VIETNAM NATIONAL UNIVERSITY - HO CHI MINH CITY **UNIVERSITY OF SCIENCE**	**SOCIALIST REPUBLIC OF VIETNAM** **Independence – Liberty - Happiness**

PROGRAM LEVEL
BACHELOR OF SCIENCE IN MATERIALS SCIENCE
Admission 2024

(Decision No……/QĐ-KHTN-ĐT dated ……. ,
issued by the Rector of the University of Science, VNU-HCM)

1. General information of the program

1.1. Program name:
- Programme name in Vietnamese: Khoa học vật liệu
- Programme name in English: Materials Science

1.2. Major code: **7440122**
1.3. Level: Undergraduate.
1.4. Type of diploma: Bachelor of Materials Science
1.5. Mode of study: Full time
1.6. Training duration: 4 years
1.7. Name of diploma:
- Name of diploma in Vietnamese: Cử nhân Khoa học vật liệu
- Name of diploma in English: Bachelor of Materials Science

1.8. Language: Vietnamese
1.9. Training place:
- Campus 1: 227 Nguyen Van Cu Std., Ward 4, District 5, Ho Chi Minh City.
- Campus 2: Linh Trung Ward, Thu Đuc City, Ho Chi Minh City.

2. Program Objectives:

2.1. General objectives:

The Materials Science and Technology (FMST) currently has 4 training majors: Polymer and composite materials, Thin film materials, Magnetic materials and Biomedical materials, with the following general training goals:

- Training bachelors of Materials Science with solid and in-depth knowledge of synthesis and properties of new materials; having the capacity to develop, deploy, and apply the latest research results of new materials into life and production; having the ability to play a leadership role to develop and actively contribute to the development of science and technology.
- Training Bachelor of Materials Science with good communication skills, community service spirit, ability to work in a team, initiative, adaptability, self-regulation, self-development, ability to detect and solve problems logically,

creatively and systematically. Bachelor of Materials Science has the ability to compete in the domestic working environment as well as in the global labor market.

2.2. Specific objectives

STT	Goals (MT or G)	Goal Met
KNOWLEDGE		
1	MT1.1	Apply knowledge of mathematics, physics, chemistry, computer science, and basic social sciences while gaining a deep understanding of the principles governing the properties and applications of materials.
2	MT1.2	Apply theoretical knowledge and research skills to develop materials with specific properties based on scientific principles.
SKILLS		
3	MT2.1	Ability to work in a team and have the skills to perform scientific work independently when doing assignments as well as presenting and discussing the results of the work.
ATTITUDES		
4	MT3.1	Develop the skills and mindsets necessary for lifelong learning, including the ability to evaluate new information, adapt to evolving technological and professional landscapes, and actively seek opportunities for ongoing personal and professional development.
PROFESSIONAL RESPONSIBILITY		
5	MT4.1	Commit to act in accordance with professional ethics, responsibilities and workplace regulations.

2.3. LEARNING OUTCOME (LO) of the training program (specified from specific objectives)

No	LOs	Expected LOs	Level of achievement of the LOs (according to Bloom's taxonomy)*	Link between LOs and training objectives
	KNOWLEDGE			
1	CCT1.1	Gain a solid foundation of knowledge about the properties of materials and the principles that influence material performance	4	MT1.1

No	LOs	Expected LOs	Level of achievement of the LOs (according to Bloom's taxonomy)*	Link between LOs and training objectives
2	CCT1.2	Demonstrate understanding of the structure-property-synthesis relationships of materials	4	MT1.1
3	CCT1.3	Apply knowledge and skills to develop new materials with desired properties.	4	MT1.2
	SKILLS			
1	CCT2.1	Gain proficiency in the use of laboratory synthesis and characterization techniques of materials	4	MT1.3
2	CCT2.2	Analyze experimental data, use tools and software to interpret results and draw meaningful conclusions about material properties.	4	MT1.3
3	CCT2.3	Develop critical thinking and problem solving skills to support working effectively in multidisciplinary teams.	4	MT1.4
4	CCT2.4	Communicate scientific information effectively, especially using English, to a variety of audiences.	4	MT1.4
	ATTITUDES			
1	CCT3.1	Committed to lifelong learning to stay up to date on the latest advances in materials science.	4	MT1.4
	PROFESSIONAL RESPONSIBILITY			
1	CCT4.1	Understand and adhere to ethical standards in research, including	4	MT1.5

