BACHELOR OF SCIENCE

IN ELECTRONIC PHYSICS TECHNOLOGY AND INFORMATICS

MODULE HANDBOOK

BAA00101 - Philosophy Marx-Lenin

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 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** The course equips students with the basic contents of the worldview and the Marxist-Leninist philosophical methodology. **Skill:** 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.

BAA00102 - Marxist-Leninist Political Economic

Module designation	**Name: Marxist-Leninist Political Economic** **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 ECTS Credits
Requirements and recommended prerequisites for joining the module	BAA00101 - Marxist-Leninist Philosophy
Module objectives/intended learning outcomes	**Knowledge:** 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. **Skill:** 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. **Attitudes:** 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	1. Mac-Leninist political economy textbook for undergraduates who are not majoring in political economy.

BAA00103 - Scientific Socialism

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 ECTS Credits
Requirements and recommended prerequisites for joining the module	BAA00101 - Marxist-Leninist Philosophy BAA00102 - Marxist–Leninist Political Economy
Module objectives/intended learning outcomes	**Knowledge:** The subject equips students with the basic contents of scientific socialism (one of the three components constituting Marxism-Leninism). **Skill:** 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

BAA00104 - History of Vietnamese Communist Party

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 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** 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). **Attitudes:** 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. **Skill:** 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	1. Ministry of Education and Training (2012), Subject program of History of Vietnamese Communist Party.

BAA00003 - HoChiMinh's Ideology

Module designation	**Name: HoChiMinh'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 ECTS 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	Minimum attendance at lectures is 80%

requirements	
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.

BAA00004 - Introduction to Vietnamese Law System

Module designation	**Name: Introduction to Vietnamese Law System** **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 ECTS 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.

BAA00005 - General Economics

Module designation	**Name: General 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 ECTS 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.

BAA00006 - General Psychology

Module designation	**Name: General 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 ECTS 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.

BAA00007 - Creative Methodology

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 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** - 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 **Skill:** - 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.

MTH00003 - Integral Calculus 1B

Module designation	**Name: Integral 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 ECTS 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.

MTH00004 - Integral Calculus 2B

Module designation	**Name: Integral 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 ECTS 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.

MTH00081 - Practice for Integral Calculus 1B

Module designation	**Name: Practice for Integral Calculus 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 ECTS 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.

MTH00030 - Linear Algebra

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 ECTS 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.

MTH00040 - Probability Statistics

Module designation	**Name: Probability 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 ECTS 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	Minimum attendance at lectures is 80%

requirements	
Reading list	1. Nguyen Thi Mong Ngoc (2018), Probability Statistics, VNUHCM Publishing House. 2. Dang Duc Trong (2016), Statistical theory, VNUHCM Publishing House.

CHE00001 - General Chemistry 1

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 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** 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.

PHY00001 - General Physics 1 (Mechanics and Thermodynamic)

Module designation	**Name: General Physics 1 (Mechanics and Thermodynamic)** **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 ECTS 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.

PHY00002 - General Physics 2 (Electromagnetism - Optics)

Module designation	**Name: General Physics 2 (Electromagnetism - Optics)** **Code: PHY00002**
Semester(s) in which the module is taught	2nd semester
Person responsible for the module	DO Duc 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 ECTS 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.

PHY00004 - Modern Physics

Module designation	**Name: Modern Physics** **Code: PHY00004**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Assoc. Prof. HUYNH Truc Phuong
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, lesson, discussion, debate
Workload	135 Hours Contact hours: Lectures: 45 hours *(in class)* Private study: 90 hours *(self-study)*
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	Calculus 1B, General physics 1, General physics 2
Module objectives/intended learning outcomes	This module provides students with fundamental knowledge of quantum optics, atomic and nuclear physics. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand quantum optics, atoms and nuclei in the discovery and study of matter. Be able to apply quantum optics, atoms and nuclei in science activities. **- Skills:** Be able to work in individual, group work, and problem solving. **- Competences:** Ability to apply modern physics knowledge to analyze new physical situations. **- Attitude:** Honesty and diligence
Content	This module includes the following topics: 1. Wave-particle duality of light 2. Waves of matter 3. Fundamentals of quantum mechanics 4. Fundamentals of atomic physics 5. Fundamentals of nuclear physics
Examination forms	Projects (Individual activities); Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0

Reading list	**Main books:** 1. Huynh Truc Phuong, Truong Thi Hong Loan, Chau Van Tao (2015). Quantum – Atomic - Nuclear. For internal circulation only, University of Science, VNUHCM, Vietnam. **References:** 1. Raymond A. Serway, John W. Jewett, Sr (2014). Physics for Scientists and Engineers with Modern Physics. Ninth Edition. BROOK/COLE, USA. 2. Alan Giambattista, Betty McCarthy Richardson, Robert C. Richardson (2010). Physics. Second Edition. McGrawHill, USA.

PET00001 - Introduction to Engineering

Module designation	**Name: Introduction to Engineering** **Code: PET00001**
Semester(s) in which the module is taught	1st semester
Person responsible for the module	MSc. NGUYEN Vuong Thuy Ngan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Teaching, Discussion, Practice, Course projects
Workload	135 Hours Face-to-face: Lectures: 15 hours (in class), Practice:60 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Introducing basic engineering students to soft skills such as writing, presentation, and presentation of technical reports, as well as the ability to solve issues. In addition, this course also trains students in professional ethics as well as building awareness and responsibility of the individual with the expectations of the country. Introduction to engineering design processes, project management, basic skills in engineering, providing learning opportunities, and using various software tools of related engineering disciplines. Students will learn to work in a team environment, using design methods to solve multidisciplinary engineering problems in practice. Students who complete this module could achieve the following: - **Knowledge:** Be able to apply natural science knowledge to technical mathematics. - **Skills:** Ability to design and knowledge of design sequence on demand at the most basic level, teamwork skills, and technical problem presentation skills through writing reports and presentations. - **Attitude:** Honest

Content	This module includes the following topics: 1. Introduction to effective learning techniques and methods 2. Occupational ethics 3. Teamwork skills 4. Communication in Engineering 5. Technical Design 6. Project Manager 7. Ability to solve problems and discuss issues related to the mid-term plan 8. Experimental design 9. How to prepare a presentation
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Oakes, Leone, Gunn, Engineering Your Future, A Comprehensive Approach, 5th Edition, Great Lake Press, 2018. **References:** 1. Saeed Moaveni, Engineering fundamentals - an introduction to engineering - 4th edition 2. Philip Kosky, George Wise, Robert Balmer, William Keat, Exploring Engineering - An Introduction to Engineering and Design.

PHY00081 - Lab Work on General Physics

Module designation	**Name: Lab Work 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 ECTS 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	1. Dang Van Liet, Do Dinh Luyen, Nguyen Van Nghia, Tran Thi Kim Phuong (2008), General Physics Experiments, University of Science – VNUHCM.

GEO00002 - Earth Science

Module designation	**Name: Earth Science** **Code: GEO0002**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, discussion, debate
Workload	90 Hours Contact hours: Lectures: 30 hours *(in class)* Private study: 60 hours *(self-study)*
Credit points	2 Credits/ 3 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The subject introduces general knowledge about the earth related to the earth's spheres, the earth's operating position in space, the composition and structure of the atmosphere, wind, weather, climate … Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand the earth's natural environment **- Skills:** Be able to work in individual, group work, and problem solving. **- Competences:** Ability to apply earrth science knowledge to explain natural phenomena. **- Attitude:** Honesty and diligence
Content	This module includes the following topics: 6. Earth in space 7. Physical and chemical properties of the earth 8. Atmospheric composition and structure 9. Wind and weather 10. Climate change 11. Sweetness of the earth 12. Seas and oceans 13. Mineral 14. Earthquakes and volcanoes 15. Earth history
Examination forms	Mid-term: Written exam and Final exam: multiple choice

Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Earth Science, DANIELSON, E.W., DENECKE, E.J.Jr"l986 2. Foundations of Eurth Science, Lutgens Frederick K. Tarbtrck Edlvard J. 1991

ENV00001 - General Environment

Module designation	**Name: General Environment** **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 ECTS
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.

CSC00003 - Computer Science 1

Module designation	**Name: Computer Science 1** **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 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** Students have the general knowledge of computers as well as the fundamentals of working with the Windows operating system and Internet services. **Skill:** 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.

ADD00031 - English 1

Module designation	**Name: English 1** **Code: ADD00031**
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/ 4.5 ECTS Credits
Requirements and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	**Knowledge:** - 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. **Skill:** 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.

ADD00032 - English 2

Module designation	**Name: English 2** **Code: ADD00032**
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/ 4.5 ECTS Credits
Requirements and recommended prerequisites for joining the module	ADD00031 - English 1
Module objectives/intended learning outcomes	**Knowledge:** - 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. **Skill:** 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.

ADD00033 - English 3

Module designation	**Name: English 3** **Code: ADD00033**
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/ 4.5 ECTS Credits
Requirements and recommended prerequisites for joining the module	ADD00032 - English 2
Module objectives/intended learning outcomes	**Knowledge:** - 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. **Skill:** 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.

ADD00034 - English 4

Module designation	**Name: English 4** **Code: ADD00034**
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/ 4. 5 ECTS Credits
Requirements and recommended prerequisites for joining the module	ADD00033 - English 3
Module objectives/intended learning outcomes	**Knowledge anh skills:** - 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.

BAA00021 - Physical Education 1

Module designation	**Name: Physical Education 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 ECTS 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.

BAA00022 - Physical Education 2

Module designation	**Name: Physical Education 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 ECTS 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.

PET10001 - Object Oriented Programming

Module designation	**Name: Object Oriented Programming** **Code: PET10001**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	MSc. NGUYEN Vuong Thuy Ngan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Teaching, Discussion, Practice, Course projects
Workload	135 Hours Face-to-face: Lectures: 15 hours (in class), Practice: 60 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students gain knowledge of fundamental concepts and components, data structures in C++, and object-oriented programming. Handling files, XML, and JSON files using C++. Connecting database management systems with C++. Constructing classes and creating objects with C++. Proficiency in using C++ editors and compilers to execute C++ programs. Analyzing, designing, and implementing object-oriented problems on computers using C++. Students who complete this module could achieve the following: - **Knowledge:** Have basic knowledge and use of C++ programming language; Knowledge of object-oriented programming, use of objects-orientated programming languages. - **Skills:** Develop practical applications in C++; Skilled in C++ interface programming, with data-based operations. Ability to design and knowledge of design sequence on demand at the most basic level, teamwork skills, and technical problem presentation skills through writing reports and presentations. - **Attitude**: Honest
Content	This module includes the following topics: 1. Overview of Object-Oriented Programming 2. C++ basic concepts 3. Class vs Object 4. Encapsulation 5. Inheritance 6. Polymorphism 7. Abstraction

	8. Exception and Error Handling
Examination forms	Class discussion; quizzes and projects; Mid-term: project, and Final exam: Practical exam (on computer)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Nguyễn Thanh Thuỷ, Lê Đăng Hưng, Nguyễn Hữu Đức, Tạ Tuấn Anh, Lập trình hướng đối tượng với C++, 2019. 2. Bjarne Stroustrup, Addison-Wesley, The programming language C++, Addison-Wesley, 2018 **References:** 1. W3 school, C++ tutorial, W3 school, 2024

PET10002 - Fundamental of Semiconductor Devices

Module designation	**Name: Fundamental of Semiconductor Devices** **Code: PET10002**
Semester(s) in which the module is taught	2thsemester of 2nd year
Person responsible for the module	PhD Pham Thanh Tuan Anh
Language	Vietnamese, English
Relation to curriculum	Compulsory
Teaching methods	Lecture, consult with supervisors
Workload	30 hours Contact hours (lecture): 24 hours Private study including examination preparation, specified in hours: 6 hours
Credit points	2 Credits/ 3 ECTS
Required and recommended prerequisites for joining the module	Modern Physics (Quantum – Atom – Nucleus)
Module objectives/intended learning outcomes	- **Knowledge:** basic knowledge and background on the structure, characteristics, properties, and operating mechanisms of semiconductor materials and devices, including an introduction to the properties and principles of semiconductors, p-n junctions, diodes, transistors, MOSFETs, and other semiconductor devices. Besides, theories of analysis and computational circuits are also introduced to introduce. The structure of the course includes: the theory of configuration, and operating principles of p-n junction, diodes, transistors, MOSFET, ... and other electronic semiconductor devices. - **Skills:** cognition, analysis, finding, and reading documents. - **Competences:** integration of knowledge, responsibility, and self-discipline in study and work. Students have basic knowledge for other courses of designing and analyzing the properties and operation of semiconductor materials and devices (such as digital and analog IC design, …) in the following semesters.

