribution, and development laws of streamflow characteristics; Understand the methods used in streamflow calculation. - Skills: Apply knowledge to apply mathematical models in streamflow forecasting; Apply teamwork skills to participate in discussions on course topics; Read and understand specialized documents.

Content	This module includes the following topics: - Surface runoff - Streamflow and river flow - Water resources management - Water resources management - Hydrological modeling: - Climate change and hydrology - Remote sensing and GIS in hydrology This comprehensive list covers the major topics typically included in hydrology courses. It provides a comprehensive understanding of the various aspects of hydrological processes, including the hydrological cycle, precipitation, evapotranspiration, infiltration, surface runoff, groundwater, streamflow, floods, water resources management, hydrological modeling, climate change impacts, and the use of remote sensing and GIS in hydrology.
Examination forms	1. Individual activities (Exercise): 25% 2. Midterm exam: 25% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Thanh Son (2003), Hydrological calculations, VNUHN Publishing House. 2. Wilfried Brutsaert (2005), Hydrology - An Introduction, Cambridge University Press. 3. K. P. Klibasev; I. F. Goroskov (1975), Hydrological calculations, cience and Technology Publishing. 4. Nguyen Thi Bay, Tran Thi Kim (2018), Applied hydrology and calculations, VNUHCM Publishing House. 5. Nguyen Khac Cuong (2015), Structural hydrology, VNUHCM Publishing House.

Module designation:	**Name: Practical Hyrology** **Code: OMH10305**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	NGUYEN Hoang Phong LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
Workload (incl. contact hours, self-study hours)	Total workload: 180 Contact hours: practice: 90 Private study: 90
Credit points	3 Credits (6 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides skills in collecting, analyzing and presenting data in Hydrology. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of regulations on monitoring in Earth Science in work at research institutes. - Skills: Be able to analyze and collect data in individual, teams in practical observations - Competences: Be able to conduct the survey. Have the ability to learn in the next stages.
Content	This module includes the following topics: 1. Regulations and regulations on monitoring in Oceanography, Meteorology and Hydrology 2. Analyze and process collected data and write reports 3. Practical observations
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. Vu Van Nghi (2016), Hydrological mathematical model, Science and Technology Publishing (Vietnamese). 2. Nguyen Thanh Son (2003), Hydrological Calculations, VNU-HN Publishing (Vietnamese). 3. Ministry of Natural Resources and Environment (2012), National technical regulation on hydrological monitoring, Ha Noi Publishing.

Module designation:	**Name: Geography and Hydrogeology** **Code: OMH10306**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Hydraulic Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of the basic concepts of hydrogeology, the basic concepts of physical hydrogeology, the basic concepts of groundwater environmental management. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain of measurement data, the techniques of surveying and surveying.
Content	This module includes the following topics: 1. Introduction to hydrogeology 2. Physical hydrogeology 3. Groundwater survey techniques 4. Groundwater quality and hydrogeological contaminants 5. Groundwater resources and groundwater environment management
Examination forms	1. Assignment: 20%

	2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Kevin M. Hiscock, (2005), Hydrogeology: principle and practice, Blackwell Publisher. 2. Charles Willard Fetter, (1994), Applied hydrogeology, 3rd edition, Prentice Hall. 3. Matthew M. Uliana, (2012), Hydrogeology lecture notes, edition 2.3.

Module designation:	**Name: Estuarine Hydro-Ecology** **Code: OMH10307**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	BUI Thi Ngoc Oanh DO Huu Hoang
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course provides students with knowledge about the hydrological ecosystem of estuaries. Students who complete this module could be achieved the following: - Knowledge: Understanding the ecosystems in the coastal and estuarine areas; Understanding the role of coastal and estuarine ecosystems in nature and for humans. - Skills: Knowing the methods of teamwork; Knowing the skills of personal development.
Content	This module includes the following topics: 1. Concepts of coastal and estuarine ecosystems 2. Typical ecosystems 3. Human impacts on coastal environments 4. Management and sustainable development of coastal areas
Examination forms	1. Assignment: 15% 2. Individual activities: 15% 3. Midterm exam: 20%

	4. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Michael J. Kennish (1992), Ecology of estuaries: Anthropogenic effects, CRC Press. 2. Nguyen Huu Khai, Nguyen Van Tuan (2001), Hydrogeography, VNUHN Publishing. 3. Zhen-Gang Ji (2017), Hydrodynamics and Water Quality: Modeling Rivers, Lakes, and Estuaries, Wiley. 4. Philip B. Bedient, Wayne C. Huber, Baxter E. Vieux (2008), Hydrology and Floodplain Analysis, Prentice Hall.

