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

PROGRAM LEVEL
BACHELOR OF SCIENCE IN MATERIALS TECHNOLOGY
Admission: 2022

(Decision No 1477/QĐ-KHTN dated 8 September2022
issued by the Rector of the University of Science, VNU-HCM)

1. General information of the program

1.1. 1.1. Program name:

- Programme name in Vietnamese: Công nghệ vật liệu
- Programme name in English: Materials Technology

1.2. Major code: 7510402

1.3. Level: Undergraduate.

1.4. Type of diploma: Bachelor of Science in Materials Technology

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 Công nghệ vật liệu
- Name of diploma in English: Bachelor of Materials Technology

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:

Training Bachelor of Materials Technology with solid expertise in the field of materials, proficient practical skills, high creativity, good teamwork and communication skills, proficient use of specialized foreign languages, high professional ethics and professionalism, meeting the needs of society for the field of advanced and smart materials. Bachelor of Materials Technology has the ability to apply specialized knowledge, practical skills and methodologies to research and develop products in the field of materials.

2.2. Specific objectives

STT	Goals (MT or G)	Goal
KNOWLEDGE		
1	MT1.1	Apply knowledge of mathematics, physics, chemistry, computer science and basic social sciences to solve practical problems in manufacturing, design and materials selection.
2	MT1.2	Apply materials science knowledge to innovate industrial processes, develop products and optimize materials for specific applications.
SKILLS		
3	MT2.1	Ability to work effectively in multidisciplinary teams, have independent scientific work skills, present and discuss work results.
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 different materials and the scientific principles that influence material behavior.	4	MT1.1
2	CCT1.2	demonstrate an understanding of the	4	MT1.1

No	LOs	Expected LOs	Level of achievement of the LOs (according to Bloom's taxonomy)*	Link between LOs and training objectives
		structure-process-property relationships of materials		
3	CCT1.3	Apply knowledge and skills to optimize the manufacturing process of products with specific features.	4	MT1.2
SKILLS				
4	CCT2.1	Gain proficiency in the use of synthesis techniques and materials characterization to solve practical engineering problems, particularly in product design, materials optimization and manufacturing taking into account performance, cost and sustainability criteria.	4	MT1.3
5	CCT2.2	Use and interpret results from data to make decisions about materials selection and fabrication.	4	MT1.3
6	CCT2.3	Develop critical thinking and problem solving skills to support working effectively in multidisciplinary teams.	4	MT1.4
7	CCT2.4	Communicate scientific information effectively, especially using English, to a variety of audiences	4	MT1.4
ATTITUDES				
8	CCT3.1	Committed to lifelong learning to stay up to date with new advances in engineering and materials technology.	4	MT1.4
PROFESSIONAL RESPONSIBILITY				
9	CCT4.1	Promote professional ethics and social responsibility, emphasizing the impact of materials science on society and the environment.	4	MT1.5

2.4. Career opportunities/jobs that learners can take on

Bachelor of Materials Technology can work at:

- - Factories, high-tech zones, enterprises, companies, research institutes... have activities related to monitoring production lines, consulting - testing, researching, manufacturing and applying related materials and chemicals, especially advanced materials such as thin film materials for electronic components and devices; polymer materials, packaging, labels, leather shoes, alloy/metal materials; materials for industries such as optical fibers, ceramics, glass.
- - In addition to jobs directly related to material production, graduates of Materials Technology can also work at companies involved in consulting, maintenance, technical guidance and operating procedures for high-tech equipment/machinery, especially equipment for science, technology, medicine, etc.
- - Participate in teaching and research at universities, colleges, research institutes, Departments of Science and Technology, Departments of Natural Resources and Environment, etc.
- - Studying master's and doctoral programs with full scholarships in advanced countries such as France, USA, Japan, Korea, Taiwan, etc.