Content	- Understanding concepts and characteristics of semiconductor materials (level: Introduce/Teach). - Presenting the concept and physical basis of the energy-band structure model of semiconductor materials (level: Introduce/Teach). - Describing physical quantities, phenomena, and carrier transport mechanisms in semiconductor materials (level: Introduce/Teach). - Presenting the mechanisms and characteristics of p-n junction and semiconductor diodes (level: Introduce/Teach). - Classifying p-n junctions, metal-semiconductor junctions, forward-reverse bias, and rectification characteristics of semiconductor diodes (level: Introduce/Teach). - Presenting the mechanisms, characteristics, and operations of semiconductor electronic devices, such as transistors, MOSFETs, LEDs, ... (level: Introduce/Teach).
Examination forms	Essay
Study and examination requirements	Students are not allowed to miss more than 3 sessions out of the total number of theory sessions. Mid-term essay (30%), homework (10%), attendance (10%), final essay (50%)
Reading list	1. S.M. Sze, Kwok K. Ng, " Physics of Semiconductor Devices", Wiley, 2006. 2. D.A. Neamen, "Semiconductor Physics and Device", McGraw-Hill, 2012. 3. Lê Khắc Bình, "Cơ sở vật lý chất rắn", NXB ĐHQG-HCM, 2016. 4. Phùng Hồ, Phan Quốc Ngô, " Vật lý bán dẫn", NXB Khoa học kỹ thuật, 2001. 5. Nguyễn Văn Hiếu, "Hệ vi cơ-điện tử: Thiết kế và mô phỏng", NXB ĐHQG-HCM, 2017.

PET10003 - Python Programming

Module designation	**Name: Python Programming** **Code: PET10003**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	MSc. VO Hoang Thuy Tien
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate. Practice
Workload	90 Hours Contact hours: Lectures: 30 hours (in class) Private study: 60 hours (self-study)
Credit points	2 Credits/ 3.5 ECTS
Required and recommended prerequisites for joining the module	Engineering Programming
Module objectives/intended learning outcomes	Python programming is an important elective subject to support Big Data and Data Science orientation in the Information Technology industry. The course includes the following main contents: (1) General introduction to the history of the Python programming language and its role in the 4.0 industrial revolution. (2) Syntactic semantics of Python programming language. (3) Object-oriented principles in Python. (4) The most popular libraries that support programming in Python. (5) Build applications with Python. In addition, the course equips you with a number of skills to guide you in reading documents fluently, research skills, report writing skills, topic presentation skills, and especially group work and coordination with each other to complete the topic explanation: - **Knowledge:** of Python programming language and application development using Python language. Introduction to Python language, basic programming with Python. Identify the classification of low-level and high-level programming languages . **- Skills:** Ability to read documents, lectures, solve English tests, use tools and methods to solve problems related to the Python language. Ability to work in groups with other members.. **- Competences**: Ability to analyze, develop applications and divide functional modules, Python programming to install computing applications. Distinguishing types of statements in Python programming. Apply object-oriented programming principles in the Python programming language.

	- Attitude: Honest
Content	This module includes the following topics: 1. History of Python programming language 2. Syntactic semantics of Python programming 3. Object-oriented principles in Python 4. Aggregation in Python_Support libraries 5. Loops and logical statements in Python 6. Data visualization in Python with support libraries 7. Analysis - Design - Building small applications/systems using Python
Examination forms	Practical exercise; Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Lutz, M. (2019). Learning Python: Powerful Object-Oriented Programming. " O'Reilly Media, Inc.". 2. Downey, A. (2019). Think Python. " O'Reilly Media, Inc.". **References:** 1. Beazley, D., & Jones, B. K. (2018). Python Cookbook: Recipes for Mastering Python 3. " O'Reilly Media, Inc.".

PET10004 - Simulation and Modelling

Module name	**Name: Simulation and Modelling** **Code: PET10004**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Dr. DO Duc Cuong
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ETCS
Required and recommended prerequisites for joining the module	Micro Calculus I and II, Linear Algebra
Recommended prerequisites	Micro Calculus I and II, Linear Algebra
Module objectives/intended learning outcomes	The course introduces methods for modeling and simulation of physical processes, for use in control applications. This module provides a deep understanding of building a numerical model for simulation of physics systems using Matlab toolbox and Matlab Simulink. Students who complete this module could be achieved the following: **- Knowledge** 1. The student will be able to build and analyze basic properties of some common physics models. 2. The student should be able to simulate and run the model on a computer. This entails implementation of explicit and implicit ODE/DAE methods, and to know principles of ODE solvers (e.g. as implemented in Matlab). 3. The student should be able to write down equations of motion for simple systems of rigid bodies, which gives a basis for modeling mechanical systems such as robots, marine vessels, cars, and airplanes. 4. The student should learn the basic principles of balance laws and use some of them to formulate simple models of process systems. **- Skills:** Be able to develop self-study skills, interprete English lectures in Physics, lifelong learning, and problem solving. **- Competences:** Solve some problems and build a system for study

Content	This module includes the following topics: 1. Introduction and Classification of Systems 2. Mathematical Modeling of Physical Systems 3. Formulation of State Space Model of Systems. 4. Formulation of System Model for Physical Systems 5. Interpretive Structural Modeling 6. Numerical Methods for Simulation and in solving differential equations. 7. Introduction to Matlab and Matlab Simulink 8. Build and analyze some physics models. a. Oscillations and Damped Oscillator system b. RLC circuits 9. Applications in control systems 10. Design a controller using Matlab Simulink 11. Applications in circuits
Examination forms	Class discussion; Annual exam; Mid-term and Final exam: Written exam (closed book)
Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)
Reading list	**Main books:** 1. Devendra K. Chaturvedi, Modeling and Simulation of Systems Using MATLAB and Simulink, Pearson (2011) 2. Holly Moore, MATLAB for Engineers, CRC Press (2015). 3. Steven I. Gordon, Brian Guilfoos, Introduction to Modeling and Simulation with MATLAB and Python, Chapman and Hall/CRC (2017) 4. Dr. Sanjeevan Kapshe, Dr. Shailendra Jain, Modeling and Simulation Using MATLAB - Simulink, Wiley (2016)

PET10005 - Digital Systems

Module designation	**Name: Digital Systems** **Code: PET10005**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Assoc. Prof. HUYNH Van Tuan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, exercise
Workload (incl. contact hours, self-study hours)	135 Hours Contact hours: Lectures: 60 hours (in class) Private study: 90 hours (self-study)
Credit points	4 Credits/ 6.5 ECTS
Required and recommended prerequisites for joining the module	Basic electronic
Module objectives/intended learning outcomes	This module introduces the basic concepts of digital electronic circuits, including: binary numbers, truth tables, and logical algebra. Students learn to test, debug, analyze and design digital circuits including: logic gates, three-state logic, flip-flops, registers, counters, encoders and decoders, multiplexers and de-multiplexers, integrated circuits, analog-to-digital converters and digital-to-analog converters. Students who complete this module could be achieved the following: **- Knowledge:** Be able to apply knowledge in logic circuit design. **- Skills**: Be able to work in individual, group work, self-study and problem solving. **- Competences:** Be able to analyze and design a relatively complete electrical circuit based on digital ICs.
Content	This module includes the following topics: 1. Introductory concepts 2. Number systems and codes 3. Logic gates and Boolean algebra 4. Combinational logic circuits 5. Flip-Flops 6. Digital arithmetic: operations and circuits 7. Counters and registers 8. MSI logic circuits 9. Interfacing with the analog world

Examination forms	Class discussion; projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) Final score is greater or equal to 5.0/10.0
Reading list	**Main text books:** 1. Huynh Van Tuan (2019), Digital circuits. VNUHCM Publishing House, Vietnam. **References:** 1. Vu Duc Tho, Do Xuan Thu (2015), Basic Digital circuits. Education Publishing House, Vietnam. 2. Dang Van Chuyet (2017), Digital Electronic Engineering, Education Publishing House, Vietnam. 3. Ronald J. Tocci & NealS. Widmer, Digital systems principles and applications (2016), 8th edition, Prentice Hall.

PET10006 - Digital Signal Processing

Module designation	**Digital Signal Processing** **Code: PET10006**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	HUA Thi Hoang Yen
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, practice with a computer, seminar
Workload	120 Hours Contact hours: Lecture: 30 hours (in class) Practice: 30 hours (in class) Private study: 60 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	- Differential calculus - Linear algebra - Basic Electronics
Module objectives/intended learning outcomes	This course provides students with the fundamental concepts in the field of digital signal processing. It covers the basics of analog signals, digital signals, and their interrelationships. Students will learn how to analyze signals and systems in both the time and frequency domains. With this foundation, students will be able to apply digital signal processing techniques in various fields, including speech processing, audio processing, and image processing. Students who complete this module could be achieved the following: **- Knowledge:** Be able to apply acquired knowledge to analyze and process digital signals **- Skills:** Analytical and problem-solving skills **- Competences:** Ability to apply straightforward, methodical, and time-saving approaches to solve problems. **- Attitude**: Honest
Content	This module includes the following topics: 1. Distinguish between different types of signals 2. Analyze the properties of signals and systems 3. Time-Domain Signal Analysis 4. Frequency-Domain Analysis 5. Digital Filter Design 6. Matlab programming language

Examination forms	Seminar; assessment exercises; final exam
Study and examination requirements	- Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Nguyễn Hữu Phương (2000), Xử lý tín hiệu số [Digital Signal Processing] (2nd ed.). NXB Thống Kê. 2. Lê Tiến Thường (2016), Xử lý số tín hiệu và Wavelets [Digital Signal Processing and Wavelets]. NXB ĐHQG TPHCM. 3. Huỳnh Văn Tuấn, Hứa Thị Hoàng Yến, & Huỳnh Thanh Nhẫn, (2017). Thực tập chuyên đề Vật Lý Tin Học 1 [Specialized Internship in Computer Physics 1]. NXB ĐHQG TPHCM.