No	LOs	Expected LOs	Level of achievement of the LOs (according to Bloom's taxonomy)*	Link between LOs and training objectives
		issues related to data integrity, intellectual property, and the social impact of new materials.		

2.4. **Career opportunities/jobs that learners can take on**

- Trained human resources are capable of both basic research and practical thinking about the ability to develop applied products according to social needs. Bachelors of materials science can work in the research, production and product development departments at high-tech zones, corporations, companies, factories, production and business establishments operating in the fields of manufacturing materials, especially advanced materials in electricity, electronics, optoelectronics, telecommunications, energy, environment, medicine, biotechnology, chemistry, polymer - composite materials (engineering and civil plastics, packaging, paint, rubber, etc.)
- In addition, graduates can do research and teaching work at universities, colleges, vocational schools, research institutes as well as work at local and central departments and agencies (Department of Science & Technology, Department of Natural Resources & Environment; etc.) or have enough opportunities and knowledge to be able to integrate well when studying for a Master's and Doctorate degree in countries with advanced science and technology.

3. Total of credits: 130 (excluding National Defense Education, Physical Education, Basic Information Technology and Foreign Languages**).**

4. Admission conditions: According to the Admission Regulations of the Ministry of Education and Training and Vietnam National University Ho Chi Minh City.

5. Training process, graduation requirements

5.1. Training process:

According to the Regulations on university training issued with Decision No. 1175/QD-KHTN dated September 24, 2021, of the President of the University of Science, VNU-HCM.

5.2. Graduation requirements:

Students must simultaneously satisfy the following conditions:

- - Accumulate enough credits for general education and professional education as described in sections 6 and 7 of this training programs.
- - Satisfy the conditions in Article 17 of the Regulations on university training issued together with Decision No. 1175/QD-KHTN dated September 24, 2021, of the President of the University of Science - VNU-HCM.

6. Training program structure

No	KNOWLEDGE BLOCK			NUMBER OF CREDITS (CR)			Total accumulated credits upon graduation (1+2+3+4)	NOTE
				Mandatory	Elective	Total		
1	**General Education (excluding National Defense Education, Physical Education, Basic Information Technology and Foreign Languages) (1)**			**50**	**4**	**54**		
2	**Professional education:**	**Fundamental (2)**		**32**		**32**		
		Specialized (3)		**34**		**34**		
		1	Polymer and Composite Materials Specialization	34		34	130	**130**
		2	Biomedical Materials Specialization	30	4	34	130	
		3	Thin Film Materials Specialization	26	8	34	130	
		Graduate (4)		10		10		

7. Training program content

Course type convention:

- Mandatory courses: M
- Elective courses: E

7.1. General education knowledge

7.1.1. Political Theory - Law

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00101	Marxist-Leninist Philosophy	3	45	0	0	M	
2	BAA00102	Marxist-Leninist Political Economy	2	30	0	0	M	
3	BAA00103	Scientific Socialism	2	30	0	0	M	
4	BAA00104	History of the Vietnamese Communist Party	2	30	0	0	M	
5	BAA00003	Ho Chi Minh's Ideology	2	30	0	0	M	
	BAA00004	General Law	3	45	0	0	M	
Sub-Total			**14**	**210**	**0**	**0**		