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)**		**48**	**4**	**52**		
2	**Professional education:**	**Fundamental (2)**	**40**	**2**	**42**		
		Specialized (3)	**26**	**0**	**26**		
		1 Polymer & Composite Materials Technology	26	0	26	130	**130**
		2 Biomedical Materials Technology	26	0	26	130	
		3 Semiconductor Materials Technology	26	0	26	130	
		4 Renewable Energy Materials Technology	26	0	26	130	
		Graduate **(4)**	10		10		

7. Training program content

Course type convention:

- Mandatory courses: M
- Elective courses: E

7.1. General education knowledge

Accumulate a total of 52 credits (excluding Physical Education, National Defense Education, Information Technology and Foreign Languages):

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	
6	BAA00004	General Law	3	45	0	0	M	
Sub-Total			**14**					

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 subject
2	BAA00006	General Psychology	2	30	0	0	E	
3	BAA00007	Methodology of Creativity	2	30	0	0	E	
4	GEO00002	Earth Sciences	2	30	0	0	E	Choose 1 subject
5	ENV00001	General environment	2	30	0	0	E	
6	MST00001	Laboratory Safety	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	MTH00003	Integral Calculus 1B	3	45	0	0	M	
2	MTH00002	Advanced Mathematics C	3	45	0	0	M	
3	MTH00040	Probability Statistics	3	45	0	0	M	
4	CHE00001	General Chemistry 1	3	30	0	30	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
5	CHE00002	General Chemistry 2	3	30	0	30	M	
6	CHE00081	Lab work - General Chemistry	2	0	60	0	M	
7	PHY00001	General Physics 1 (Mechanics - Thermodynamics)	3	45	0	0	M	
8	PHY00002	General physics 2 (Electromagnetic - Optical)	3	45	0	0	M	
9	PHY00004	General physics 2 (Electricity-Magnetism)	3	45	0	0	M	
10	PHY00081	Lab work - General physics	2	0	60	0	M	
11	MSC00001	Introduction to Materials Science	3	45	0	0	M	
12	MST00002	Introduction to Materials Technology	3	45	0	0	M	
Sub-Total			**34**					

7.1.4. Computer Science (not included in GPA, included in cumulative credits)

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**					

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**				

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. Basic industry knowledge: Accumulate a total of 42 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	MSC10006	Transition and Non-Transition Elements	3	45	0	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
2	MSC10007	Organic Chemistry	3	30	0	30	0	M	
3	MST10001	Organic Chemistry Practice	2	0	60	0	0	M	
4	MST10002	Inorganic Chemistry Practice	2	0	60	0	0	M	
5	MST10003	Inorganic Material Fabrication Methods	3	30	0	30	0	M	
6	MST10005	Material Fabrication Methods Practice	2	0	60	0	0	M	
7	MST10008	Material Analysis Methods Practice	2	0	60	0	0	M	
8	MST10009	Polymer and Composite Materials	3	30	0	30	0	M	
9	MST10011	Professional Skills	2	22.5	0	15	0	M	
10	MST10015	Calculation and Simulation for Materials	2	15	30	0	0	M	
11	MST10016	Organic Material Fabrication Methods	2	22.5	0	15	0	M	
12	MST10017	Structural and Morphological Analysis Methods	2	22.5	0	15	0	M	
13	MST10018	Methods for Analyzing Material Properties	2	30	0	0	0	M	
14	MST10019	Biotechnology Practice	2	0	60	0	0	M	
15	MST10020	Material Modification Techniques	2	30	0	0	0	M	
16	MST10021	Biotechnology	2	30	0	0	0	M	
17	MST10022	Fundamentals of Solid State Science	2	30	0	0	0	M	
18	MST10023	Material Thermodynamics	2	30	0	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
19	MST10024	Metal and Alloy Materials	2	30	0	0	0	E	Choose 1 subject
20	MST10025	Ceramic Materials	2	30	0	0	0	E	
21	MST10026	Semiconductor Materials	2	30	0	0	0	E	
Sub-Total			**42**	**397.5**	**330**	**135**	**862.5**		

7.2.2. Specialized knowledge

7.2.2.1. Polymer & Composite Materials Technology Specialization

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	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	M	
2	MSC10201	Polymer Synthesis Internship	2	0	60	0	0	M	
3	MSC10202	Mechanical Properties of Polymer	2	0	60	0	0	M	
4	MSC10219	Processing Technology of Polymers	2	22.5	0	15	0	M	
5	MST10101	Mechanical Properties of Polymers	2	30	0	0	0	M	
6	MST10112	Enterprise Internship	3	0	90	0	0	M	
7	MST10129	Learning with Enterprises	2	30	0	0	0	M	
8	MST10136	Advanced Materials Research and Manufacturing Project	2	0	0	0	60	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
9	MST10137	Innovation and Entrepreneurship	2	30	0	0	0	M	
10	MST10138	Polymer characterization methods	2	22.5	0	15	0	M	
11	MST10139	Polymer Additives and Polymer-Modified	2	30	0	0	0	M	
12	MST10140	Polymer Blends and Thermoplastic Elastomers	2	30	0	0	0	M	
Sub-Total			**26**	**240**	**210**	**30**	60	**540**	