PET10007 - Data Structures and Algorithms

Module designation	**Name: Data Structures and Algorithms** **Code: PET10007**
Semester(s) in which the module is taught	2st semester
Person responsible for the module	MSc. PHAN Nguyet Thuan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, exercise
Workload (incl. contact hours, self-study hours)	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Engineering Programming
Module objectives/intended learning outcomes	Introducing students with basic database structure, searching and sorting algorithms, linked lists and tree data structure. **- Knowledge:** The basic knowledge of database structure. **- Skills:** building, update, and query databases proficiently on the SQL-Server database management system. **- Competences:** On that basis, students can apply it to choose appropriate algorithms and data structures to solve specific problems in programming.
Content	This module includes the following topics: 1. Introduction 2. Searching and sorting algorithms 3. Linked list 4. Tree data structure
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) Final score is greater or equal to 5.0/10.0

Reading list	1. Trần Hạnh Nhi, Dương Anh Đức, Nhập môn cấu trúc dữ liệu và thuật toán, NXB ĐH KHTN, 2017 2. Phạm Thế Bảo, Cấu trúc dữ liệu và giải thuật, NXB ĐHQG TP. HCM, 2017 3. Đỗ Xuân Lôi, Cấu trúc dữ liệu và giải thuật, NXB ĐHQG Hà Nội, 2018 4. Hồ Sĩ Đàm, Cấu trúc dữ liệu và giải thuật: cẩm nang cho người lập trình, NXB Giáo dục, 2017 5. Derick Wood, Data structures, algorithms, and performance, Massachusetts : Addison-Wesley, 1993.

PET10008 - Sensors and Measurement Techniques

Module designation	**Name: Sensors and Measurement Techniques** **Code: PET10008**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Dr. NGUYEN Quang Khoi, Dr. HO Thanh Huy
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate.
Workload	120 Hours Contact hours: Lectures: 60 hours *(in class)* Private study: 60 hours *(self-study)*
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This subject provides students with basic knowledge about measurement and measuring equipment, and how to determine errors in measurement values due to measuring equipment. Students know the structure and operation of DC and AC electrical meters (equipment for measuring voltage, current, resistance, capacitance, inductance and power); sensors and conversion devices (mechanical, thermal, optical quantities,... to voltage, current,...); Design basic measurement circuits and signal processing circuits (voltmeter measurement circuits, measurement bridge circuits and measurement amplifier circuits). Students who complete this module could be achieved the following: **- Knowledge:** Basic knowledge of measurement and measuring equipment.;Use sensors to measure physical quantities.; Design measurement circuits and control circuits. **- Skills:** Use sensors to measure physical quantities,; Design measurement circuits and control circuits. **- Attitude:** Have a positive attitude in learning and absorbing subject knowledge to serve your future career; Positive attitude in teamwork and communication
Content	This module includes the following topics: Chapter 1: Concept of measuring equipment Chapter 2: Voltmeter and ammeter Chapter 3: Measuring resistance Chapter 4: AC measuring bridge Chapter 5: Concepts and basic characteristics of sensors

	Chapter 6: Types of sensors
Examination forms	Evaluate the process (Mid-term test scores, regular test scores, discussion scores, practice scores, group report scores, attendance scores); Summative assessment (End of semester exam)
Study and examination requirements	1. Minimum theory class attendance: 80%. 2. Minimum practice class attendance: 80%. 3. Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Luu The Vinh (2007). Sensor Measurement Textbook. National University Publishing House, Vietnam. 2. Pham Quoc Hai, Tran Trong Minh, Vo Minh Chinh (2005). Power Electronics. Science and Technology Publishing House, Vietnam. **References:** 1. Pham Thuong Han, Nguyen Van Hoa, Nguyen Trong Que (2005). Measurement techniques for physical quantities: volume I, Education Publishing House 2. Pham Thuong Han, Nguyen Van Hoa, Nguyen Trong Que (2004). Techniques for measuring physical quantities: volume II Education Publishing House 3. Le Van Doanh et al. (2006). Sensors in measurement and control techniques . Science and Technology Publishing House 4. Muhamad H. Rashid (2011). Power electronics: circuits, devices, and applications. Butterworth-Heinemann

PET10009 - Engineering Programming

Module designation	**Name: Engineering Programming** **Code: PET10009**
Semester(s) in which the module is taught	3nd semester
Person responsible for the module	VO Thi Ngoc Thuy
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion
Workload	88 Hours Contact hours: Lectures: 25 hours *(in class)* Practice: 25 hours *(in class)* Private study: 38 hours *(self-study)*
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Laboratory Calculus 1B
Module objectives/intended learning outcomes	- **Knowledge:** Engineering Programmingis course focus on describe a certain algorithm by using flow chart; write C/C++ code for a required product; build the subroutines/functions for a project so that these are able to be repaired, re-used, and improved - **Skills:** Be able to give speed or defence confidently. - **Attitude:** Faithful and Responsibility
Content	This module includes the following topics: 1. Introduction 2. Fundamental Types and Operators 3. Statements and Flow Control 4. Pointer and Function 5. Data Arrays 6. Chars Arrays: String 7. Struct Data Type 8. File Type 9. Dynamic memory and Linekd list
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0

Reading list	**Main books:** 1. Tran Dan Thu, Nguyen Thanh Phuong, Đinh Ba Tien và Tran Minh Triet (2014), Engineering programming. Science and Technics Publishing House, Vietnam. 2. Tran Dan Thu, Nguyen Thanh Phuong, Đinh Ba Tien và Tran Minh Triet (2011), Introduction to Programming. Science and Technics Publishing House, Vietnam.

PHY10003 - Computational Mathematics

Module designation	**Name: Computational Mathematics** **Code: PHY10003**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Nguyen Huynh Tuan Anh
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate.
Workload	120 Hours Contact hours: Lectures: 30 hours *(in class)* Private study: 90 hours *(self-study)*
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	• Calculus 1B • Linear algebra
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:** This is the basic subject of the semiconductor technology program to help students calculate and solve numerical problems to solve problems in physics and engineering. - **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	This module includes the following topics: 1. Number system and main errors in calculation method 2. Solutions of nonlinear equations and systems of nonlinear equations Interpolation Derivatives and integrals System of linear equations and eigenvalues 3. Least squares method and Splain interpolation method 4. Ordinary differential equations and boundary value problems 5. Difference method for partial differential equations
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)

Study and examination requirements	1. Minimum attendance at lectures is 85% (Absences must not exceed 3 times for the entire duration of the lectures) 2. Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Đặng Văn Liệt (2004), Giải tích số, VNUHCM Publishing House, Vietnam. **References:** 1. Tôn Tích Ái, (2001), Phương pháp số Đại học Quốc gia Hà Nội - Hà Nội, 2. S.C. Chapra (2018), Applied Numerical Methods with MATLAB for Engineers and Scientists, Mc. Graw Hill 3. John H. Mathews (1987), Numerical methods: for Mathematics, Science, and Engineering, Prentice-Hall, Inc, USA 4. Francis Scheid (1990), 2000 Solved Problems in Numerical Analysis Schaum's Solved Problems Series, Mc Graw-Hill Publishing Company, Singapore

PHY10005 - Basic Electronics

Module designation	**Name: Basic Electronics** **Code: PHY10005**
Semester(s) in which the module is taught	4th semester
Person responsible for the module	Prof. HUYNH Van Tuan PhD NGUYEN Chi Nhan
Language	Vietnamese
Relation to curriculum	Optional
Teaching methods	Lecture, discussion, practice
Workload	180 Hours Contact hours: Lectures: 60 hours (in class) Private study: 120 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This module provides an overview of the field of electronics, basic electronic circuits, and electronic components. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand and apply basic knowledge of semiconductor components such as PN junction, Diode, bipolar junction transistor (BJT). Analyzing and designing simple electronic circuits such as rectifier and filter circuits, small signal amplifier circuits, power amplifier circuits and voltage regulators, analog amplifier circuits, logic circuits, and oscillator circuits that create sine waves and square waves. **- Skills:** Be able to work in problems solving, programming, including skills such as logical thinking and communication skills. **- Competences:** Ability in teamwork and effective communication. **- Attitude and Ethics:** Diligence, professional responsibility and be honest.
Content	This module includes the following topics: 1. Electrical circuit laws 2. PN junction 3. Types of diodes and diode circuits 4. Bipolar junction transistor (BJT) 5. Small signal amplifier circuit 6. Feedback amplifier circuit

	7. Operational amplifier circuit 8. Power amplifier circuit 9. Oscillating circuit 10. Ogic gate
Examination forms	- Mid-term exam - Final exam (seminar report) - Practice - Diligence
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. PGS.TS. Trần Thu Hà, Trương Thị Bích Ngà, Nguyễn Thị Lưỡng, Bùi Thị Tuyết Đan, Phù Thị Ngọc Hiếu, Dương Thị Cẩm Tú (2013). Giáo trình Điện tử cơ bản. NXB Đại học Quốc gia TP. Hồ Chí Minh **References:** 1. Donald A.Neamen (2007). Microelectronics: Circuit Analysis and Design (3rd Edition). McGraw Hill 2. Nhóm tác giả Bộ môn Vật lý điện tử và Vật lý tin học, Khoa Vật lý-Vật lý kỹ thuật (2014). Giáo trình Thực hành Điện tử cơ bản. Lưu hành nội bộ. 3. ThS. Trương Thị Bích Ngà, TS. Nguyễn Minh Tâm, ThS. Lê Hoàng Minh, TS. Nguyễn Thị Lưỡng (2017). Giáo trình thực hành điện tử cơ bản. NXB Đại học Quốc gia TP. Hồ Chí Minh

PHY10007 - Quantum Mechanic 1

Module designation	**Quantum Mechanic 1**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Do Duc Cuong, PhD.
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	General physics 1, General physics 2
Module objectives/intended learning outcomes	This module provides basic knowledge of quantum mechanics and thereby an understanding of basic postulates of quantum mechanics, some quantum mechanic problems such as free particle model, quantum well, harmonic oscillations, angular momentum, and Hydrogen atom model, … Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand and apply knowledge of quantum mechanics and its applications of it in daily life. Understand and analyze the physics in specific quantum mechanics problems such as free particle model, quantum well, harmonic oscillations, angular momentum, and Hydrogen atom model, … **- Skills:** Be able to develop self-study skills, interprete English lectures in Physics, lifelong learning, and problem solving. **- Competences:** Solve some problems related to quantum mechanics
Content	This module includes the following topics: 1. Introduction to quantum mechanics 2. Math Review: Vector spaces and Linear Algebra 3. De Broglie wavelength and Heisenberg uncertainty 4. Postulates of Quantum Mechanics and Schrodinger equation 5. Fundamental Properties of Operators

	6. Particle in Quantum Well (infinite and finite well) 7. Harmonic Oscillation 8. Angular momentum 9. Hydrogen atom model 10. Many Particles Problems
Examination forms	Class discussion; Annual exam; Mid-term and Final exam: Written exam (closed book)
Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)
Reading list	**Main books:** 1. D. J. Griffiths, D. F. Schroeter, Introduction to Quantum Mechanics 3rd, Cambridge University Press (2018). 2. R. Shankar, Principles of Quantum Mechanics, Plenum Press, (1994). 3. D. A. Fleisch, Student's Guide to the Schrödinger Equation, Cambridge University Press (2020)

PHY10010 - Solid State Physics

Module designation	**Name: Solid State Physics** **Code: PHY10010**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Assoc. Prof. Tran Quang Trung
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate.
Workload (incl. contact hours, self-study hours)	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Main objective: This subject provides research methods of solid state physics, from simple models to derive the basic properties of main materials such as metals, dielectrics, and semiconductors. In addition, the subject also provides specialized knowledge such as energy band theory, and Fermi - Dirac distribution,... Students who complete this module could achieve the following: **- Knowledge:** Be able to understand and know crystal structure, crystal binding, crystal vibrations, thermal properties, free electron Fermi gas, energy bands and semiconductor crystals **- Skills:** Be able to work at individual level and group work. **- Competences:** be able to apply critical thinking, creativity, and professional knowledge to analyze and solve real problems **- Attitude:** Honest
Content	This module includes the following topics: - Crystal structure - Crystal binding - Phonons. Crystal vibrations - Phonons. Thermal properties. - Free electron Fermi gas - Energy bands - Semiconductor crystals

Examination forms	Class discussion; quizzes and projects; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Le Khac Binh, Nguyen Nhat Khanh. (2002). Solid State Physics. VNUHCM Publishing House, Vietnam. **References:** 1. Charles Kittel. (2005). Introduction to Solid State Physics, 8th edition. John Wiley and Sons, New York 2. Neil W. Ashcroft, N. David Mermin (1976). Solid State Physics. Brooks Cole.

