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
Cohort 2020

(Decision No 1315B/QĐ-KHTN dated 9 October 2020
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:

The Materials Technology program is designed to provide graduates with a strong foundation in materials science, along with practical skills, creativity, teamwork abilities, and effective communication skills. Graduates will be fluent in relevant foreign languages and demonstrate strong professional ethics and professionalism, enabling them to meet societal needs in the advanced and smart materials sectors. Those earning a Bachelor's degree in Material Technology will be equipped to apply their specialized knowledge, practical skills, and methodologies in researching and developing products within the materials field.

2.2. Specific objectives

Graduates from Bachelor of Science in Materials Technology will be provided the knowledge, skills and attitudes as below

Intended learning Outcome code	Content
ILO1	Understanding of social and natural sciences.
ILO2	Apply knowledge of natural sciences and core concepts in materials science to solve problems related to materials technology (knowledge).
ILO3	Develop and optimize processes and technologies for material synthesis (synthesis).
ILO4	Describe physical and chemical phenomena and reactions to select appropriate materials for specific applications (knowledge).
ILO5	Analyze results and efficiency of synthesis processes through material analysis techniques (evaluation).
ILO6	Systematically plan research on complex materials-related issues, which includes conducting a literature review, designing and carrying out experiments, analyzing and interpreting data, and synthesizing information to reach conclusions (comprehension & application)
ILO7	Proficiency in using laboratory instruments and operating basic technical equipment in the field of materials technology (application).
ILO8	Recognizing the importance of lifelong learning in the context of rapidly advancing technology, which allows for access to new development opportunities and bridges the gap

	between laboratory research and practical application.
ILO9	Use English for communication and specialized English (according to the regulations of the Vietnam National University - Ho Chi Minh City)
ILO10	Skilled in using IT tools for social communication and professional activities
ILO11	Organize, plan, work independently and in teams, and communicate effectively in scientific, professional, and social contexts.
ILO12	Understanding the professional responsibilities and ethics of a materials scientist and engineer, possessing entrepreneurial skills and critical thinking.

2.3. Career opportunities/jobs position

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.

- According to the Regulations on university training issued with Decision No. 1227/QD-KHTN dated July 12, 2018, of the President of the University of Science, VNUHCM.
- Accumulate enough credits for general education and professional education as described in sections 6 and 7 of this training program.
- Satisfy the conditions in Article 17 of the Regulations on university training issued together with Decision No. 1227/QD-KHTN dated July 12, 2018, of the President of the University of Science - VNUHCM.

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)**		**33**	**4**	**37**		
		Specialized (3)						
		1	Polymer & Composite Materials Technology	25	6	31	130	
		2	Biomedical Materials Technology	28	3	31	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	
Sub-Total			**11**					

7.1.2. Social Sciences - Economics - Skills & Environment - Life Sciences & Law

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	
7	BAA00004	General Law	3	45	0	0	M	
Sub-Total			**7**					

7.1.3. Foreign Languages - Information - Gymnastics - National Defense

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00011	English 1	3	30	30	0	M	not include in GPA
2	BAA00012	English 2	3	30	30	0	M	
3	BAA00013	English 3	3	30	30	0	M	
4	BAA00014	English 4	3	30	30	0	M	
5	BAA00021	Physical education 1	2	15	30	0	M	
6	BAA00022	Physical education 2	2	15	30	0	M	
7	BAA00030	National defense - Security education	4				M	
8	CSC00003	Introduction to Informatics	3	15	60	0	M	
Sub-Total			**23**					

7.1.4. Mathematics - Natural Sciences

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	
5	CHE00002	General Chemistry 2	3	30	0	30	M	
6	CHE00081	General Chemistry Laboratory 1	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	Modern physics (Electricity-Magnetism)	3	45	0	0	M	
10	PHY00081	General physics Laboratory	2	0	60	0	M	
11	MSC00001	General Materials Science	3	45	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
12	MST00002	Introduction to Materials Technology	3	45	0	0	M	
Sub-Total			**34**					