7.2.2.2. Biomedical Materials Technology Specialization

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	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	M	
2	MSC10315	Biological Property Assessment of Materials Internship	2	0	60	0	0	M	
3	MST10112	Enterprise Internship	3	0	90	0	0	M	
4	MST10129	Learning with Enterprises	2	30	0	0	0	M	
5	MST10136	Advanced Materials Research and Manufacturing Project	2	0	0	0	60	M	
6	MST10137	Innovation and Entrepreneurship	2	30	0	0	0	M	
7	MST10201	Biomedical Materials 1	2	22.5	0	15	0	M	
8	MST10202	Biomedical Materials 2	2	22.5	0	15	0	M	
9	MST10203	Biomedical Material Fabrication Practices	2	0	60	0	0	M	
10	MST10204	Techniques for evaluating the biological properties of materials	2	30	0	0	0	M	
11	MST10205	Biomedical Sensors and Evaluation Techniques	2	30	0	0	0	M	
12	MST10206	Tissue Engineering	2	30	0	0	0	M	
Sub-Total			**26**	**240**	**210**	**30**	60	**540**	

7.2.2.3. Semiconductor Materials Technology Specialization

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	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	M	
2	MST10112	Enterprise Internship	3	0	90	0	0	M	
3	MST10129	Learning with Enterprises	2	30	0	0	0	M	
4	MST10136	Advanced Materials Research and Manufacturing Project	2	0	0	0	60	M	
5	MST10137	Innovation and Entrepreneurship	2	30	0	0	0	M	
6	MST10301	Semiconductor Packaging Technology	2	22.5	0	15	0	M	
7	MST10302	Semiconductor Devices	2	22.5	0	15	0	M	
8	MST10303	Optoelectronic Devices	2	30	0	0	0	M	
9	MST10304	Microelectromechanical Systems (MEMS) Technology	2	30	0	0	0	M	
10	MST10305	Semiconductor Device Fabrication and Evaluation Internship	2	0	60	0	0	M	
11	MST10306	Modeling and Simulation of Semiconductor Devices	2	0	60	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
12	MST10307	Basic Integrated Circuits	2	30	0	0	0	M	
Sub-Total			**26**	**240**	**210**	**30**	60	**540**	

7.2.2.4. Renewable Energy Materials Technology Specialization

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	MSC10012	Quality Management Systems (QMS)	3	45	0	0	0	M	
2	MST10112	Enterprise Internship	3	0	90	0	0	M	
3	MST10129	Learning with Enterprises	2	30	0	0	0	M	
4	MST10136	Advanced Materials Research and Manufacturing Project	2	0	0	0	60	M	
5	MST10137	Innovation and Entrepreneurship	2	30	0	0	0	M	
6	MST10401	Renewable Energy Systems and Their Impact on Economic and Environmental	2	22.5	0	15	0	M	
7	MST10402	Energy Harvesting and Conversion Materials	2	30	0	0	0	M	
8	MST10403	Energy Storage Materials	2	30	0	0	0	M	
9	MST10404	Renewable Energy Harvesting and Conversion Technology	2	22.5	0	15	0	M	
10	MST10405	Renewable Energy Storage Technology	2	30	0	0	0	M	
11	MST10406	Characterization of Energy Conversion	2	0	60	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
		and Storage Materials							
12	MST10407	Characterization of Energy Conversion and Storage Devices	2	**0**	60	0	0	M	
Sub-Total			**26**	**240**	**210**	**30**	60	**540**	

7.2.3. Graduation knowledge: 10 credits, students choose 1 of 2 options to accumulate 10 credits

7.2.3.1 **Option 1:** Students do 10-credit graduation thesis

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MST10995	Graduation thesis	10	0	0	0	300	M	
Sub-Total			**10**				**300**		