7.1.2. Social Sciences - Economics - Skills

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00005	General Economics	2	30	0	0	E	Choose 1 of 4 courses
2	BAA00006	General Psychology	2	30	0	0	E	
3	BAA00007	Methodology of Creativity	2	30	0	0	E	
4	MST00005	Academic and Professional Skills	2	30	0	0	E	
5	GEO00002	Earth Sciences	2	30	0	0	E	Choose 1 of 2 courses
6	ENV00001	General environment	2	30	0	0	E	
Sub-Total			**4**					

7.1.3. Mathematics - Natural Sciences - Technology - Environment

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	CHE00001	General Chemistry 1	3	30	0	30	M	
2	CHE00002	General Chemistry 2	3	30	0	30	M	
3	CHE00081	Lab work - General Chemistry	2	0	60	0	M	
4	MSC00001	Introduction to Materials Science	3	45	0	0	M	
5	MSC00010	Introduction to Materials Science	2	30	0	0	M	
6	BIO00001	General Biology 1	3	45	0	0	M	
7	MTH00003	Integral Calculus 1B	3	45	0	0	M	
8	MTH00002	Advanced Mathematics C	3	45	0	0	M	
9	MTH00040	Probability Statistics	3	45	0	0	M	
10	PHY00001	General Physics 1 (Mechanics - Thermodynamics)	3	45	0	0	M	
11	PHY00002	General physics 2 (Electromagnetic - Optical)	3	45	0	0	M	
12	PHY00004	General physics 2 (Electricity-Magnetism)	3	45	0	0	M	
13	PHY00081	Lab work - General physics	2	0	60	0	M	
Sub-Total			**36**					

7.1.4. **Information Technology (not included in GPA, included in cumulative credits, except for Information Technology Specialization)**

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	CSC00003	Basic Informatics	3	15	60	0	M	
Sub-Total			**3**	**15**	**60**	**0**		

7.1.5. **Foreign language (not included in GPA and cumulative credits)**

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type
				Theory	Practice	Exercise	

1	ADD00031	English 1	3	30	30	0	Students who meet the current foreign language output standards do not register for English courses.
2	ADD00032	English 2	3	30	30	0	
3	ADD00033	English 3	3	30	30	0	
4	ADD00034	English 4	3	30	30	0	
Sub-Total			**12**	**120**	**120**	**0**	

7.1.6. **Physical education (not included in GPA, included in cumulative credits)**

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00021	Physical education 1	2	15	30	0	M	
2	BAA00022	Physical education 2	2	15	30	0	M	
Sub-Total			**4**					

7.1.7. **National defense and security education (not included in GPA, included in accumulated credits)**

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00030	National defense - Security education	4				M	
Sub-Total			**4**					

7.2. Professional educational knowledge

7.2.1. Major knowledge: Accumulate a total of 32 credits from the courses according to the following table:

a) **Required Courses**: Accumulate a total of 32 credits from the courses according to the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10007	Organic Chemistry	2	22.5	0	15	0	M	
2	MSC10001	Electrodynamics	2	22.5	0	15	0	M	
3	MSC10004	Fundamental of Solid State Science	3	45	0	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
4	MSC10009	Basic biology	3	45	0	0	0	M	
5	MSC100xx	Fundamental chemistry of transition and non-transition elements	2	22.5	0	15	0	M	
6	MSC10002	Thermodynamics	3	45	0	0	0	M	
7	MSC10010	Material Fabrication Methods 1	2	30	0	0	0	M	
8	MSC10011	Material Fabrication Methods 2	2	30	0	0	0	M	
9	MSC10015	Material Characterization Methods 1	3	45	0	0	0	M	
10	MSC10016	Material Characterization Methods 2	2	22.5	0	15	0	M	
11	MSC10008	Polymer and composite materials	2	22.5	0	15	0	M	
12	MSC10017	Material Fabrication Methods Practice	2	0	60	0	0	M	
13	MSC10018	Material Characterization Methods Practice	2	0	60	0	0	M	
14	MSC10005	Metals, semiconductors, and insulators Materials	2	22.5	0	15	0	M	
Sub-Total			**30**	**352.5**	**120**	**75**	**0**	547.5	