7.2. Professional educational knowledge

7.2.1. Basic industry knowledge: Accumulate a total of 37 credits from the courses according to the following table:

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	MSC10006	Transition and Non-Transition Elements	3	45	0	0	M	
2	MSC10007	Organic Chemistry	3	30	0	30	M	
3	MST10001	Organic Chemistry Practice	2	0	60	0	M	
4	MST10002	Inorganic Chemistry Practice	2	0	60	0	M	
5	MST10003	Inorganic Material Fabrication Methods	3	30	0	30	M	
6	MST10004	Organic Material Fabrication Methods	3	30	0	30	M	
7	MST10008	Material Analysis Methods Practice	2	0	60	0	M	
8	MST10009	Polymer and Composite Materials	3	30	0	30	M	
9	MST10010	Surface modification Technologies	2	30	0	0	M	
10	MST10006	Structural and Morphological Analysis Methods	3	37.5	0	15	M	
11	MST10007	Methods for Analyzing Material Properties	3	37.5	0	15	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
12	MST10010	Material Modification Techniques	2	30	0	0	M	
13	MST10011	Professional working skills	2	22.5	0	15	M	
14	MST10012	Introductory to ceramic technology	2	30	0	0	E	select two course
15	MST10013	Sensor technology	2	30	0	0	E	
16	MST10014	Micro and Nano Technology and application	2	30	0	0	E	
17	MST10015	Calculation and Simulation for Materials	2	15	30	0	E	
Sub-Total			**37**					

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		
1	MST10101	Mechanical Properties of Polymers	2	30	0	0	M	
2	MSC10204	Polymer characterization methods	3	37.5	0	15	M	
3	MSC10212	Polymer processing Technology	3	37.5	0	15	M	
4	MST10102	Polymer Additives and Polymer-Modified	2	30	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
5	MSC10206	Polymer blend	2	30	0	0	M	
6	MSC10202	Mechanical Properties of Polymer laboratory	2	0	60	0	M	
7	MSC10201	Polymer synthesis laboratory	2	0	60	0	M	
8	MST10103	Conducting polymer	2	30	0	0	E	select two courses
9	MST10104	Fabrication polymer-nanostructured material	2	30	0	0	E	
10	MST10105	Biodegradable polymer	2	30	0	0	E	
11	MST10106	Hybrid Materials	2	30	0	0	E	
12	MSC10113	Fuel cells	2	30	0	0	E	
13	MST10107	Display materials Technology	2	30	0	0	E	select 1 course
14	MST10107	Rubbers:chemistry and technology	2	30	0	0	E	
15	MST10108	Organic solar cells	2	30	0	0	E	
16	MST10109	Flame-retardant materials	2	22.5	0	15	E	
17	MST10110	Topics on Materials Science and Technology (study with company)	2	15	30	0	M	
18	MST10111	Research and fabrication project of advanced materials	3	15	30	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
19	MST10112	Internship of manufacturing practice	3	0	90	0	M	
Sub-Total			**31**					

7.2.2.2. Biomedical Materials Technology Specialization

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	MST10113	Cell and molecular Biology	3	45	0	0	M	
2	MST10114	Materials Science in Biotechnology	3	30	0	30	M	
3	MSC10312	Tissue Technology	3	45	0	0	M	
4	MSC10304	Functional biomedical materials	3	45	0	0	M	
5	MST10115	Sensors engineering Assessment	2	22.5	0	15	M	
6	MST10116	Biomedical sensing technologies and their application	2	15	0	30	M	
7	MSC10310	Biomedical materials synthesis laboratory 1	2	15	0	30	M	
8	MST10117	Fabricating biomedical materials 2	2	0	60	0	M	
9	MST10118	Biomedical materials	3	45	0	0	E	select 1 course
10	MSC10303	Biosensors	3	37.5	0	15	E	
11	MSC10306	Biomedical technology	3	45	0	0	E	
12	MSC10305	Molecular technology in diagnosis	3	**45**	0	0	E	
13	MST10110	Topics on Materials Science and	2	15	30	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
		Technology (study with company)						
14	MST10111	Research and fabrication project of advanced materials	3	15	30	0	M	
15	MST10112	Internship of manufacturing practice	3	0	90	0	M	
Sub-Total			**31**					