PET10101 - Database

Module designation	**Name: Database** **Code: PET10101**
Semester(s) in which the module is taught	3st semester
Person responsible for the module	MSc. PHAN Nguyet Thuan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, exercise
Workload (incl. contact hours, self-study hours)	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Data Structure and Algorithms
Module objectives/intended learning outcomes	Introducing students with basic relational databases, relational data model, relational algebra language, how to build, update, and query databases. **- Knowledge:** The basic knowledge of database. **- Skills:** building, update, and query databases proficiently on the SQL-Server database management system. **- Competences:** On that basis, students can build, update, and query databases on the SQL-Server database management system.
Content	This module includes the following topics: 1. Introduction 2. Relational data model 3. Relational algebra 4. SQL query language 5. View and Constraint 6. Programming T-SQL 7. Cursor 8. Function
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) Final score is greater or equal to 5.0/10.0

Reading list	1. Đồng Thị Bích Thủy, Nguyễn Trần Minh Thư, Phạm Thị Bạch Huệ, Cơ sở dữ liệu, NXB KH&KT, 2017 2. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Fourth Edition, Addison-Wesley, 2018. 3. Walter Shields, SQL QuickStart Guide: The Simplified Beginner's Guide to Managing, Analyzing, and Manipulating Data With SQL, ClydeBank Media LLC; Illustrated edition, 2019 4. Đỗ Trung Tuấn, Cơ sở dữ liệu, NXB ĐHQG Hà Nội, 2017

PET10102 - Machine Learning

Module designation	**Name: Machine Learning** **Code: PET10102**
Semester(s) in which the module is taught	3st semester
Person responsible for the module	MSc. HUYNH Quoc Viet
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate.
Workload	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Python programing
Module objectives/intended learning outcomes	Introducing students with basic machine learning methods, including algorithms, techniques and installation. **- Knowledge:** The basic knowledge of machine learning methods **- Skills:** Monitoring and no monitoring, using the decisive function to distinguish samples, and to learn the statistics for the classification problem, enhance learning, nest network-Artificial Ron, local methods and methods of combining ministries.. **- Competences:** On that basis, students can design more deeply learning systems and research on specific problems **- Attitude:** Honest
Content	This module includes the following topics: 1. Introduction 2. Supervised Learning 3. Decision Trees 4. Sample Classification 5. Statistical Learning 6. Unsupervised Learning 7. Neural Networks 8. Local Learning Models 9. Reinforcement Learning 10. Model Ensemble

Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. E. Alpaydın. Introduction to Machine Learning. Massachusetts Institute of Technology, Second Edition, 2019. 2. Hoàng Xuân Huấn. Giáo trình nhận dạng mẫu. Nhà xuất bản ĐHQG, 2019. 3. T. Mitchell. Machine learning. McGraw-Hill, 2018. 4. H.B. Demuth and M. Beale. Neural network design. PWS Publishing company, 2017

PET10103 - Electric Circuit Analysis

Module designation	**Name: Electric Circuit Analysis** **Code: PET10103**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Prof. DUONG Hoai Nghia
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Lecture, discussion, debate.
Workload	90 Hours Contact hours: Lectures: 30 hours (in class) Private study: 60 hours (self-study)
Credit points	2 Credits/ 3 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Provide students with knowledge of circuit analysis to be able to design various types of circuits. The curriculum includes linear circuit analysis in steady -state conditions, linear circuit analysis in transient conditions. Understand the concepts of impedance and loading. Power. Resonance. After completing the course, students must grasp techniques for electrical circuit analysis, have the ability to analyze, design, and construct a relatively complete system. **- Knowledge:** Be able to understand of circuit analysis to be able to design various types of circuits. The curriculum includes linear circuit analysis in steady-state conditions, linear circuit analysis in transient conditions, as well as an understanding of concepts such as impedance, loading, power, and resonance. Additionally, students should acquire competences in analyzing electrical circuits, developing circuit designs, and constructing comprehensive system. **- Skills:** Be able to work at individual level and group work. **- Competences:** Proficient in applying circuit analysis techniques to practical engineering problems and be capable of designing and implementing functional electrical systems. **- Attitude:** Honest
Content	This module includes the following topics: 1. Basic concepts 2. Feedback control mode 3. Circuit analysis in the frequency domain 4. Circuit analysis in the s-domain

Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Đỗ Xuân Thụ, Kỹ thuật điện tử, NXB Giáo Dục, 2017. 2. Nguyễn Hữu Phương, Mạch số, NXB Giao Thông Vận Tải, 2012. **References:** 1. R. J. Tocci, Digital systems: Principles and applications, Prentice-Hall international, Inc, 2011.

PET10104 - Thin Film Manufacturing Technology

Module designation	**Name: Thin Film Manufacturing Technology** **Code: PET10104**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Associate Prof.PhD. VU Thi Hanh Thu
Language	Vietnamese
Relation to curriculum	Specialisation
Teaching methods	Teaching, Discussion, seminar
Workload	90 Hours Face-to-face: Lectures: 15 hours (in class), Practice:15 hours (in class) Private study: 60 hours (self-study)
Credit points	4 Credits/ 7 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students who complete this course will have a comprehensive knowledge of thin film manufacturing technique: **- Knowledge:** how to prepare equipment, what advantages and disadvantages there are, and how to select the best ways for their study on thin film materials. in some way **- Skills:** thin film manufacturing technique. **- Attitude:** Honest
Content	This module includes the following topics: 1. Introducing the subject 2. Equipment preparation 3. Advantages and disadvantages and knowing how to choose appropriate methods
Examination forms	Semina with Projects (20%); Mid-term (30%), Final exam (50%)
Study and examination requirements	1. Students are not allowed to miss more than 3 sessions out of the total number of theory sessions 2. Students finish their final and midterm tests 3. Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Vũ Thị Hạnh Thu, Kỹ thuật chế tạo màng mỏng, NXB: ĐH Quốc gia năm 2014 2. Donald L.Smith, Thin film deposition, McGraw-Hill,1995. 3. Milton shring, Materials science of thin films, Academic

	press, 2002. 4. Krisna Seshan, Handbook of Thin Film Deposition Processes and Techniques, Principles, Methods, Equipment and Applications, William Andrew, 2012

PET10105 - Material Analysis Techniques

Module designation	**Name: Material Analysis Techniques** **Code: PET10105**
Semester(s) in which the module is taught	4st semester
Person responsible for the module	Dr. NGUYEN Huu Ke
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Teaching, Discussion, Seminar.
Workload	135 Hours Contact hours: Lectures: 45 hours *(in class)* Private study: 90 hours *(self-study)*
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This module provides specialized knowledge of about the interaction of electrons, photons with matter, and using signals emitted from samples in analytical methods. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand about structure, operating principle of analytical methods, and apply each specific method to identify the properties of the sample. **- Skills:** Be able to work in individual, group work, self-study, lifelong learning, and problem solving. **- Competences:** Be able to identify and analyze properties of the sample. Have the capacity to finish graduation thesis. **- Attitude:** Honest
Content	This module includes the following topics: 1. Introduction and overview of the interaction of photons, electron beams with matter 2. UV-Vis spectroscopy method and how to determine the optical properties of samples 3. PL spectroscopy method and how to determine band gap, impurity level in the sample 4. The STM method and quantum arrangement 5. The AFM method and how to determine the surface roughness of the sample 6. SEM method and how to determine sample structure morphology

	7. TEM method and determination of the structure and composition of nanoparticles 8. XRD method and how to determine the crystal lattice structure, nanoparticle size 9. XPS method and how to determine the impurity composition and bonding in the film 10. Hall method and how to determine electrical properties of samples
Examination forms	Assessment method: 1. Paper assignment = 10% 2. Individual activities = 10% 3. Seminar exam = 30% 4. Final exam = 50%
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Le Vu Tuan Hung (2013) Material Analysis Techniques. VNUHCM Publishing House, Vietnam.

PET10106 - Microcontroller

Module designation	**Name: Microcontroller** **Code: PET10106**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Nguyen Chi Nhan
Language	Vietnamese
Relation to curriculum	Specialisation Names of other study programmes with which the module is shared: Physics
Teaching methods	Lecture and lab works
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 150 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 60 hours Private study including examination preparation, specified in hours: 90 hours
Credit points	3 credits / 5 ECTS
Required and recommended prerequisites for joining the module	Fundamental Electronic, Digital System
Module objectives/intended learning outcomes	- Students understand fundamental knowledge of microprocessor and microcontroller, AVR microcontroller chip's architecture, experiment kit placement and be able to modify registers in a data port to perform as an CPU. - Students know how to use C programming language to perform embedded coding and applied basic communication module with the microcontroller. - Students are able to design and program a required system - Students know how to apply internal interrupts, timers and counters in the microcontroller programming. - Students are able to integrate the lessons to future work honestly, responsibly and trustworthy.
Content	The description of the contents should clearly indicate the weighting of the content and the level. 1. Introduction to microcontroller 2. AVR microcontroller's architecture 3. AVR microcontroller's programming 4. AVR microcontroller's communication to basic peripherals. 5. AVR's interrupts and timers 6. Motors communication 7. AVR's communication modules

Examination forms	Lab exercise ; class discussion ; written exam (mid-term and final)
Study and examination requirements	Minimum attendance at lectures is 75% (Absences must not exceed 3 times for the entire duration of the lectures) Final score is greater or equal to 5.0/10.0
Reading list	**Main book:** 1. Bài giảng: Vi điều khiển, Nguyen Chi Nhan (internal document) **Reference:** 1. Hồ Thanh Huy, Nguyễn Chí Nhân, Trần Lê Thiên Thuỷ, "Thực tập chuyên đề điện tử - Tập 1", NXB Đại Học Quốc Gia TP.HCM, 2018. 2. Nguyễn Văn Hiếu, "Kỹ thuật điện tử ứng dụng", NXB Đại Học Quốc Gia TP.HCM, 2018. 3. Ngô Diên Tập, "Kỹ thuật Vi điều khiển với AVR", NXB Khoa học và Kỹ thuật, Hà Nội 2019

PHY10205 - Optical Properties of Solids

Module designation	**Name: Optical Properties of Solids** **Code: PHY10205**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	M.S. Huynh Van Giang
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students who complete this module could achieve the following: **- Knowledge:** The course introduces basic knowledge of the physical nature, carrier statistics, carrier transfer processes, working principles, main parameters, and applications of basic semiconductor devices currently being studied. Common practical uses of semiconductor devices and their basic applications. The course also helps students learn about modern trends in research on new materials used in semiconductor devices. **- Skills:** Be able to work at individual level and group work. **- Attitude:** Honest, Lifelong Learning.
Content	This module includes the following topics: 1. Overview of semiconductors 2. P-N transition 3. Bipolar transistor 4. Semiconductor devices 5. Modern trends in research on new materials used in semiconductor devices 6. Review
Examination forms	Class discussion; Annual exam; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)

Reading list	**Main books:** 1. Mark Fox (2010), Optical Properties of Solids, Oxford References: 1. Charles Kittel (1996). Introduction to Solid State Physics. John Wiley & Sons, Inc. 2. Kwok Ng (2018), Complete guide to semiconductor devices McGraw Hill 3. A.Neaman (2019), Semiconductor physics & devices, Wiley