7.2.2. Specialized knowledge

7.2.2.1. Polymer and Composite Materials Specialization

a) **Required Courses**: Accumulate a total of 30 credits from the courses according to the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC102xx	Mechanical Properties of Polymer	2	22.5	0	15	0	M	
2	MSC10203	Technology of Synthesis and Recycle of Polymers	2	30	0	0	0	M	
3	MSC10209	Rubber: Chemistry and Technology	2	30	0	0	0	M	
4	MSC10204	Polymer Testing and Characterization Methods	3	37.5	0	15	0	M	
5	MSC10219	Polymer Processing Technology	2	22.5	0	15	0	M	
6	MSC10211	Composite and nanocomposite materials	3	45	0	0	0	M	
7	MSC10217	Modification of polymers	2	30	0	0	0	M	
8	MSC10206	Polymer Blends	2	30	0	0	0	M	
9	MSC102xx	Polymer Additives	2	22.5	0	15	0	M	
10	MSC10208	Specialization Seminar	2	0	0	0	60	M	
11	MSC10202	Mechanical Polymers Laboratory	2	0	60	0	0	M	
12	MSC10201	Polymer Synthesis Laboratory	2	0	60	0	0	M	
13	MSC10218	Smart polymer materials and applications	2	30	0	0	0	M	
14	MSC102xx	Polymer Materials in electronic and semiconductor	2	22.5	0	15	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
15	MSC10xxx	Research Project	4	0	0	0	120	M	
Sub-Total			**34**	**322.5**	**120**	**75**	**180**		

7.2.2.2. Biomedical Materials Specialization

a) **Required Courses**: Accumulate a total of 26 credits from the courses according to the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10302	Specialized Biology	2	30	0	0	0	M	
2	MSC10312	Tissue Technology	3	45	0	0	0	M	
3	MSC10304	Functional biomedical materials	3	45	0	0	0	M	
4	MSC10307	Surface Modification of Materials	3	37.5	0	15	0	M	
5	MSC10305	Molecular Techniques in Diagnostics	3	45	0	0	0	M	
6	MSC10306	Biomedical engineering	3	45	0	0	0	M	
7	MSC10319	Learning with Enterprises	2	15	30	0	0	M	
8	MSC10320	Biomedical Material Fabrication Practices	3	0	90	0	0	M	
9	MSC10314	Biochemical Laboratory	2	0	60	0	0	M	
10	MSC10315	Biological Property Assessment of Materials	2	0	60	0	0	M	
11	MSC10xxx	Research project	4	0	0	0	120	M	
Sub-Total			**30**	**262.5**	**240**	**15**	**120**		

b) **Elective courses: Accumulate a total of 4 credits from the courses according to the following table:**

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10321	Biosensors	2	30	0	0	0	E	
2	MSC10316	Dental Materials	2	30	0	0	0	E	
3	MSC10317	Cancer treatment by immunological technique	2	30	0	0	0	E	
4	MSC10318	Drug delivery materials	2	30	0	0	0	E	
Sub-Total			**4**	**60**	0	0	0		

7.2.2.3. Thin Film Materials Specialization

a) **Required Courses**: Accumulate a total of 22 credits from the courses according to the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10107	Surface and Interface Science of Solids	2	22,5	0	15	0	M	
2	MSC10105	Thin-film Physics	3	37,5	0	15	0	M	
3	MSC10101	Chemical Defects in Materials	2	22,5	0	15	0	M	
4	MSC10108	Computational Materials	2	30	0	0	0	M	
5	MSC10109	Micro and Nano Electronic Engineering	3	37,5	0	15	0	M	
6	MSC10110	Surface functionalization of materials	2	22,5	0	15	0	M	
7	MSC10113	Fuel cells	2	30	0	0	0	M	
8	MSC10111	Materials and Devices for Energy storage	2	30	0	0	0	M	
9	MSC10103	Practical Methods for Material Analysis 1	2	0	60	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
10	MSC10104	Materials synthesis and Characterization Laboratory 2	2	0	60	0	0	M	
11	MSC10xxx	Research project	4	0	0	0	120	M	
Sub-Total			**26**	**232.5**	**120**	**75**	120		

b) **Elective courses**: Accumulate a total of 8 credits from the following courses