7.2.3. Graduation knowledge: 10 credits,

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	MST10995	Graduation thesis	10	0	300	0	M	
Option 2								
1	MST10190	Graduation seminar	**6**	0	180	0	M	
2	MST10119	Organic adhesive technology	**2**	30	0	0	E	select 2 courses
3	MST10120	Textile and packaging technology	**2**	30	0	0	E	
4	MST10123	Paint, varnish technology	**2**	30	0	0	E	
5	MST10122	Functional polymer materials	**2**	22.5	0	15	E	
6	MST10123	Radiation technology applied in manufacturing and studying advanced materials	**2**	30	0	0	E	
7	MSC10313	Equipments and technology of biomedical materials	**3**	45	0	0	E	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
8	MSC10012	Quality Management System	**3**	45	0	0	E	

8. Study plan (tentative)

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
1	BAA00004	General Law	3	45	0	0	M	
2	BAA00011	English 1	3	30	30	0	M	
3	BAA00021	Physical education 1	2	15	30	0	M	
4	BAA00030	National defense - Security education	4	30	60	0	M	
5	MTH00003	Integral Calculus 1B	3	45	0	0	M	
6	MTH00002	Advanced Mathematics C	3	45	0	0	M	
7	CHE00001	General Chemistry 1	3	30	0	30	M	
8	CHE00002	General Chemistry 2	3	30	0	30	M	
9	PHY00001	General Physics 1 (Mechanics - Thermodynamics)	3	45	0	0	M	
10	MST00002	Introduction to Materials Technology	3	45	0	0	M	
Sub-total the 1st semester			**23**					
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	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
4	BAA00005	General Economics	2	30	0	0	E	select 1 course
5	BAA00006	General Psychology	2	30	0	0	E	
6	BAA00007	Methodology of Creativity	2	30	0	0	E	
7	GEO00002	Earth Sciences	2	30	0	0	E	select 1 course
8	ENV00001	General environment	2	30	0	0	E	
9	MST00001	Laboratory Safety	2	30	0	0	E	
10	BAA00012	English 2	3	30	30	0	M	
11	BAA00022	Physical education 2	2	15	30	0	M	
12	CSC00003	Introduction to Informatics	3	15	60	0	M	
13	PHY00002	General physics 2 (Electromagnetic - Optical)	3	45	0	0	M	
Subtotal of the 2nd semester			**22**					
1	BAA00104	History of the Vietnamese Communist Party	2	30	0	0	M	
2	BAA00003	Ho Chi Minh’s Ideology	2	30	0	0	M	
3	BAA00013	English 3	3	30	30	0	M	
4	MTH00040	Probability Statistics	3	45	0	0	M	
5	CHE00081	General Chemistry Laboratory 1	2	0	60	0	M	
6	PHY00081	General physics Laboratory	2	0	60	0	M	
7	PHY00004	Modern physics (Electricity-Magnetism)	3	45		0	0	M
8	MSC00001	General Materials Science	3	45		0	0	M
Subtotal 3rd semester			**20**					
1	BAA00014	English 4	3	30		30	0	M
2	MSC10007	Organic Chemistry	3	30	0	30	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
3	MST10009	Polymer and Composite Materials	3	30	0	30	M	
4	MSC10006	Transition and Non-Transition Elements	3	45	0	0	M	
5	MST10003	Inorganic Material Fabrication Methods	3	30	0	30	M	
6	MST10004	Organic Material Fabrication Methods	3	30	0	30	M	
7	MST10011	Professional working skills	2	22.5	0	15	M	
total of 4th semester			**20**					
1	MST10001	Organic Chemistry Practice	2	0	60	0	M	
2	MST10002	Inorganic Chemistry Practice	2	0	60	0	M	
3	MST10005	Material fabrication Practice	2	0	60	0	M	
4	MST10006	Structural and Morphological Analysis Methods	3	37.5	0	15	M	
5	MST10007	Methods for Analyzing Material Properties	3	37.5	0	15	M	
6	MST10008	Material Analysis Methods Practice	2	0	60	0	M	
7	MST10010	Surface modification Technologies	2	30	0	0	M	
8	MST10012	Introductory to ceramic technology	2	30	0	0	E	select 2 coures
9	MST10013	Sensor technology	2	30	0	0	E	