PHY10207 - Crystal Grown Technology

Module designation	**Name: Crystal Grown Technology** **Code: PHY10207**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Assoc. Prof. Tran Quang Trung
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload (incl. contact hours, self-study hours)	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students who complete this module could achieve the following: **- Knowledge:** This subject provides students with knowledge about crystal surface morphology, thermodynamics of phase equilibrium, thermodynamic basis of phase transition during crystal growth, and phase diagrams. of 1-component, 2-component and 3-component systems. Besides, the basic theories of crystal formation, and basic methods of growing crystals from vapor, solution, and molten phases... are also introduced in this subject.- Skills: Be able to work at individual level and group work. **- Competences:** be able to apply critical thinking, creativity, and professional knowledge to analyze and solve real problems **- Attitude:** Honest
Content	This module includes the following topics: - The basic concepts - Physicochemical basis for crystal growth - Kinetic processes - Theories of crystal formation - Crystal growing techniques - New trends in crystal fabrication
Examination forms	Class discussion; quizzes and projects; Mid-term and Final exam: Written exam (closed-book)

Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Vu Thi Phat Minh, Lectures on Growth Crystals **References:** 1. Hans J. Scheel, Tsuguo Fukuda (2018), Crystal Growth Technology, Published by John Wiley and Sons 2. Vladimir P. Skripov, Mars Z. Faizullin (2018), Crystal-Liquid-Gas Phase Transitions and Thermodynamic Similarity, Published by Hardcover 3. Georg Müller, Jean-Jacques Métois, Peter Rudolph (2017), Crystal growth - from fundamentals to technology, Published by Elsevier 4. Kenneth A. Jackson (2019), Kinetic Processes: Crystal Growth, Diffusion, and Phase Transformations in Materials, Published by Hardcover

PHY10211 - The Mechanical and Thermal Properties of Solids

Module designation	**Name: The Mechanical and Thermal Properties of Solids** **Code: PHY10211**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	PhD. Le Thuy Thanh Giang
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers the basic knowledge of mechanical and thermal properties of solids, the Mechanics Section with detailed and in-depth knowledge of the basic concepts, the number of methods for testing defects in solids, The Thermal Section with knowledge about the thermal vibrations of the crystal lattice in solids... Students who complete this module could achieve the following: **- Knowledge:** Be able to distinguish between the elastic properties of solids, such as deformation, elasticity, and elastic limit, and the types of deformation of solids, such as tensile deformation, shear, and torsion.; Be able to rectify common defects in fusion welding of solids.; Be able to apply nondestructive testing (ndt) methods to identify defects in solids; Be able to explain thermal vibrations of the crystal lattice in solids. **- Skills:** Be able to work at individual level and group work. **- Attitude:** Honest, Lifelong Learning.
Content	This module includes the following topics: 1. Elastic Properties of Solids 2. Welding Defects 3. Thermal Vibrations of the Crystal Lattice 4. Thermal Conductivity of Solids 5. Review

Examination forms	Class discussion; Annual exam; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)
Reading list	**Main books:** 1. Charles Kittel (1996). Introduction to Solid State Physics. John Wiley & Sons, Inc. **References:** 1. Christman J. R. (2017) Fundamentals of solid state physics. John Wiley & Sons, Inc. 2. H. J. Goldsmid, (2018). The Thermal Properties of Solids Strathclyde University. 3. Le Khac Binh, Nguyen Nhat Khanh, (2010). Solid State Physics. VNUHCM Publishing House, Vietnam. 4. Neil W. Ashcroft, N. David Mermin(2018). Solid State Physics. Cornell University. 5. Ziman J. M(2017). Principles of the theory of solids. CUP, New York

PHY10610 - Java Programming

<table>
<tr><td>Module name</td><td colspan="4">Name: Java Programming
Code: PHY10610</td></tr>
<tr><td>Module level, if applicable</td><td colspan="4">Specialized</td></tr>
<tr><td>Code, if applicable</td><td colspan="4">PHY10</td></tr>
<tr><td>Subtitle, if applicable</td><td colspan="4"></td></tr>
<tr><td>Courses, if applicable</td><td colspan="4"></td></tr>
<tr><td>Semester(s) in which the module is taught</td><td colspan="4">6th semester</td></tr>
<tr><td>Person responsible for the module</td><td colspan="4">MSc. NGUYEN Anh Thu</td></tr>
<tr><td>Lecturers</td><td colspan="4">MSc. NGUYEN Anh Thu</td></tr>
<tr><td>Language</td><td colspan="4">Vietnamese</td></tr>
<tr><td>Relation to curriculum</td><td colspan="4">Compulsory</td></tr>
<tr><td>Types of teaching and learning</td><td>Attendance time (hours per week per semester)</td><td>Forms of active participation</td><td colspan="2">Workload</td></tr>
<tr><td rowspan="2">Teaching,
Discussion,
Practice,
Course projects</td><td rowspan="2">3</td><td rowspan="2">Discussion,
Exercise,
Practice,
Course projects</td><td>Lectures: 2 hours x 15 times
Practice: 3 hours x 10 times</td><td>60</td></tr>
<tr><td>Preparation and Follow up 6 hours x 15 times</td><td>90</td></tr>
<tr><td>Total workload</td><td colspan="4">150 Hours</td></tr>
<tr><td>Credit points</td><td colspan="4">3 Credits/ 5 ECTS</td></tr>
<tr><td>Requirements according to the examination regulations</td><td colspan="4">- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures)
- Homework (20%),
- Practice (30%),
- Final exam (50%)</td></tr>
<tr><td>Recommended prerequisites</td><td colspan="4">Computational Mathematics, Engineering programming in C</td></tr>
<tr><td>Related Course</td><td colspan="4">None</td></tr>
</table>

Module objectives/intended learning outcomes	The content includes knowledge of applying object-oriented programming to organize object classes in application programs and handle exceptions. Provides the knowledge to develop an application in Java language. Students completing this module can achieve the following: **- Knowledge:** Having basic knowledge of Java programming from which to build real projects such as a mobile application, game or web in Java language. **- Skills:** Ability to work individually, in groups, self-study and problem-solving. **- Attitude:** honest, responsible.
Content	This module includes the following topics: 1. Introduction 2. Overview of Object Oriented Programming and enviroment setup 3. Conditionals, arrays and loop 4. Class, object 5. Abstract class, Interface, inheritance in java 6. String 7. Collection 8. I/O 9. Handle exceptions
Study and examination requirements and forms of examination	Assessment method: 1. Practice = 30% 2. Homework = 20% 3. Final exam = 50%
Media employed	Text books and slides (power points)
Reading list	**Main text books:** 1. Bruce Eckel, President MindView, Thinking In Java 4th Edition, Inc. teochew. **References:** 1. Đoàn Văn Ban, Lap trinh huong doi tuong voi Java, NXB Khoa Học & Kỹ Thuật, 2005.

PHY10612 - Computer Network

Module designation	**Name: Computer Network** **Code: PHY10612**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	M.Eng Nguyen Thi Tu Trinh
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate, practice
Workload	150 Hours Contact hours: Lectures: 60 hours (30 hours of theory, 30 hours of practice) (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	1. C programming techniques 2. Calculation method
Module objectives/intended learning outcomes	The course aims to provide students with knowledge about data transmission on computer network systems; At the same time, students will examine the architecture of the Internet network system (TCP/IP) and the services provided by this network system. The course also provides students with basic knowledge in the field of computer networks, concepts, communication models, connection models, technical characteristics, network connection devices and other devices. network operating system. Students who complete this module could be achieved the following: **- Knowledge:** Ability to understand and apply basic knowledge of computer networks. **- Skills:** Able to work individually, in groups, self-study and read English documents related to the subject. **- Competences:** Able to apply learned knowledge to analyze and deploy on real network models. **- Attitude:** Honest
Content	This module includes the following topics: 1. Development history 2. Basic concepts 3. Communication model 4. Open systems connectivity model 5. Technical characteristics of LAN

	6. Network connection devices 7. TCP/IP protocol 8. Introduction to Windows/Unix network operating system 9. Windows/ Unix/ Other installation/ administration/ management system 10. Windows/Unix/Other network services
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam
Study and examination requirements	- Minimum attendance at lectures is 75% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Forouzan, Behrouz A., (2022). Data communications and networking with TCP/IP protocol suite. McCraw-Hill. 2. James F. Kurose, Keith W. Ross, (2020). Computer networking: a top-down approach. Pearson 20. **References**: 1. Jill West, (2022). Data Communication and Computer Networks. Cengage Learning.

PHY10613 - Digital Logic Design

Module designation	**Name: Digital Logic Design** **Code: PHY10613**
Semester(s) in which the module is taught	3rd semester
Person responsible for the module	Prof. CHAU Van Tao
Language	Vietnamese
Relation to curriculum	Optional
Teaching methods	Lecture, discussion.
Workload	88 Hours Contact hours: Lectures: 25 hours (in class) Practice: 25 hours (in class) Private study: 38 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Digital Systems
Module objectives/intended learning outcomes	Digital logic design focus on using hardware description language Verilog to design the logical circuits then implement them on the embedded device FPGA **- Skills:** Be able to discuss and work in group. **- Attitude:** Faithful and Responsibility
Content	This module includes the following topics: 1. Introduction 2. The introduction to Verilog and FPGA 3. Reducing cost of logic Circuits 4. Number representation 5. Combinational circuits design 6. Flip-flops, registers, counters 7. Designing synchronous Sequential circuits 8. Designing a simple processor and enhanced
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Brown Stephen (2014). Fundamentals of digital logic with verilog design. McGraw-Hill.

	References: 1. Balabanian Norman, Carlson Bradley (2004) Digital logic design principles. John Wiley and Sons.

PHY10614 - Internship

Module designation	**Name: Internship** **Code: PHY10614**
Semester(s) in which the module is taught	8th semester
Person responsible for the module	MSc. Hua Thi Hoang Yen MSc. Nguyen Phuoc Hoang Khang
Language	Vietnamese
Relation to curriculum	Specialisation Names of other study programmes with which the module is shared.
Teaching methods	Company internship
Workload (incl. contact hours, self-study hours)	(Estimated) Total workload: 120 hours Contact hours (please specify whether lecture, exercise, laboratory session, etc.): 60 hours Private study including examination preparation, specified in hours[1]: 60 hours
Credit points	2 credits/ 4 ECTS
Required and recommended prerequisites for joining the module	All previous specialisation modules
Module objectives/intended learning outcomes	- Students are able to apply previous courses into profession - Students gain professional and teamwork skill - Students develop working ethic, responsibility
Content	- Students perform internship and study following the company's assignments
Examination forms	- Weekly report and presentation
Study and examination requirements	- Attend 70% internship time at the company - Attend 70% weekly report - Acknowledgment of internship
Reading list	None