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10112	Sound-thermal insulation and mechanical materials	2	30	0	0	0	E	
2	MSC10114	Gas sensor materials	2	30	0	0	0	E	
3	MSC10115	Photocatalytic Materials	2	30	0	0	0	E	
4	MSC10116	Electrical Memory Materials and Devices	2	30	0	0	0	E	
5	MSC10118	Application of radiation technology in materials science	2	30	0	0	0	E	
6	MSC10119	Smart materials and applications	2	30	0	0	0	E	
7	MSC10120	Practice in computational materials	2	0	60	0	0	E	
Sub-Total			**4**	**60**	**60**	0	0		

7.2.3. Graduate knowledge (10 credits)

Students choose 1 of the following 3 options to accumulate 10 credits

7.2.3.1. Thin Film Materials Specialization: Students choose 1 of 2 options to accumulate 10 credits as follows:

a. Option 1: Students do 10-credit graduation thesis

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10195	Graduation thesis	10	0	0	0	300	M	Teachers guide students according to regulations

b. Option 2: Students take the Graduation Seminar and study 06 credits of the subjects according to the following list:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10190	Graduation Seminar	4	0	0	0	120	M	Teachers guide students according to regulations
2	MSC10117	Seminar	3	30	30	0	0	M	
3	MSC10012	Quality Management System (QMS)	3	45	0	0	0	M	
Sub-Total			**10**	**75**	**30**	0	**120**		

7.2.3.2. Polymer and Composites Materials Specialization: Students choose 1 of 3 options to accumulate 10 credits as follows:

a. Option 1: Students do 10-credit graduation thesis

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10295	Graduation thesis	10	0	0	0	300	M	Teachers guide students according to regulations

b. Option 2: Students who complete the 06 credits Graduation Seminar and study at least 04 credits from the following graduation elective subjects:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	No
				Theory	Practice	Exercise	Thesis		
1	MSC10290	Graduation Seminar	6	0	0	0	180	M	Teachers guide students according to regulations
2	MSC10214	Polymer materials 1: Paints, Varnish and adhesives	3	45	0	0	0	E	Students choose at least 4 credits from elective courses
3	MSC10215	Polymer materials 2: Packaging and textile	2	30	0	0	0	E	
4	MSC10216	Functional polymers	2	22,5	0	15	0	E	
5	MSC10213	Radiation technology for modification of polymer materials	2	30	0	0	0	E	
6	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	E	
Sub-Total			**10**	**172,5**	0	15	**180**		

c. Option 3: Students take a minimum of 10 credits from the following graduation electives

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MSC10214	Polymer materials 1: Paints, Varnish and adhesives	3	45	0	0	0	E	
2	MSC10215	Polymer materials 2: Packaging and textile	2	30	0	0	0	E	
3	MSC10216	Functional polymers	2	22,5	0	15	0	E	
4	MSC10213	Radiation technology for modification of polymer materials	2	30	0	0	0	E	
5	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	E	
Sub-Total			**10**	**172,5**	**0**	**15**	0		

7.2.3.3. Biomedical Materials Specialization: Students choose 1 of 2 options to accumulate 10 credits as follows:

a. Option 1: **Students do 10-credit graduation thesis**

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	No
				Theory	Practice	Exercise	Thesis		
1	MSC10395	Graduation thesis	10	0	0	0	300	M	Teachers guide students according to regulations

b. Option 2: Students take the Graduation Seminar and study 06 credits of the subjects according to the following list:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	No
				Theory	Practice	Exercise	Thesis		
1	MSC10390	Graduation Seminar	4	0	0	0	120	M	Teachers guide students accord