Module designation:	**Name: Hydrological Modelling Tools** **Code: OMH10308**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course will equip students majoring in hydrology with basic knowledge of models applied in hydrological computational research. In addition, histology also equips students with practical knowledge applied in running simulations of basic hydrological problems. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the hydrological processes and primary equations and numerical computational technique to solve these equations. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and apply some basic hydrology model in the practice problems.
Content	This module includes the following topics: 1. Concepts of system analysis and hydrological mathematical models 2. Rainfall-runoff models and their application in the world

	and Vietnam 3. The situation of using hydrological mathematical models in Vietnam 4. The situation of using hydrological mathematical models around the world 5. Typical rainfall-runoff models
Examination forms	1. Paper 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. Vu Van Nghi (2016), Hydrological mathematical model, Scientific and technical publishing (Vietnamese). 2. Sharad K. Jain, Vijay P. Singh (2019), Engineering Hydrology: An Introduction to Processes, Analysis, and Modeling, McGraw-Hill Education.

Module designation:	**Name: Hydrological Agriculture and Urban** **Code: OMH10309**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The subject of agricultural and urban hydrology encompasses the study of water dynamics and management in agricultural and urban environments. It focuses on understanding the intricate relationships between water resources, hydrological processes, and the unique challenges faced in these specific settings. By examining the interplay between water availability, quality, and usage, this subject aims to develop comprehensive knowledge and practical skills for sustainable water management.
Content	This module includes the following topics: 1. Introduction to hydrological agriculture and urban systems 2. Agricultural water management 3. Urban hydrology and stormwater management 4. Water quality in agricultural and urban watersheds 5. Sustainable water management in agriculture and urban areas 6. Case studies and practical applications

Examination forms	1. Paper assignment: 10% 2. Individual activities: 15% 3. Midterm exam: 25% 4. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Uyen (2006), Applied hydrogeology, Construction Publishing. 2. Lieu Kim Sanh (1974), River hydrology, Volume 2: Inundation and flooding, solid motion, Sacred Fire Publishing. 3. Haygarth, P. M., Jarvis, S. C (2002), Agriculture, Hydrology, and Water Quality, CABI Publishing. 4. Nguyen Van Nghiep (2001), Applied Hydrology, VNUHCM Publishing. 5. McDowell, R.W., Laurenson, S. (2014), Water: Water Quality and Challenges from Agriculture, Elsiver. 6. Goh Kim Chuan (2005), Hydrology and Rural Water Supply in Southeast Asia, The Physical Geography of Southeast Asia.

Module designation:	**Name: Computational Hydrology** **Code: OMH10310**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	LAM Van Hao LE Xuan Tu
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course provides students with fundamental and advanced knowledge of hydrological processes and computational methods for simulating and computing these processes. The main subject of this course will be focused on developing theoretical knowledge and practical skills related to the application of computational methods and modeling techniques in hydrological analysis. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the hydrological processes and primary equations and numerical computational techniques to solve these equations. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and compute some hydrological processes and features.

Content	This module includes the following topics: 1. Introduction to computational hydrology 2. Introduction to computational hydrology 3. Mathematical and numerical methods in hydrology 4. Introduction to computational hydrology 5. Case studies and practical applications 6. Case studies and practical applications The module objectives aim to equip students with the knowledge and skills necessary to apply computational methods and modeling techniques in hydrological analysis. By combining theoretical understanding with practical application, students can effectively utilize computational tools to address hydrological challenges, improve water resources management, and make informed decisions in the field of hydrology.
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. Nguyen Thi Bay (2018), Applied hydrology and computation (Vietnamese), VNUHCM Publishing. 2. Nguyen Thanh Son (2013), Hydrological calculations, VNUHN Publishing. 3. K. P. Klibasev and I. F. Goroskov (1975), Computational hydrology (translated into Vietnamese), Science and technology Publisher. 4. Ven Te Chow (1988), Applied Hydrology, Mc Graw Hill. 5. John C. Manning (1987), Applied Principles of Hydrology, Merril.

Module designation:	**Name: Prediction of Hydrology** **Code: OMH10311**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An LE Xuan Tu
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The course equips students with knowledge of and skills in forecasting models of hydrological factors such as river flows, floods, etc. Specifically, flood forecasting models using the corresponding water level method, predictive models. The focus of this course will be predicted water level variation, flood waves, flow, and velocity distribution. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the approach methods for predicting water level variation, flood waves, flow, and velocity distribution. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and calculate some features such as water level, flood waves, flow, and velocity distribution.