PHY10616 - Programming on Mobile Devices

<table>
<tr><td>Module name</td><td colspan="4">Name: Programming on Mobile Devices
Code: PHY10616</td></tr>
<tr><td>Module level, if applicable</td><td colspan="4">Specialized</td></tr>
<tr><td>Code, if applicable</td><td colspan="4">PHY10616</td></tr>
<tr><td>Subtitle, if applicable</td><td colspan="4"></td></tr>
<tr><td>Courses, if applicable</td><td colspan="4"></td></tr>
<tr><td>Semester(s) in which the module is taught</td><td colspan="4">6th semester</td></tr>
<tr><td>Person responsible for the module</td><td colspan="4">MSc. NGUYEN Anh Thu</td></tr>
<tr><td>Lecturers</td><td colspan="4">MSc. NGUYEN Anh Thu</td></tr>
<tr><td>Language</td><td colspan="4">Vietnamese</td></tr>
<tr><td>Relation to curriculum</td><td colspan="4">Compulsory</td></tr>
<tr><td>Types of teaching and learning</td><td>Attendance time (hours per week per semester)</td><td>Forms of active participation</td><td colspan="2">Workload</td></tr>
<tr><td rowspan="2">Teaching,
Discussion,
Practice,
Course projects</td><td rowspan="2">3</td><td rowspan="2">Discussion,
Exercise,
Practice,
Course projects</td><td>Lectures: 2 hours x 15 times
Practice: 3 hours x 10 times</td><td>60</td></tr>
<tr><td>Preparation and Follow up 6 hours x 15 times</td><td>90</td></tr>
<tr><td>Total workload</td><td colspan="4">150 Hours</td></tr>
<tr><td>Credit points</td><td colspan="4">3 Credits/ 5ECTS</td></tr>
<tr><td>Requirements according to the examination regulations</td><td colspan="4">- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures)
- Homework (20%),
- Practice (30%),
- Final exam (50%)</td></tr>
<tr><td>Recommended prerequisites</td><td colspan="4">OOP, Engineering programming in Java</td></tr>
<tr><td>Related Course</td><td colspan="4">None</td></tr>
</table>

Module objectives/intended learning outcomes	Content includes basic knowledge about android studio programming environment using Java programming language, components in android. Students can design layouts and build an android application. The course provides knowledge and understanding of the lifecycle of an Activity, switching screens with intents, building and managing applications using databases, multithreaded programming, some multimedia and animation controls. Students completing this module can achieve the following: **- Knowledge:** Having basic knowledge to build an android application. **- Skills:** Ability to work individually, in groups, self-study and problem-solving. **- Attitude:** honest, responsible.
Content	This module includes the following topics: 1. Overview of Java 2. Introduction and enviroment setup 3. Activity and the lifecycle of an activity, intent 4. Listview 5. Fragment 6. SQLite 7. Content Provider Menu, Action Bar, ToolBar 8. Asynctask – Thread – Handler Service – Broadcast Receiver and Notification
Study and examination requirements and forms of examination	Assessment method: 1. Practice = 30% 2. Homework = 20% 3. Final exam = 50%
Media employed	Text books and slides (power points)
Reading list	**Main text books:** 1. Android Programming, Zigurd Mednieks, Laird Dornin, G. Blake Meike, and Masumi Nakamura, O'Reilly Media, Inc.

PHY10620 - Embedded System and IoT

Module designation	**Name: Embedded System and IoT** **Code: PHY10620**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	PhD NGUYEN Chi Nhan
Language	Vietnamese
Relation to curriculum	Optional
Teaching methods	Lecture, discussion
Workload	180 Hours Contact hours: Lectures: 60 hours (in class) Private study: 120 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This module provides basic knowledge of embedded system and IoT applications, hardware and software architecture of embedded systems. Design an embedded systems using Arduino, Raspberry board and Internet of Things application. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand and apply basic knowledge of informatics and in-depth knowledge of embedded system and IoT, physics and electronic engineering to design and program a system using tools and software. **- Skills:** Be able to work in problems solving, programming, including skills such as logical thinking and communication skills. **- Competences:** Ability in teamwork and effective communication. **- Attitude and Ethics:** Diligence, professional responsibility and be honest.
Content	This module includes the following topics: 1. Overview of embedded systems and IoT. 2. Embedded programming on NodeMCU 3. Building an IoT node 4. IoT platform 5. Develop embedded systems on IoT platform 6. Building a wireless sensor network

Examination forms	- Mid-term exam - Final exam (seminar report) - Diligence
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Vu Duc Lung, Tran Ngoc Duc (2016). Giáo trình hệ thống nhúng, VNU-HCM Publishing House. **References:** 1. Phan Van Ca, Truong Quang Phuc (2017). Internet of things basics and applications (Embedded System Design), VNUHCM Publishing House. 2. Ngo Dien Tap (2003). AVR microcontroller technology, Sciences and Technies Publishing House. 3. Vu Duc Lung, Le Quang Minh, Phan Dinh Duy (2016). Microcontroller. VNU-HCM Publishing House. 4. Kieu Xuan Thuc (2009). Microcontroller structure, programming and applications. Vietnam Education Publishing House

PHY10621 - PLC Programming

Module designation	**Name: PLC Programming** **Code: PHY10621**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Ms. PHAM Xuan Hien
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Teaching, discussion, debate, demo.
Workload	135 Hours Contact time: Lectures: 45 hours (in class) Private study: 135 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course provides students with information about functions, application areas, working objects, and basic programming knowledge for Omron PLCs. Students who complete this module can achieve the following: **- Attitude:** have high professional ethics and professionalism **- Skills:** Ability to work individually and in groups, programming skills, presentation skills, English document reading skills. **- Knowledge:** Ability to understand PLC controllers, PLC programming, and standard automation systems in industrial factories.
Content	This module includes the following topics: 1. Introducing industrial automation systems 2. PLC controller 3. PLC programming language 4. PLC instruction sets 5. Programming on industrial system simulation models
Examination forms	Class discussion; quizzes and projects; Mid-term and Final exam: project
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0

Reading list	**Main document:** 1. Pham Xuan Hien (2023). Robotics and control, internal documents. **References:** 1. Le Van Doanh (2006), Sensors in measurement and control engineering, Science and Engineering. 2. Tran The San (2016), Circuit design and PLC programming, Science and Engineering.

PHY10623 - Digital Image Processing

Module designation	**Name: Digital Image Processing** **Code: PHY10623**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	HUA Thi Hoang Yen
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, practice with a computer, seminar
Workload	120 Hours Contact hours: Lecture: 30 hours (in class) Practice: 30 hours (in class) Private study: 60 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	- Digital Signal Processing - Computation Method
Module objectives/intended learning outcomes	This course provides students with the fundamental concepts in the field of digital image processing. Digital image processing is the field of computer-based techniques for manipulating and enhancing digital images. It encompasses both general signal processing techniques and specialized image processing algorithms. Digital image processing can be broadly categorized into various subfields, including: image enhancement, image restoration, image analysis, image compression,… Students who complete this module could be achieved the following: **- Knowledge:** Be able to apply acquired knowledge to analyze and process digital images **- Skills:** Analytical and problem-solving skills **- Competences:** Ability to apply straightforward, methodical, and time-saving approaches to solve problems. **- Attitude:** Honest
Content	This module includes the following topics: 1. Fundamental Concepts in Digital Image: Image Representation and Structure 2. Image Transformations in Spatial and Frequency Domains 3. Morphological Image Processing 4. Image Filtering, Restoration, Compression,…

	5. Matlab programming language
Examination forms	Seminar; assessment exercises; final exam
Study and examination requirements	- Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Đặng Văn Liệt. Giáo trình Xử lý Ảnh, Trường Đại học Khoa học Tự nhiên TP. HCM, 2018. 2. Nguyễn Thanh Hải, Giáo trình Xử lý Ảnh, NXB Đai học Quốc gia TP HCM, 2017. 3. Hồ Văn Sung, Xử lý ảnh số - Lý thuyết và thực hành với Matlab, NXB Khoa học và kỹ thuật, Hà Nội, 2018.

PHY10801 - Scientific Research Methodology

Module designation	**Name: Scientific Research Methodology** **Code: PHY10801**
Semester(s) in which the module is taught	5th semester
Person responsible for the module	Dr. NGUYEN Quang Khoi
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	60 Hours Contact hours: Lectures: 30 hours (in class) Private study: 30 hours (self-study)
Credit points	2 Credits/ 3 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The module " Scientific Research Methodology " provides students with an introduction to scientific research and basic skills to begin a research career. Students will be introduced to basic skills such as choosing a research topic, reading scientific newspapers/articles, writing articles and conducting research. In addition, students will be introduced to a number of methods to support the research and writing process in their study program. Students are also provided with some basic information about scientific journals that are quite important to start their long journey in science. During the course, students will personally experience the steps in the research process to enhance their passion for scientific research. **- Knowledge:** Basic knowledge of the concepts and meaning of scientific research. Basic knowledge and skills in reading a scientific article, Analyzing a scientific article, Knowing how to search for information about scientific journals. Knowledge of the process to conduct scientific research, Know the skills of choosing a scientific research topic, Understand some methods to support the scientific research process, Know the process of writing an article science, Apply scientific presentation skills **- Skills:** Basic skills in reading a scientific article, analyzing a scientific article, searching for information about scientific journals. Skills in analyzing the process of conducting a scientific research, skills in choosing a scientific research topic, skills in applying a number of methods to support the scientific research process, knowing the process of writing an article

	science, scientific presentation skills. **- Attitude:** Have a positive attitude in learning and absorbing subject knowledge to serve your future career; Positive attitude in teamwork and communication.
Content	This module includes the following topics: 1. Chapter 1 Introduction to scientific research methods 2. Chapter 2 Skills for reading a scientific article 3. Chapter 3 Choosing the topic and conducting scientific research 4. Chapter 4 Some methods to support the scientific research process 5. Chapter 5 Publication of scientific research results 6. Chapter 6 Success in a scientific career
Examination forms	Evaluate the process (Mid-term test scores, group report scores, attendance scores); Summative assessment (Final exam)
Study and examination requirements	- Minimum theory class attendance: 80%. - Minimum practice class attendance: 80%. - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Nguyen Van Tuan (2018). Going into scientific research. Ho Chi Minh City General Publishing House **References:** 1. Nguyen Van Tuan (2012). From research to publishing soft skills for scientists. Ho Chi Minh City General Publishing House

PET10107 - Creativity and Innovation

Module designation	**Name: Creativity and Innovation** **Code: PET10107**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	M.Econ NGUYEN Yen Ngoc
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	90 Hours Contact hours: Lectures: 30 hours (in class) Private study: 60 hours (self-study)
Credit points	2 Credits/ 3 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This module will enable students to enhance their understanding of innovation and creativity in a variety of contexts and from perspectives that include the individual, the organisation and society at large. Using current academic research we reflect upon the practice of innovation and creativity, and explore the potential of applying theories to foster sustainable competitive advantage for both new and existing organisations. **- Knowledge:** Be able to assess their ability to manage innovation and creativity; Be able to explain creativity and innovation in the individual, team, organisational and societal context; Be able to examine perspectives on the creativity and innovation process and the organisational implications of that process. **- Skills:** Be able to work at individual level and group work. **- Competences:** Students will be presented with opportunities within the programme curriculum to develop their information retrieval and evaluation skills, in order to identify appropriate resources effectively; **- Attitude:** Honest
Content	This module includes the following topics: 1. Sources of innovation and creativity 2. Creativity and the individual: cognition, perception and emotion 3. Organizational creativity: culture and climate 4. Creativity, innovation and new product development

	5. New product development: teams, technology and design 6. Paths, paradigms and trajectories 7. Intellectual property rights 8. Profiting from innovation
Examination forms	Class discussion and presentation ; Mid-term and Final exam: Project
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Alexander Osterwalder, Yves Pigneur (2010), Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, John Wiley and Sons **References:** 1. Harvard Business Review Press (2020), On innovation- Doi moi sang tao, National Economics University Publishing House 2. Patrick Van Der Pijl, Justin Lokitz, & Lisa Kay Solomon (2016), Design a Better Business: New Tools, Skills, and Mindset for Strategy and Innovation, Wiley

PET10108 - Crystal Physics

Module designation	**Name: Crystal Physics** **Code: PET10108**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	PhD. Le Thuy Thanh Giang
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers the fascinating realm of crystallography like crystal lattice, crystal systems, Bravais lattices, and crystal symmetry groups in space, introduction to X-ray diffraction by crystals, representing physical quantities with tensors: applications to crystal physics. Students who complete this module could achieve the following: **- Knowledge:** Be able to explain the crystal structure; Be able to apply the X-ray diffraction by crystals; Be able to represent physical properties of crystalline media with tensors. **- 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, Lifelong Learning.
Content	This module includes the following topics: 1. Crystal structure 2. Spatial symmetries 3. Closed-structures 4. X-ray diffraction 5. Tensors 6. Review
Examination forms	Class discussion; Mid-term and Final exam: Written exam (closed-book)

Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)
Reading list	**Main books:** 1. Truong Quang Nghia (2019). Physical Properties of Crystals. VNUHCM Publishing House, Vietnam. **References:** 1. Truong Quang Nghia (2030) General Physics 1. VNUHCM Publishing House, Vietnam. 2. Quan Han Khang, (2017). Crystal Optics and Polarized Light Microscopy. University and Vocational Publishing House of Hanoi. 3. N.V.Perelomova, N.M.Tagiaeva, (2018). Problems in crystal Physics with solutions, Mir Pubishers Moscow.