10	MST10014	Micro and Nano Technology and application	2	30	0	0	E	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
11	MST10015	Calculation and Simulation for Materials	2	15	30	0	E	
Total 5 semester			**20**					
Polymer & Composite Materials Technology Specialization								
1	MST10101	Mechanical Properties of Polymers	2	30	0	0	M	
2	MSC10204	Polymer characterization methods	3	37.5	0	15	M	
3	MSC10212	Polymer processing Technology	3	37.5	0	15	M	
4	MST10102	Polymer Additives and Polymer-Modified	2	30	0	0	M	
5	MSC10206	Polymer blend	2	30	0	0	M	
6	MSC10202	Mechanical Properties of Polymer laboratory	2	0	60	0	M	
7	MSC10201	Polymer synthesis laboratory	2	0	60	0	M	
8	MST10103	Conducting polymer	2	30	0	0	E	select 2
9	MST10104	Fabrication polymer-nanostructured material	2	30	0	0	E	
10	MST10105	Biodegradable polymer	2	30	0	0	E	
11	MST10106	Hybrid Materials	2	30	0	0	E	
12	MSC10113	Fuel cells	2	30	0	0	E	
Subtotal 6 semester			**15**					
1	MSC10206	Polymer blend	2	30	0	0	M	
2	MSC10202	Mechanical Properties of Polymer laboratory	2	0	60	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
3	MSC10201	Polymer synthesis laboratory	2	0	60	0	M	
4	MST10107	Display materials Technology	2	30	0	0	E	select 1
5	MST10107	Rubbers:chemistry and technology	2	30	0	0	E	
6	MST10108	Organic solar cells	2	30	0	0	E	
7	MST10109	Flame-retardant materials	2	22.5	0	15	E	
8	MST10110	Topics on Materials Science and Technology (study with company)	2	15	30	0	M	
9	MST10111	Research and fabrication project of advanced materials	3	15	30	0	M	
10	MST10112	Internship of manufacturing practice	3	0	90	0	M	
Sub-total 7 semester			**16**					
Biomedical Materials Technology Specialization								
1	MST10113	Cell and molecular Biology	3	45	0	0	M	
2	MST10114	Materials Science in Biotechnology	3	30	0	30	M	
3	MSC10312	Tissue Technology	3	45	0	0	M	
4	MSC10304	Functional biomedical materials	3	45	0	0	M	
5	MST10115	Sensors engineering Assessment	2	22.5	0	15	M	
6	MST10116	Biomedical sensing technologies and their application	2	15	0	30	M	
total 6 semester			**16**					
1	MSC10310	Biomedical materials synthesis laboratory 1	2	15	0	30	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
2	MST10117	Fabricating biomedical materials 2	2	0	60	0	M	
3	MST10118	Biomedical materials	3	45	0	0	E	select 1
4	MSC10303	Biosensors	3	37.5	0	15	E	
5	MSC10306	Biomedical technology	3	45	0	0	E	
6	MSC10305	Molecular technology in diagnosis	3	**45**	0	0	E	
7	MST10110	Topics on Materials Science and Technology (study with company)	2	15	30	0	M	
8	MST10111	Research and fabrication project of advanced materials	3	15	30	0	M	
9	MST10112	Internship of manufacturing practice	3	0	90	0	M	
Total 7 semester			**15**					
	Thesis							
1	MST10995	Graduation thesis	10	0	300	0	M	
	Study 3 specialized courses							
1	MST10190	Graduation seminar	**6**	0	180	0	M	
2	MST10119	Organic adhesive technology	**2**	30	0	0	E	select 2
3	MST10120	Textile and packaging technology	**2**	30	0	0	E	
4	MST10123	Paint, varnish technology	**2**	30	0	0	E	
5	MST10122	Functional polymer materials	**2**	22.5	0	15	E	
6	MST10123	Radiation technology applied in manufacturing and studying	**2**	30	0	0	E	

No	Code	Course Name	Credit	NUMBER OF LESSONS			Course type	Note
				Theory	Practice	Exercise		
		advanced materials						
7	MSC10313	Equipments and technology of biomedical materials	**3**	45	0	0	E	
8	MSC10012	Quality Management System	**3**	45	0	0	E	
subtotal 8 semsester			**10**					
TOTAL			**130**					

HEAD OF FACULTY **HEAD OF TRAINING** **PRESIDENT**