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	No
				Theory	Practice	Exercise	Thesis		
									ing to regulations
2	MSC10313	Biomedical Materials Engineering and Equipment	3	45	0	0	0	M	
3	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	M	
Sub-Total			**10**	**90**	0	0	**120**		

8. Expected teaching plan/curriculum structure, link between modules and LOs

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
1	CHE00001	General Chemistry 1	3	2	CCT1.1
	MSC00010	Introduction to Materials Science	2	2,3	CCT1.1
	ADD00031	English 1	3	2	CCT2.4
	BAA00004	General Law	3	2	CCT4.1
	BIO00001	General Biology 1	3	2	CCT1.1
	PHY00001	General Physics 1 (Mechanics - Thermodynamics)	3	2	CCT1.1
	MTH00003	Integral Calculus 1B	3	2	CCT1.1
	BAA00021	Physical education 1	2	2	

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	BAA00030	National defense - Security education	4	2	
	Sub-Total (excluding National Defense and Security Education, English)		**19**		
2	BAA00101	Marxist-Leninist Philosophy	3	2	CCT4.1
	MST00005	Academic and Professional Skills	2	2.0	CCT4.1
	CSC00003	Basic Informatics	3	2	CCT2.2
	ADD00032	English 2	3	2	CCT2.4
	MTH00002	Advanced Mathematics C	3	2	CCT1.1
	CHE00002	General Chemistry 2	3	2.0	CCT1.1
	PHY00002	General physics 2 (Electricity-Magnetism)	3	2	CCT3.1
	BAA00005	General Economics	2	2	CCT4.1
	BAA00007	Methodology of Creativity	2	2	CCT2.3
	BAA00006	General Psychology	2	2	CCT2.3, CCT2.4
	GEO00002	Earth Sciences	2	2	CCT1.1
	ENV00001	General environment	2	2	CCT1.1
	BAA00022	Physical Education 2	2	2	
	Sub-total (excluding english)		**21**		
3	MSC00001	Introduction to Materials Science	3	2	CCT1.1, CCT1.2, CCT1.3, CCT2.1

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	BAA00103	Scientific Socialism	2	2	CCT4.1
	BAA00102	Marxist-Leninist Political Economy	2	2.0	CCT4.1
	ADD00033	English 3	3	2	CCT2.4
	CHE00081	Lab work - General Chemistry	2	2	CCT2.1
	PHY00081	Lab work - General physics	2	2	CCT2.1
	MTH00040	Probability Statistics	3	2	CCT1.1
	PHY00004	Modern Physics (Quantum - Atom - Nucleus)	3	2	CCT1.1
	Sub-total (excluding english)		**17**		
4	ADD00034	English 4	3	2	CCT2.4
	BAA00104	History of the Vietnamese Communist Party	2	2.0	CCT4.1
	MSC10007	Organic Chemistry	2	2	CCT1.1
	MSC10001	Electrodynamics	2	2	CCT1.1
	MSC10004	Fundamental of Solid State Science	3	3	CCT1.2
	MSC10009	Basic biology	3	3	CCT1.1, CCT1.2
	MSC100xx	Fundamental chemistry of transition and non-transition elements	2	3	CCT1.1, CCT2.4, CCT3.1
	MSC10002	Thermodynamics	3	3	CCT1.1, CCT1.2, CCT2.3, CCT2.4
	MSC100xx	Polymer and composite materials	2	3	CCT1.1, CCT1.2, CCT2.2