PET10109 - Manufacturing Technology SERS Sensor

Module designation	**Name: Manufacturing Technology SERS Sensor** **Code: PET10109**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Assc.Prof. Le Vu Tuan Hung
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, lesson, lab works, seminar
Workload	165 Hours Contact hours: Lectures: 15 hours (in class)-60 hour (in lab) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course provides basic knowledge about Raman spectroscopy and the theory of Raman signal amplification from surface plasmon resonance effects. Students will practice making SERS substrates based on semiconductor nanomaterials combined with noble metal nanoparticles. From the SERS substrates, students will practice measuring Raman signals of organic or biological substances. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand and apply Molecular vibrational spectroscopy theory. Raman spectroscopy and the theory of Raman signal amplification from surface plasmon resonance effects (SERS). **- Skills:** Practical skills in lab, group activities **- Competences:** Ability to apply knowledge to analyze physical situations. **- Attitude:** Honest
Content	This module includes the following topics: 1. Molecular vibrational spectroscopy theory. 2. Raman spectroscopy theory. 3. Raman signal amplification from surface plasmon resonance effects (SERS). 4. Fabrication process SERS substrate. 5. Practice detecting trace of organic molecules on SERS substrate.

Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Duong Ai Phuong (2005). Molecule spectroscopy. VNUHCM Publishing House, Vietnam. 2. Practice methods of Applied Physics Department (2015). VNUHCM Publishing House, Vietnam. **References:** 1. Papers of SERS of Le Vu Tuan Hung and et.al

PET10110 - Photonics and Semiconductor Materials

Module designation	**Name: Photonics and Semiconductor Materials** **Code: PET10110**
Semester(s) in which the module is taught	2st semester
Person responsible for the module	PhD. Phan Thi Kieu Loan
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers semiconductor materials and applications. Students who complete this module could be achieved the following: **- Knowledge:** Understand principles of photonic materials; optical methods used to study semiconductors; optoelectric properties of some outstanding semiconductors; Designing technologies for manufacturing photonic materials; **- Skills:** Be able to work at individual level and group work. **- Competences:** Ability to analyze the optoelectronic properties of semiconductors, manufacturing methods and applications. **- Attitude:** Honest
Content	This module includes the following topics: 1. Introduction to semiconductors and outstanding applications of semiconductors. 2. Semiconductors and distinguish between semiconductors, metals, and dielectrics. 3. Optical properties of semiconductors. 4. The optical spectroscopy techniques for the characterization of semiconductor materials. 5. Technologies for manufacturing photonics materials 6. The methods for manufacturing semiconductor nanomaterials.
Examination forms	Class discussion; quizzes and exercises ; Semina and Final exam: Written exam and practice.

Study and examination requirements	Minimum attendance at lectures and practices is 80%
Reading list	**Main books:** 1. JaspritSingh,Semiconductor Optoelectronics, McGRAW-HILL. 2. Le Vu Tuan Hung and author collective - Topical practice - Department of Applied Physics – VNUHCM Publishing House, Vietnam. **References:** 1. Phung Ho, Phan Quoc Pho, Semiconductor physics textbook, Hanoi Science and Technology Publishing House, Vietnam. 2. Jasprit Singh, Electronic and optoelectronic properties of semiconductor structures,Cambridge University Press.

PET10111 - Simulation and Computational Optcics and Plasma Physics

Module designation	**Name: Simulation and Computational Optcics and Plasma Physics** **Code: PET10111**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	Ph.D. PHAN Trung Vinh
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, practice with a computer
Workload	180 Hours Contact hours: Lectures: 60 hours *(in class)* Private study: 120 hours *(self-study)*
Credit points	2 Credits/ 4 ECTS
Required and recommended prerequisites for joining the module	- General Physics 2 (Eletromagnetism – Optics) - Programming Techniques
Module objectives/intended learning outcomes	This course involves simulating several applied problems in optics and gas discharge plasma physics using Matlab application and sophisticated algorithms. Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand the optical characteristics of thin film-nanomaterials, laser optical systems, gas discharge plasma media and the methods of matrix optics, N-square scan, Genetics, Monte Carlo algorithms **- Skills:** Be able to program and simulate optical problems related to wave optics, spectroscopy, lasers and gas discharge plasma **- Competences:** Ability to apply straightforward, methodical, and time-saving approaches to solve problems. **- Attitude:** Honest
Content	This module includes the following topics: 1. Matlab programming language 2. Matrix optics 3. Simulation of optical characteristics of thin film-nanomaterials 4. Simulation of gas discharge plasma
Examination forms	Diligence; assessment exercises; final exam

Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Nguyen Huu Chi (2017). Plasma Physics (Ionized Gases). VNUHCM Publishing House, Vietnam. 2, Nguyen Hoai Son, Do Thanh Viet, Bui Xuan Lan (2018). Matlab application in technical calculations. VNUHCM Publishing House, Vietnam. **References:** 1. Huynh Thanh Dat, Le Vu Tuan Hung (2019). Applied Optics. VNUHCM Publishing House, Vietnam.

PET10112 - Semiconductor Physics

Module designation	**Name: Semiconductor Physics** **Code: PET10112**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Assoc. Prof. Tran Quang Trung
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	112.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers fundamentals of semiconductor materials, crystal structures, carrier statistics, charge transport phenomena, generation and recombination of charge carriers, and modern research trends. Students who complete this module could achieve the following: **- Knowledge:** Be able to understand semiconductor materials and crystal structures; Be able to comprehend carrier statistics; Be able to understand generation and recombination of charge carriers. **- Skills:** Be able to conduct experiments, collect and analyze data, and draw meaningful conclusions; work as a group, and adapt to modern workspace. **- Attitude:** Honest, Lifelong Learning,
Content	This module includes the following topics: 1. Introduction to Semiconductors 2. Energy Band Structure 3. Statistics of Charge Carriers in Semiconductors 4. Transport of Charge Carriers in Semiconductors 5. Generation and Recombination of Charge Carriers 6. Miniaturization and Performance Enhancement
Examination forms	Class discussion; Mid-term and Final exam: Written exam
Study and examination requirements	Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures)

Reading list	**Main books:** 1. Tran Quang Trung Physics and Semiconductor Devices Curriculum Internal Distribution Curriculum. **References:** 1. A.S. Grove (2019). Physics and Technology of Semiconductor Devices Science and Technics Publishing House, Hanoi. 2. Kwok Ng (2019). Complete guide to semiconductor devices. McGraw Hill. 3. A.Neaman, (2018). Semiconductor physics & devices. Wiley.

PET10113 - Ultrasonic Technique

Module designation	**Name: Ultrasonic Technique** **Code: PET10113**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Phd. Le Thuy Thanh Giang
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	12.5 Hours Contact Hours: Lectures: 37.5 hours (in class) Private study: 75 hours (self-study)
Credit points	3 Credits/ 4.5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Students who complete this module could achieve the following: **- Knowledge:** The ultrasound course provides students with a solid foundation in the basic principles and applications of ultrasonic waves in materials testing. Thereby, students not only clearly understand how ultrasonic waves are created and how they propagate through different media but also know how to use them to detect hidden defects in solid objects without damaging specimens. **- Skills:** Be able to work at individual level and group work. **- Attitude:** Honest, Lifelong Learning
Content	This module includes the following topics: 1. Basic knowledge of non-destructive testing 2. Defects in solid objects 3. Piezoelectric properties of materials 4. Ultrasonic measurement system 5. Applications
Examination forms	Mid-term and Final exam: Written exam
Study and examination requirements	- Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	1. W.P.Mason (2018), Physical Acoustic and the Properties of Solids, D.Van Nostrand Co., New York 2. J.R.Fredericks (2018), Ultrasonic Engineering, John Wiley &

	Sons, Inc 3. D.L.Folds (2019), Experimental Determination of Ultrasonic Wave Velocities in Plastics, Elastomers, and Syntactic Foam as a Function of Temperature, Naval Research and Development Laboratory, Panama City, Florida

PET10114 - Introduction of Material Science

Module designation	**Name: Introduction of Material Science** **Code: PET10114**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Phd. Le Thuy Thanh Giang
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	180 Hours Contact Hours: Lectures: 60 hours (in class) Private study: 120 hours (self-study)
Credit points	4 Credits/ 6 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course covers the crystallographic fundamentals including point symmetry groups, space symmetry groups, crystal notation and structures, crystal defects, X-ray crystallography, and the physical properties of crystals, helping students analyze the formation of thin films and bulk crystals. Students who complete this module could achieve the following: **- Knowledge:** Be able to understand fundamentals of material - crystalline materials; Be able to understand angle measurements and macroscopic symmetry elements in crystallography; Be able to understand point groups, classes, and systems of crystals, and the relationship between crystal structure and symmetry groups; Be able to understand experimental methods for crystal structure research using X-ray diffraction. **- Skills:** Be able to work at individual level and group work. **- Attitude:** Honest, Lifelong Learning
Content	This module includes the following topics: 1. Fundamental concepts in crystallography 2. Angle measurements in crystallography 3. Crystal symmetry 4. Crystallographic notation 5. Crystal structure and space groups overview 6. Crystal structure and space group research 7. Physical properties of crystals

Examination forms	Mid-term and Final exam: Written exam
Study and examination requirements	- Minimum attendance at lectures is 70% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Vu Thi Phat Minh (2005). Overview of introductory crystallography curriculum. 2. Trinh Han, Quan Han Khang. (2018) Overview of introductory crystallography. VNUHN. **References:** 1. Sanat K. Chatterjee, (2019). Crystallography and the World of Symmetry. Published by Springer. 2. Donald E. Sands, (2019). Introduction to Crystallography. Published by Courier Dover Publications 3. Bernard Denn is Cullity, (2019). Elements of X-Ray Diffraction. Elements of X-Ray Diffraction, Published by Prentice Hall. 4. B. E. Warren, (2020). X-Ray Diffraction. Published by Dover. 5. Kelly, A., and G.W Groves, (2019). Crystallography and Crystal Defects. Published by Addison Wesley.