Content	This module includes the following topics: 1. Introduction to basic concepts of hydrological forecasting. 2. Methods of forecasting flood wave movement and water level variation. 3. Flow forecasting for the operation and sustainable management of the reservoir. 4. Practice measuring and monitoring hydrological factors. 5. Remote sensing application for flood forecasting 6. Case studies and practical applications These module objectives aim to equip students with the knowledge and skills necessary to predict and forecast hydrological processes. By understanding prediction methods, utilizing hydrological models, and incorporating data analysis techniques, students can contribute to improved water resources management, flood forecasting, drought monitoring, and other applications where accurate and reliable hydrological predictions are essential.
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. Vu Van Nghi (2016), Hydrological model, Scientific and technical publisher (Vietnamese). 2. Nguyen Thanh Son (2003), Hydrological calculations, VNU-HN Publishing. 3. Andre Musy, Christophe Higy (2011), Hydrology: A Science of Nature, CRC Press Publishing.

Module designation:	**Name: Hydrological and Hydrolics Models** **Code: OMH10312**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An NGUYEN Hoang Phong TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of the Hydraulic Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge some knowledge about hydrological computational models, the deterministic pattern model, random patterns model, the Streeter-Phelp model, the CORMIX model and the hydraulic model of the river network. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain hydrological computational models.
Content	This module includes the following topics: 1. The concept of hydrological computational model 2. Deterministic model 3. Random model 4. Water quality model These module objectives aim to equip students with the

	knowledge and skills necessary to utilize hydrological and hydraulic models for various applications. By understanding modeling principles, data processing, calibration, and uncertainty analysis, students can effectively simulate and analyze hydrological and hydraulic systems, contributing to informed decision-making and sustainable water resources management. River network hydraulic model.
Examination forms	1. Assignment: 30% 2. Midterm exam: 30% 3. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Huu Khai, Nguyen Thanh Son (2003), Hydrographic Mathematical Modeling, National University Publishing House. 2. Vijay P. Singh, Donald K. Frevert (2002), Mathematical Models of Small Watershed Hydrology and Applications, Water Resources Publication. 3. Vijay P. Singh, Donald K. Frevert (2002), Mathematical Models of Large Watershed Hydrology, Water Resources Publication.

Module designation:	**Name: Hydrologic Measurement** **Code: OMH10313**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, 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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The objectives aim to equip students with the knowledge and skills necessary to conduct hydrologic measurements accurately and effectively. By understanding measurement techniques, instrument operation, data acquisition, and quality control, students can contribute to obtaining reliable data for hydrological analysis, water resources management, and decision-making. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the measurement approaches and data analysis related to hydrological features. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and calculate some hydrological features.

Content	This module includes the following topics: 1. Introduction to hydrologic measurement 2. Measurement techniques and instrumentation 3. Field measurements of flow, velocity, salinity, water temperature, and sediment concentration. 4. Data acquisition and quality control. 5. Field work and safety 6. Data analysis and reporting
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 Dinh Loi, Nguyen Nang Minh (2002), Measurement and correction of hydrological data. Measuring and editing hydrological data, Construction publisher (Vietnamese). 2. Nguyen Thanh Son (2003), Hydrological calculations, VNU-HN Publishing. 3. Todd C. Rasmussen (2012), Hydrology Measurements, John Wiley & Sons, Inc Publishing.

Module designation:	**Name: Environmental Hydrology** **Code: OMH10314**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	BUI Thi Ngoc Oanh TRAN Xuan Dung
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	These module objectives aim to equip students with the knowledge and skills necessary to understand and address the environmental aspects of hydrology. By studying the interactions between hydrological processes and the environment, students can contribute to sustainable water resources management, ecosystem conservation, and the protection of water quality in various environmental contexts. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge the basic concepts in the field of environmental hydrology, the water cycle in nature, the main hydrological models, the basin acidification pattern, water pollution patterns in shallow water and identify physical factors affecting surface runoff. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to explain the water pollution models and causes of flooding from nature and humans.