7.2.3.2 **Option 2:**

Students who do Seminars graduate with 06 credits and choose to study 04 credits of elective courses in the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
1	MST10990	Graduation Seminar	6	0	0	0	180	M	
2	MST10121	Painting Materials and Varnish Technology	2	30	0	0	0	E	Choose 02 subjects
3	MST10171	Smart Materials and Applications	2	30	0	0	0	E	
4	MST10172	Packaging Materials Technology	2	30	0	0	0	E	
5	MST10173	New Materials Technology in Construction	2	30	0	0	0	E	
6	MST10174	Nanotechnology and Nanomaterials	2	30	0	0	0	E	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
7	MST10175	Sensor Technology and Applications	2	30	0	0	0	E	
8	MST10176	Machine Learning and AI in Materials Science	2	30	0	0	0	E	
9	MST10177	Flexible Devices	2	30	0	0	0	E	
10	MST10178	Recycling Materials Technology	2	30	0	0	0	TC	
Sub-Total			**10**	60	0	0	**180**		

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	BAA00004	General Law	3	2.0	CCT4.1
	ADD00031	English 1	3	2.0	CCT2.4
	BAA00021	Physical education 1	2	2.0	
	BAA00030	National defense - Security education	4	2.0	
	MTH00003	Integral Calculus 1B	3	2.0	CCT1.1
	MTH00002	Advanced Mathematics C	3	2.0	CCT1.1
	CHE00001	General Chemistry 1	3	2.0	CCT1.1
	CHE00002	General Chemistry 2	3	2.0	CCT1.1
	PHY00001	General Physics 1 (Mechanics - Thermodynamics)	3	2.0	CCT3.1
	MST00002	Introduction to Materials Technology	3	2.0	CCT1.1, CCT1.2, CCT1.3, CCT2.2
	Sub-Total (excluding National Defense and Security Education, English))		**23**		
2	BAA00101	Marxist-Leninist Philosophy	3	2.0	CCT4.1

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	BAA00102	Marxist-Leninist Political Economy	2	2.0	CCT4.1
	BAA00103	Scientific Socialism	2	2.0	CCT4.1
	BAA00005	General Economics	2	2.0	CCT4.1
	BAA00006	General Psychology	2	2.0	CCT2.3, CCT2.4
	BAA00007	Methodology of Creativity	2	2.0	CCT2.3
	GEO00002	Earth Sciences	2	2.0	CCT1.1
	ENV00001	General environment	2	2.0	CCT1.1
	MST00001	Laboratory Safety	2	2.0	CCT1.3
	ADD00032	English 2	3	2.0	CCT2.4
	BAA00022	Physical education 2	2	2.0	
	CSC00003	Basic Informatics	3	2.0	CCT2.4
	PHY00002	General physics 2 (Electromagnetic - Optical)	3	2.0	CCT3.1
	Sub-Total (excluding english)		**20**		
3	BAA00104	History of the Vietnamese Communist Party	2	2.0	CCT4.1
	BAA00003	Ho Chi Minh's Ideology	2	2.0	CCT4.1
	ADD00033	English 3	3	2.0	CCT2.4
	MTH00040	Probability Statistics	3	2.0	CCT1.1
	CHE00081	Lab work - General Chemistry	2	2.0	CT2.1
	PHY00081	Lab work - General physics	2	2.0	CCT2.1
	PHY00004	Modern Physics (Quantum - Atom - Nucleus)	3	2.0	CCT2.3
	MSC00001	Fundamental of Materials Science	3	2.0	CCT1.1, CCT1.2, CCT1.3, CCT2.1
	Sub-Total (excluding english)		**19**		
4	ADD00034	English 4	3	2.0	CCT2.4
	MSC10007	Organic Chemistry	3	2.0	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
	MST10009	Polymer and Composite Materials	3	3.0	CCT1.1, CCT1.2, CCT2.2
	MSC10006	Transition and Non-Transition Elements	3	3.0	CCT1.2, CCT1.3, CCT3.1
	MST10003	Inorganic Material Fabrication Methods	3	3.0	CCT1.2, CCT2.2, CCT2.4
	MST10002	Inorganic Chemistry Practice	2	3.0	CCT1.2, CCT1.3
	MST10011	Professional Skills	2	3.0	CCT2.3, CCT4.1
	Sub-Total (excluding english)		**16**		
5	MST10001	Organic Chemistry Practice	2	3.0	CCT1.1, CCT1.2
	MST10016	Organic Material Fabrication Methods	2	3.0	CCT1.2, CCT2.3
	MST10019	Biotechnology Practice	2	3.0	CCT1.3
	MST10021	Biotechnology	2	3.0	CCT1.3
	MST10005	Material Fabrication Methods Practice	2	3.0	CCT1.2, CCT1.3
	MST10020	Material Modification Techniques	2	3.0	CCT1.3
	MST10023	Material Thermodynamics	2	3.0	CCT1.3
	MST10015	Calculation and Simulation for Materials	2	3.0	CCT1.2, CCT1.3, CCT2.2, CCT2.3
	MST10025	Ceramic Materials	2	3.0	CCT1.2
	MST10024	Metal and Alloy Materials	2	3.0	CCT1.2
	MST10026	Semiconductor Materials	2	3.0	CCT1.2
	MST10022	Fundamentals of Solid State Science	2	3.0	CCT1.2
	Sub-Total		**20**		
6	**Polymer & Composite Materials Technology Specialization**				
	MST10018	Các phương pháp phân tích tính chất của vật liệu	2	3.0	CCT1.3
	MST10008	Thực hành các phương pháp phân tích vật liệu	2	3.0	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
	MST10017	Các phương pháp phân tích cấu trúc và hình thái vật liệu	2	3.0	CCT1.1, CCT2.1, CCT2.2, CCT2.4
	MST10101	Mechanical Properties of Polymers	2	3.0	CCT1.2, CCT1.3, CCT2.1, CCT2.2
	MST10138	Polymer characterization methods	2	3.0	CCT1.1, CCT1.2, CCT2.2
	MSC10219	Processing Technology of Polymers	2	3.0	CCT1.2, CCT1.3, CCT2.1, CCT2.2
	MST10139	Polymer Additives and Polymer-Modified	2	3.0	CCT1.1, CCT1.2, CCT2.2
	Sub-Total		**14**		
	Biomedical Materials Technology Specialization				
	MST10018	Material Property Analysis Methods	2	3.0	CCT1.3
	MST10008	Material Analysis Methods Practice	2	3.0	CCT2.1
	MST10017	Structural and Morphological Analysis Methods	2	3.0	CCT1.1, CCT2.1, CCT2.2, CCT2.4
	MST10201	Biomedical Materials 1	2	3.0	CCT1.3
	MST10205	Biomedical Sensors and Evaluation Techniques	2	3.0	CCT1.3
	MST10206	Tissue Engineering	2	3.0	CCT1.3
	MST10204	Techniques for evaluating the biological properties of materials	2	3.0	CCT1.1
	Sub-Total		**14**		
	Semiconductor Materials Technology Specialization				
	MST10018	Material Property Analysis Methods	2	3.0	CCT1.3
	MST10008	Material Analysis Methods Practice	2	3.0	CCT2.1
	MST10017	Structural and Morphological Analysis Methods	2	3.0	CCT1.1, CCT2.1, CCT2.2, CCT2.4