PET10115 - Material Manufacturing Technology

Module designation	**Name: Material Manufacturing Technology** **Code: PET10115**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Assoc. Prof. TRAN QUANG TRUNG
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	100 Hours Contact Hours: Lectures: 25 hours (in class) Practice hours: 75 hours (in class)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes.	This course provides students with a major in materials manufacturing engineering, including two main parts. Part 1 introduces the basics of high vacuum physics and engineering, the working principles of high vacuum systems, and their basic applications. Part 2 introduces the basic knowledge of physics and paint film forming techniques, principles of foundation fabrication from PVD, CVD, and solution methods, and their basic applications. Students who complete this module could achieve the following: **- Knowledge:** the theoretical basis of gas thermodynamics and the theory of vacuum and basic devices to create vacuum for closed volumes. Having a deep understanding of material fabricating methods (CVD, AP-CVD, LP-CVD, and PE-CVD). Understanding the principles of thin films manufacturing by using PVD techniques such as thermal evaporation, electron beam, vacuum arc, and magnetron sputtering. **- Skills:** Being able to work in groups, adapt to a modern working environment, solve problems, effective communicate by using language in science and professional activities. **- Competences:** Having Ability to research and experiment and apply in interdisciplinary fields, ability to analyze and evaluate research and experimental results. **- Attitude:** Honest, having the spirit of self-study, self-research and lifelong learning.
Content	This module includes the following topics: 1. Vacuum - Basic Knowledges.

	2. PVD method - Several basic methods. 3. CVD method - Several basic methods. 4. Solution technique- Several basic methods. 5. Global thin film-fabricating technology trends
Examination forms	Class discussion; samples fabricating; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Tran Quang Trung. Vacuum And Thin Film Technology lectures. VNUHCM Publishing House, Vietnam. **References:** 1. John F. O'Hanlon. (2018- 2003). A User's Guide to Vacuum Technology. John Wiley & Sons, USA. 2. Walter Umrath. (2019). Fundamentals of Vacuum Technology. Cologne Publishing Company, Germany. 3. Smith D. (2020). Thin film deposition: Princes and practice. McGraw-Hill Companies, Inc, USA.

PET10116 - Robot Technology and Applications

Module designation	**Name: Robot Technology and Applications** **Code: PET10116**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Ms. PHAM Xuan Hien
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Teaching, discussion, debate, demo.
Workload	135 Hours Contact time: Lectures: 45 hours (in class) Private study: 135 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	C or Python programming.
Module objectives/intended learning outcomes	This course includes basic knowledge of robotics and robot programming. Students who complete this module can achieve the following: **- Attitude:** have high professional ethics and professionalism **- Skills:** Ability to work individually and in groups, programming skills, presentation skills, English document reading skills. **- Knowledge:** Ability to understand the structures of everyday robots. Able to program common types of robots such as mobile robots, robot arms, etc.
Content	This module includes the following topics: 1. Introducing application robots 2. Engine and motion system 3. Power transmission system 4. Applied robot technologies 5. Solutions for Applied Robot control technology 6. Experiment with algorithms on real models
Examination forms	Class discussion; quizzes and projects; Mid-term and Final exam: project
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main document:**

	1. Pham Xuan Hien (2023). Robotics and control, internal documents. **References:** 1. Le Hoai Quoc (2002). Introduction to Industrial Robotics, Science and Engineering. 2. Berthold Klaus Paul Horn (1986), Robot vision, MIT Press.

PET10117 - Artificial Intelligence

Module designation	**Name: Artificial Intelligence** **Code: PET10117**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Nguyen Thi Nhu Quynh
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course provides students with basic knowledge of Artificial Intelligence, approaches to solving problems. Besides, learners grasp search strategies and heuristic algorithms. The course also presents knowledge representation methods and an introduction to machine learning: **- Knowledge:** Understand what Artificial Intelligence is and its applications in life. **- Skills:** Have critical thinking, apply professional knowledge, Teamwork, problem presentation. **- Competences:** Using methods in Artificial Intelligence to find and solve problem. **- Attitude:** Honest
Content	This module includes the following topics: 1. Introduction to Artificial Intelligence 2. Problem-solving methods and Heuristic algorithms 3. Status space and search strategy 4. Knowledge representation and deduction 5. Introduction to machine learning
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0

Reading list	**Main books:** 1. Stuart Russell, Peter Norvig (2020). Artificial Intelligence: A Modern Approach (Pearson Series in Artifical Intelligence). Pearson. **References:** 1. Le Hoai Bac, to Hoai Viet. (2013) Giáo trình Cơ sở Trí tuệ nhân tạo. VNUHCM Publishing House, Vietnam.

PET10118 - Biomedical Electronics

Module designation	**Name: Biomedical Electronics** **Code: PET10118**
Semester(s) in which the module is taught	7th semester
Person responsible for the module	PhD NGUYEN Chi Nhan
Language	Vietnamese
Relation to curriculum	Optional
Teaching methods	Lecture, discussion
Workload	150 Hours Contact hours: Lectures: 60 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	This course of Biomedical Electronics provides basic knowledge on advanced techniques and medical investigation methods and the principle of biomedical sensors. In it, a number of electronic devices used in diagnosis and treatment of diseases are explained in detail in terms of device principles, electrical circuits and operation. Moreover, the group of students will make some simple medical tests at hospital to check their health and practice some of the knowledge they have learned Students who complete this module could be achieved the following: **- Knowledge:** Be able to understand and know about X-ray imaging, ultrasound, electrocardiogram, magnetic nanoparticle method, ultraviolet LED for micro-disinfection bacteria, energy-based treatments (laser, radiation and magnetic fields) and biosensors. **- Skills:** Be able to work in individual, group work, self-study, lifelong learning, and problem solving with project group. **- Competences:** Be able to study other relatied subjects/modules in 6^{th}, 7^{th}, 8^{th} semesters and their graduate thesis in bachelor program in Electronic Engineering. **- Attitute and Ethics:** Applications of biosensor for health care; Can be explaned the priniciple operation of biosensors, be honest, and community service.
Content	This module includes the following topics: 1. Overview about biomedical electronics

	2. X-ray 3. Ultrasound 4. Electrocardiogram 5. Magnetic nanoparticle 6. Ultraviolet LED for micro-disinfection bacteria 7.Energy-based treatments (laser, radiation and magnetic fields) 8. Biosensors 9. Tests at the hospital
Examination forms	- Exercise (at class, group) - Individual activities (homeworks) - Midterm exam - Final exam
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Nguyen Van Hieu (updated 2021) Biomedical Electronics: Circuits and Equipments (Vietnamese), Dept. of Physics and Electronic Engineering, VNUHCM-US, Vietnam. **References:** 1. Huynh Thu and Ho Trung My (2005): Biomedical Electronics (Vietnamese), VNUHCM Publishing House. 2. Neil Townsend, Lecture: Medical Electronics, Department of Engineering Science, Oxford Robotics Institute (UK). 3. Body 2.0: The Engineering Revolution in Medicine by Sara Latta: https://www.thomasnet.com/articles/other/best-biological-and-biomechanical-engineering-books/

PET10119 - Big Data

Module designation	**Name: Big Data** **Code: PET10119**
Semester(s) in which the module is taught	3st semester
Person responsible for the module	MSc. HUYNH Quoc Viet
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	Data Structures and Algorithms, Database
Module objectives/intended learning outcomes	The course introduces an overview of the concept, characteristics as well as challenges of Big Data (The ability to analyze, predict to extract a greater value from data). **- Knowledge:** Common methods and tools for harnessing and managing Big Data (Hadoop, MapReduce, and Spark).. **- Skills:** Be able to work at individual level and group work. **- Competences:** Topics on big data analysis, providing appropriate suggestions for students to develop and conduct big data research **- Attitude:** Honest
Content	This module includes the following topics: 1. Big Data Overview 2. Real-time 3. Hadoop basics 4. MapReduce programming 5. Spark programming 6. Big Data application
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:**

	1. Team, O. M. (2019). Big Data Now: 2019 Edition. O'Reilly Media, Inc. 2. Tom White (2020). Hadoop The Definitive Guide. Published by O' Reilly Media, Inc., Gravenstein Highway North, Sebastopol, CA 95472. 3. Holden Karau, Andy Kowinski and Matei Zaharia (2018). Learning Spark. Published by O' Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472. 4. Jiawei Han, Micheline Kamber, Jian Pei (2017). Data mining Concepts and Techniques. Published by Elservier, Inc., Waltham, MA 02451, USA

PET10120 - Web Programming

Module designation	**Web Programming**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	MSc. NGUYEN Vuong Thuy Ngan
Language	Vietnamese
Relation to curriculum	Compulsory
Teaching methods	Teaching, Discussion, Practice, Course projects
Workload	135 Hours Face-to-face: Lectures: 15 hours (in class), Practice:60 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	Provides basic Web concepts, Web design techniques such as HTML, CSS, Javascript... Provides the basics of the REACT programming language, file processing and object orientation in REACT. How to combine REACT, Nodejs with MongoDB and some advanced techniques in REACT such as Cookies, Session, Email... Completely build web applications in the REACT programming language
Content	This module includes the following topics: 1. Overview of Web Programming 2. Web Layout Design with HTML, CSS, and JavaScript. Static web design 3. Operators, loop, string,… in React 4. Array 5. From and basic control 6. File handling and OOP 7. Database – React+Mongodb 8. Cookie, Session, Email 9. MVC
Examination forms	Class discussion; quizzes and projects; Mid-term: project, and Final exam: Practical exam (on computer)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0

Reading list	**Main books:** 1. Robin Wieruch, The Road to React: Learning React to Build Modern Web Applications, 2024. **References:** 1. Ashley Menhennett, A Guide to HTML5 and CSS3, Zenva, 2014 2. Carlos Santana Roldan, React Cookbook, Packt Publishing, 2018

PET10121 - Fuzzy Logic and Neural Network

Module designation	**Name: Fuzzy Logic and Neural Network** **Code: PET10121**
Semester(s) in which the module is taught	6th semester
Person responsible for the module	Nguyen Thi Nhu Quynh
Language	Vietnamese
Relation to curriculum	Elective
Teaching methods	Lecture, discussion, debate.
Workload	135 Hours Contact hours: Lectures: 45 hours (in class) Private study: 90 hours (self-study)
Credit points	3 Credits/ 5 ECTS
Required and recommended prerequisites for joining the module	None
Module objectives/intended learning outcomes	The course of fuzzy logic and neural networks aims to provide students with basic and in-depth knowledge of fuzzy inference systems and artificial neural network structures. Thereby, students will have a clear understanding of how to apply these concepts to solve practical problems in information processing and decision-making. **- Knowledge:** Understand what Artificial Intelligence is and its applications in life. Using methods in Artificial Intelligence to find and solve problems. **- Skills:** Have critical thinking, apply professional knowledge, Teamwork, problem presentation. **- Competences:** the course is also geared towards developing programming and analytical skills to deploy intelligent applications based on fuzzy logic and neural networks. **- Attitude:** Honest
Content	This module includes the following topics: 1. Fuzzy logic and applications 2. Fuzzy aggregator, Fuzzy processing system and application 3. Neural networks and applications 4. Combining neural networks and fuzzy logic 5. Evolutionary algorithm 6. Application of neural networks in medical and biological sciences 7. Application of neural networks in digital filtering design

	8. Application of neural networks in computer networks 9. Application of fuzzy logic in heating, refrigeration and air conditioning control 10. Application of Compatible Fuzzy Reasoning System Robot
Examination forms	Class discussion; quizzes and projects ; Mid-term and Final exam: Written exam (closed-book)
Study and examination requirements	- Minimum attendance at lectures is 80% (Absences must not exceed 3 times for the entire duration of the lectures) - Final score is greater or equal to 5.0/10.0
Reading list	**Main books:** 1. Zilouchian, M. Jamshidi (Eds) (2017). Intelligent control systems using soft computing methodologies. CRC Press LLC.