Content	This module includes the following topics: 1. Introduction to environmental hydrology 2. Water cycle and watershed processes 3. Hydrological impacts of land use and land cover changes 4. Ecosystem hydrology 5. Climate change and hydrological responses 6. Data collection and analysis 7. Case studies and practical applications
Examination forms	1. Assignment: 20% 2. Midterm exam: 30% 3. Final exam: 50%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Wilfried Brutsaert (2006), Hydrology – An Introduction, University Press, Cambridge. 2. Vijay J. Singh (1995), Environmental Hydrology, Springer-Science+Business

Module designation:	**Name: River Engineering** **Code: OMH10315**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, Video.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	These module objectives aim to equip students with the knowledge and skills necessary to effectively design, manage, and restore rivers and river systems. By understanding river processes, channel design, flood control, and environmental considerations, students can contribute to sustainable river management, resilient infrastructure, and the preservation of river ecosystems. Students who complete this module could be achieved the following: - Knowledge: Be able to understand the river morphological processes. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to analyze and calculate some calculating processes of riverbank erosion and riverbed erosion and deposition.

Content	This module includes the following topics: 1. Introduction to river engineering. 2. River morphology and processes. 3. River hydrology and hydraulics. 4. River channel design. 5. Riverbank protection and erosion control 6. Floodplain management and flood control 7. Sustainable river management 8. Case studies and practical 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. Tran Minh Quang (2014), River dynamics and river management, VNU-HCM Publishing House (Vietnamese). 2. Avijit Gupta (2019), Large Rivers: Geomorphology and Management, Wiley-Blackwell Publishing. 3. Aronne Armanini (2018), Principles of River Hydraulics, Springer Publishing.

Module designation:	**Name: Management of Water Resources** **Code: OMH10316**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise, Group report.
Workload (incl. contact hours, self-study hours)	Total workload: 90 Contact hours: lecture: 30 Private study: 60
Credit points	2 Credits (3 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	The module provides knowledge about the collection of meteorological and hydrological information, the measurement of water resources characteristics, and the calculation methods related to water resources. Students who complete this module could be achieved the following: - Knowledge: Present issues related to water resources on Earth, the influence of natural geographical conditions on water resources; Classify methods of measuring and calculating water resources; Evaluate physical, chemical, and biological parameters of water quality, economic activities affecting water quality, and measures to protect surface water from contamination; Identify issues related to Vietnam's water resources. - Competences: Serious and honest in studying and testing.
Content	1. Introduction to water resources 2. Investigation and calculation of water resources national hydrological statue 3. Methods of assessing territorial water resources

	4. Assessing water quality 5. Surface water resources in Vietnam 6. Main river systems in Vietnam
Examination forms	1. Individual activities (Exercise): 30% 2. Group Report: 10% 3. Midterm exam: 20% 3. Final exam: 40%
Study and examination requirements	Minimum attendance at lectures is 80%
Reading list	1. Nguyen Thanh Son (2010), Assessment of Vietnam's water resources, Vietnam Education Publishing. 2. Nguyen Thi Ngoc An (2005), Environmental Management and Natural Resources, Agriculture Publishing. 3. Nguyen Huu Khai, Nguyen Van Tuan (2001), Hydrogeography, VNUHN Publishing. 4. Nguyen Thanh Son (2003), Hydrological calculations, VNUHN Publishing. 5. Daniel H. Chen (2017), Sustainable Water Management, CRC Press. 6. Robert C. Brears (2021), Water Resources Management: Innovative and Green Solutions, De Gruyter.

Module designation:	**Name: Dynamics of Marine Environment** **Code: OMH10401**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	VO Luong Hong Phuoc LE Quang Toai LA Thi Cang,
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	• Introduction of Oceanology • Applied programing • Fluid mechanics
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	6th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	6th semester
Person responsible for the module	LE Quang Toai LE Nguyen Hoa Tien
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	6th semester
Person responsible for the module	BUI Thi Ngoc Oanh DO Huu Hoang
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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: Special Topics in Oceanology, Meteorology, and Hydrology** **Code: OMH10405**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	DANG Truong An NGUYEN Hoang Phong NGUYEN Tien Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice.
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	These module objectives aim to provide students with a comprehensive understanding of specialized topics in oceanology, meteorology, and hydrology. By exploring emerging trends, advanced concepts, and research methods, students can deepen their knowledge in specific areas of interest. Additionally, the module emphasizes the interdisciplinary nature of these fields and encourages the application of theoretical knowledge to real-world scenarios. Students completing this course will be able to: + Exploit ocean data + Exploit Hydrological data + Exploit meteorological data