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	Sub-total (excluding english)		**19**		
5	BAA00003	Ho Chi Minh's Ideology	2	2.0	CCT4.1
	MSC10010	Material Fabrication Methods 1	2	2	CCT1.2, CCT2.3
	MSC10011	Material Fabrication Methods 2	2	3	CCT1.1, CCT1.2, CCT1.3, CCT2.1
	MSC10015	Material Characterization Methods 1	3	3	CCT1.1, CCT1.2
	MSC10016	Material Characterization Methods 2	2	3	CCT1.1, CCT1.2, CCT2.1, CCT2.2
	MSC10017	Material Fabrication Methods Practice	2	3	CCT2.1
	MSC10018	Material Characterization Methods Practice	2	3	CCT2.1
	MSC10005	Metals, semiconductors, and insulators Materials	2	3	CCT1.2
	Sub-total		**17**		
6	**Polymer and Composites Materials Specialization**				
	MSC102xx	Polymer physical properties	2	3	CCT1.1, CCT1.2, CCT2.2, CCT2.4
	MSC10203	Technology of Synthesis and Recycle of Polymers	2	3	CCT1.1, CCT1.2, CCT1.3
	MSC10209	Rubber: Chemistry and Technology	2	3	CCT1.1 CCT2.3, CCT3.1
	MSC10206	Polymer Blends	2	3	CCT1.1, CCT2.4, CCT4.1
	MSC10211	Composite and nanocomposite materials	3	3	CCT1.2, CCT2.4
	MSC10219	Processing Technology of Polymers	2	3	CCT1.1, CCT1.2, CCT1.3, CCT2.2

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MSC10217	Modification of polymers	2	3	CCT1.2, CCT1.3, CCT2.3
	MSC10218	Smart polymer materials and applications	2	3	CCT1.1, CCT1.2, CCT2.2
	Sub-Total		**17**		
	Biomedical Materials Specialization				
	MSC10302	Specialized Biology	2	3	CCT1.3
	MSC10312	Tissue Technology	3	3	CCT1.2, CCT1.3
	MSC10307	Surface Modification of Materials	3	3	CCT1.2, CCT1.3
	MSC10304	Functional biomedical materials	3	3	CCT1.1
	MSC10305	Molecular Techniques in Diagnostics	3	3	CCT4.1
	MSC10314	Biochemical Laboratory	2	3	CCT2.1
	Sub-Total		**16**		
	Thin film Materials Specialization				
	MSC10107	Surface and Interface Science of Solids	2	3	CCT1.2
	MSC10105	Thin-film Physics	3	3	CCT1.2
	MSC10101	Chemical Defects in Materials	2	3	CCT1.1, CCT1.2, CCT2.3
	MSC10108	Computational Materials	2	3	CCT1.2
	MSC10109	Micro and Nano Electronic Engineering	3	3	CCT1.1, CCT2.1, CCT3.1, CCT4.1
	MSC10110	Surface functionalization of materials	2	3	CCT1.1

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MSC10103	Practical Methods for Material Analysis 1	2	3	CCT1.1, CCT1.2, CCT2.1, CCT2.2
	Sub-Total		**16**		
7	**Polymer and Composites Materials Specialization**				
	MSC10204	Polymer Testing and Characterization Methods	3	3	CCT1.1, CCT1.2, CCT2.1
	MSC102xx	Polymer Additives	2	3	CCT1.1, CCT1.2, CCT2.2
	MSC102xx	Polymer Materials in electronic and semiconductor	2	3	CCT1.1, CCT1.2, CCT2.2
	MSC10208	Specialization Seminar	2	3	CCT1.2, CCT1.3, CCT2.3, CCT2.4
	MSC10202	Mechanical Polymers Laboratory	2	3	CCT1.2, CCT2.1, CCT2.2
	MSC10201	Polymer Synthesis Laboratory	2	3	CCT1.2, CCT2.2
	MSC10xxx	Research Project	4	3	CCT1.2, CCT1.3, CCT2.3, CCT2.4
	Sub-Total		**17**		
	Biomedical Materials Specialization				
	MSC10306	Biomedical engineering	3	3	CCT1.1, CCT1.3
	MSC10315	Biological Property Assessment of Materials	2	3	CCT1.2, CCT2.1
	MSC10319	Learning with Enterprises	2	3	CCT3.1, CCT4.1
	MSC10320	Biomedical Material Fabrication Practices	3	3	CCT1.1, CCT1.3, CCT2.1, CCT3.1
	MSC10321	Biosensors	2	3	CCT1.3
	MSC10316	Dental Materials	2	3	CCT1.3
	MSC10317	Cancer treatment by immunological technique	2	3	CCT1.2