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MST10301	Semiconductor Packaging Technology	2	3.0	CCT1.1, CCT2.1, CCT3.1, CCT4.1
	MST10302	Semiconductor Devices	2	3.0	CCT1.1, CCT2.3, CCT3.1, CCT4.1
	MST10303	Optoelectronic Devices	2	3.0	CCT1.3
	MST10304	Microelectromechanical Systems (MEMS) Technology	2	3.0	CCT1.1, CCT1.2, CCT2.3, CCT4.1
	Sub-Total		**14**		
	Renewable Energy Materials Technology Specialization				
	MST10018	Methods for Analyzing Material Properties	2	3.0	CCT1.3
	MST10008	Practical Methods for Material Analysis	2	3.0	CCT2.1
	MST10017	Methods for Analyzing Material Structure and Morphology	2	3.0	CCT1.1, CCT2.1, CCT2.2, CCT2.4
	MST10401	Renewable Energy Systems and Their Impact on Economic and Environmental	2	3.0	CCT1.3
	MST10402	Energy Harvesting and Conversion Materials	2	3.0	CCT1.1
	MST10403	Energy Storage Materials	2	3.0	CCT1.1, CCT1.2, CCT2.2, CCT2.4
	MST10404	Microelectromechanical Systems (MEMS) Technology	2	3.0	CCT1.2
	Sub-Total		**14**		
7	**Polymer and Composite Materials Technology, Biomedical Materials Technology, Semiconductor Materials Technology, Renewable Energy Materials Technology**				
	MST10112	Enterprise Internship	3	3.0	CCT3.1, CCT4.1
	Sub-Total		**3**		
8	**Polymer & Composite Materials Technology Specialization**				