Content	This course aims to delve deeper into topics about oceanography, meteorology and hydrology, and about the process to solve a practical problem: there is a close combination of theory - practical practice - practice in the laboratory. experimental – computational model. Besides basic theories, the subject also includes practical and laboratory practices. - Exploration of emerging topics in oceanography, meteorology and hydrology fields -Climate change and global environmental challenges - Meteorological phenomena and atmospheric dynamics hydrological modeling and water -Resources management - Coastal processes and management - Case studies and applied projects
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. Richard E. Thomson, William J Emery, Waltham (2014), Data Analysis Methods in Physical Oceanography (3rd Edition), Elsevier Science. 2. Pham Van Huan (2003), Computational in Oceanography, VNUHN Publishing. 3. Nguyen Thanh Son (2003), Hydrological calculation, VNUHN Publishing. 4. Phan Van Tan (2003), Statistical methods in climate, VNUHN Publishing.

Module designation:	**Name: Practical Majors** **Code: OMH10406**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	TRAN Xuan Dung LAM Van Hao
Language	Vietnamese
Relation to curriculum	Compulsory / Specialisation
Teaching methods	Lecture, Discussion, Debate, Exercise, Practice, Group activities.
Workload (incl. contact hours, self-study hours)	Total workload: 240 Contact hours: practice: 120 Private study: 120
Credit points	4 Credits (8 ETCS Credits)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides basic knowledge of forecast tools and how to conduct a survey in the field. Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of forecast tools in meteorology, hydrology in work at research institutes. - Skills: Be able to understand in individual, self-study - Competences: Be able to explain the basic characteristics of forecast tools and conduct the survey. Have the ability to learn in the next stages.
Content	This module includes the following topics: 1. Forecast Tools 2. Principles of the weather forecast 3. Regulations and regulations on monitoring in Oceanography, Meteorology and Hydrology 4. The process of conducting surveys on the sea

Examination forms	1. Assignment = 10% 2. Pratice: 30% 3. Group activities: 20% 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. Tran Tan Tien, Nguyen Dang Que (2002), Processing meteorological data and weather forecasting by using physical statistics, VNU-HN Publishing (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.

Module designation:	**Name: Modeling Tools** **Code: OMH10407**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	DANG Truong An NGUYEN Hoang Phong NGUYEN Minh Giam
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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: Weather Forecast** **Code: OMH10408**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	LE Thi Xuan Lan NGUYEN Vinh Xuan Tien
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	This module provides the basic knowledge of weather forecast Students who complete this module could be achieved the following: - Knowledge: Be able to understand and apply knowledge of weather forecast in science and life. - Skills: Be able to work in individual, group work, self-study, lifelong learning, and problem solving. - Competences: Be able to forecast/predict the basic weather phenomena. Have the capacity to learning in the next periods.
Content	This module includes the following topics: 1. Synoptic method 2. Atmospheric circulation 3. Synoptic scale and analyzing typical weather patterns 4. Introduction to numerical forecasting 5. Numerical weather prediction
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. Tran Cong Minh (2009), Synoptic meteorology: The tropics, VNU Publishing House (Vietnamese). 2. Tran Tan Tien, Nguyen Dang Que (2002), Processing meteorological data and weather forecasting by physical statistics, VNU Publishing House (Vietnamese). 3. Gerald Augusto Corzo Perez (2009), Hybrid models for hydrological forecasting: Integration of data - driven and conceptual modelling techniques, CRC Press. 4. Mak, Mankin (2011), Atmospheric Dynamics, Cambridge University Press. 5. B.M. Jamart, J.C.J. Nihoul (1989), Mesoscale/Synoptic Coherent Structures in Geophysical Turbulence, Elsevier Science. 6. Eugenia Kalnay (2003), Atmospheric modeling, data assimilation, and predictability, Cambridge university press.

Module designation:	**Name: Integrated Coastal Zone Management** **Code: OMH10409**
Semester(s) in which the module is taught	8th semester
Person responsible for the module	VO Luong Hong Phuoc LE Dinh Mau
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	6th semester
Person responsible for the module	NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	7th semester
Person responsible for the module	BUI Thi Ngoc Oanh NGUYEN Cong Thanh
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	7th semester
Person responsible for the module	NGUYEN Cong Thanh NGUYEN Hoang Phong
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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	7th semester
Person responsible for the module	DANG Truong An NGUYEN Minh Giam LAM Van Hao
Language	Vietnamese
Relation to curriculum	Elective / Specialisation
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)
Requirements and recommended prerequisites for joining the module	
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