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MSC10318	Drug delivery materials	2	3	CCT1.1, CCT1.3, CCT2.4, CCT4.1
	MSC10xxx	Research project	4	3	CCT1.2, CCT1.3, CCT2.3, CCT2.4
	Sub-Total		**18**		
	Thin film Materials Specialization				
	MSC10111	Materials and Devices for Energy storage	2	3	CCT1.3
	MSC10112	Sound-thermal insulation and mechanical materials	2	3	CCT1.1
	MSC10113	Fuel cells	2	3	CCT1.2
	MSC10114	Gas sensor materials	2	3	CCT1.1
	MSC10115	Photocatalytic Materials	2	3	CCT1.2
	MSC10116	Electrical Memory Materials and Devices	2	3	CCT1.2
	MSC10104	Materials synthesis and Characterization Laboratory 2	2	3	CCT2.1, CCT2.2, CCT4.1
	MSC10118	Application of radiation technology in materials science	2	3	CCT1.1, CCT3.1
	MSC10119	Smart materials and applications	2	3	CCT1.2
	MSC10120	Practice in computational materials	2	3	CCT1.1, CCT1.2, CCT1.3, CCT2.3
	MSC10xxx	Research project	4	3	CCT1.2, CCT1.3, CCT2.3, CCT2.4
	Sub-Total		**16**		
8	**Polymer and Composites Materials Specialization**				

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	Option 1				
	MSC10295	Graduation thesis	10	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	Option 2: ***Students conduct Graduation Seminar and 2 graduation subjects***				
	MSC10290	Graduation Seminar	6	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	Students choose 2 out of 5 subjects				
	MSC10214	Polymer materials 1: Paints, Varnish and adhesives	3	4	CCT1.1, CCT3.1
	MSC10215	Polymer materials 2: Packaging and textile	2	4	CCT1.1, CCT2.3
	MSC10216	Functional polymers	2	4	CCT1.3
	MSC10213	Radiation technology for modification of polymer materials	2	4	CCT1.3
	MSC10012	Quality Management Systems (QMS)	3	3	CCT2.2, CCT3.1
	Option 3: Students choose 4 specialized graduation subjects (minimum 10 credits)				
	MSC10214	Polymer materials 1: Paints, Varnish and adhesives	3	4	CCT1.1, CCT3.1
	MSC10215	Polymer materials 2: Packaging and textile	2	4	CCT1.1, CCT2.3
	MSC10216	Functional polymers	2	4	CCT1.3
	MSC10213	Radiation technology for modification of polymer materials	2	4	CCT1.3
	MSC10012	Quality Management Systems (QMS)	3	3	CCT2.2, CCT3.1

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	Sub-Total		**10**		
	Biomedical Materials Specialization				
	Option 1				
	MSC10395	Graduation thesis	10	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	Option 2:				
	MSC10390	Graduation Seminar	4	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	MSC10313	Biomedical Materials Engineering and Equipment	3	4	CCT1.3
	MSC10012	Quality Management Systems (QMS)	3	3	CCT2.2, CCT3.1
	Sub-Total		**10**		
	Thin film Materials Specialization				
	Option 1				
	MSC10195	Graduation thesis	10	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	Option 2				
	MSC10190	Graduation Seminar	4	4	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	MSC10117	Specialized seminar	3	4	CCT1.1, CCT2.1
	MSC10012	Quality Management Systems (QMS)	3	3	
	Sub-Total		**10**		

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