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MST10140	Polymer Blends and Thermoplastic Elastomers	2	3.0	CCT1.2, CCT2.2, CCT2.4
	MSC10202	Mechanical Properties of Polymer	2	3.0	CCT1.1, CCT2.1, CCT2.2
	MSC10201	Polymer Synthesis Internship	2	3.0	CCT1.2, CCT2.2, CCT4.1
	MST10129	Learning with Enterprises	2	3.0	CCT4.1
	MST10136	Advanced Materials Research and Manufacturing Project	2	3.0	CCT2.1, CCT2.2, CCT4.1
	MST10137	Innovation and Entrepreneurship	2	3.0	CCT2.2
	MSC10012	Quality Management Systems (QMS)	3	3.0	CCT1.3, CCT3.1
	Sub-Total		**15**		
	Biomedical Materials Technology Specialization				
	MST10203	Biomedical Material Fabrication Practices	2	3.0	CCT1.1, CCT1.3, CCT2.1, CCT3.1
	MSC10315	Biological Property Assessment of Materials Internship	2	3.0	CCT1.1
	MST10202	Biomedical Materials 2	2	3.0	CCT1.1, CCT1.2
	MST10129	Learning with Enterprises	2	3.0	CCT4.1
	MST10136	Advanced Materials Research and Manufacturing Project	2	3.0	CCT2.1, CCT2.2, CCT4.1
	MST10137	Innovation and Entrepreneurship	2	3.0	CCT2.2
	MSC10012	Quality Management Systems (QMS)	3	3.0	CCT1.3, CCT3.1
	Sub-Total		**15**		
	Semiconductor Materials Technology Specialization				

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
	MST10305	Semiconductor Device Fabrication and Evaluation Internship	2	3.0	CCT2.1
	MST10306	Modeling and Simulation of Semiconductor Devices	2	3.0	CCT1.1, CCT1.2, CCT2.1, CCT2.2
	MST10307	Basic Integrated Circuits	2	3.0	CCT1.3
	MST10129	Learning with Enterprises	2	3.0	CCT4.1
	MST10136	Advanced Materials Research and Manufacturing Project	2	3.0	CCT2.1, CCT2.2, CCT4.1
	MST10137	Innovation and Entrepreneurship	2	3.0	CCT2.2
	MSC10012	Quality Management Systems (QMS)	3	3.0	CCT1.3, CCT3.1
	Sub-Total		**15**		
	Renewable Energy Materials Technology Specialization				
	MST10405	Renewable Energy Storage Technology	2		CCT1.1, CCT1.2, CCT2.2, CCT2.3
	MST10406	Characterization of Energy Conversion and Storage Materials	2	3.0	CCT2.1
	MST10407	Characterization of Energy Conversion and Storage Devices	2	3.0	CCT2.3
	MST10129	Learning with Enterprises	2	3.0	CCT4.1
	MST10136	Advanced Materials Research and Manufacturing Project	2	3.0	CCT2.1, CCT2.2, CCT4.1
	MST10137	Innovation and Entrepreneurship	2	3.0	CCT2.2
	MSC10012	Quality Management Systems (QMS)	3	3.0	CCT1.3, CCT3.1
	Sub-Total		**15**		

Semester	Code	Course Name	Credit	Level of achievement of the LOs (according to Bloom's assessment scale)	Link between LOs and training program
9	**Option1:**				
	MST10995	Graduation thesis	10	3.0	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	MST10990	Graduation Seminar	6	3.0	CCT1.2, CCT1.3, CCT2.1, CCT2.2, CCT2.4
	MST10171	Smart Materials and Applications	2	3.0	CCT1.1, CCT1.2, CCT2.2
	MST10172	Packaging Materials Technology	2	3.0	CCT1.1, CCT2.3
	MST10121	Painting Materials and Varnish Technology	2	3.0	CCT1.1, CCT2.3
	MST10173	New Materials Technology in Construction	2	3.0	CCT1.3
	MST10174	Nanotechnology and Nanomaterials	2	3.0	CCT1.3
	MST10175	Sensor Technology and Applications	2	3.0	CCT1.1
	MST10176	Machine Learning and AI in Materials Science	2	3.0	CCT1.2, CCT1.3, CCT2.2, CCT2.3
	MST10177	Flexible Devices	2		CCT1.1, CCT1.2, CCT2.3, CCT4.1
	MST10178	Recycling Materials Technology	2		CCT1.1, CCT2.1, CCT4.1
	Sub-Total		**10**		

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