University of Science, VNU – HCMC
The Faculty of Materials Science and Technology

SOCIALIST REPBULIC OF VIETNAM
Independent – Freedom – Happiness

Ho Chi Minh City, 31/12/2020

PROGRAM LEVEL
BACHELOR OF SCIENCE IN MATERIALS SCIENCE
Cohort 2019

(Decision No 2557/QĐ-KHTN dated 31/12/2020,
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:

Materials Science is an interdisciplinary science with the ability to connect with many scientific and technological fields such as Physics, Chemistry, Biomedical Technology, Information Technology, Electronics, Environmental Technology, Energy, etc. It is a training and research field in advanced materials science and technology, belonging to the national science and technology development strategy. The development of Materials Science has made a significant contribution to the industrialization and modernization of the country.

The Materials Science program focuses on training bachelors with sufficient knowledge and skills to serve the needs of teaching, basic research, and the application of advanced materials science and technology into production and life.

2.1. General objectives:

The Department of Materials Science currently has four training specializations: Polymer and Composite Materials, Thin Film Materials, Magnetic Materials, and Biomedical Materials, with the following general training objectives:

Training Bachelor of Science in Materials Science with a solid foundational and in-depth knowledge of the synthesis and properties of new materials; equipped with the capability to develop, implement, and apply the latest research outcomes of various new materials in daily life and production; able to take on leadership roles to develop and contribute positively to the advancement of science and technology

Training Bachelor of Science in Materials Science with good communication skills, toward the community, teamwork, proactivity, adaptability, self-regulation, self-development, and the ability to identify and solve problems logically, creatively, and systematically. Bachelor of Science in Materials Science graduates are competitive in both domestic job markets and the global labor market.

2.2. Specific Objectives/Educational Program Outcomes:

2.2.1. Knowledge

Ability to apply knowledge of mathematics, chemistry, physics, biology, and materials science fundamentals to synthesize and analyze the properties of advanced materials, especially low-dimensional materials (nanometer size).

Based on knowledge of materials science, develop new materials in the specializations of polymer and composite materials, thin film materials, nanomaterials, magnetic materials, and biomedical materials for applications in life and industrial, agricultural, fishery, biomedical, and environmental production.

Understanding the theoretical foundations and research tools to test and evaluate material properties and material production technology systems.

Ability to utilize other professional support tools to maximize the activities of trained specialized skills.

2.2.2. Soft Skills

Personal Skills and Attitudes: Proactive and willing to take risks; Persistent and flexible; Creative and evaluative thinking; Ability to self-assess personal knowledge, skills, and attitudes; Ability to self-study and lifelong learning; Ability to manage time and resources.

Teamwork Skills: Team formation; Activity organization; Team management and development; Team leadership.

Communication Skills: Building communication methods; Written communication; Presentation skills; Speaking skills; Public speaking; Multimedia communication.

Foreign Language Skills: Conversational and specialized English.

Computer Skills: Basic and specialized computer skills.

Professional Skills: Professional knowledge and skills, analytical skills, systems thinking skills, scientific research skills.

2.2.3. Research and Scientific Methods

Develop ideas; Formulate problems; collect, summarise and analyze information to build theoretical models and problem-solving processes, hypotheses; Develop systematic solutions and implementation processes.

Conduct experiments; Survey experimental results, verify, compare with theoretical models and perform comprehensive evaluations.

2.2.4. Professional Culture and Ethics

Understand professional culture.

Have professional ethics.

Have professional responsibility.

2.2.5. Conceive, Design, Implementation and Operation

Conceive: Social context related to the profession; Factors related to and affecting the specific object under consideration in the profession (processes, systems, manufactured products...); Awareness of the mechanisms and processes of forming the products to be manufactured.

Design and Technical Formation: Design materials and products according to needs; Build material fabrication processes; Processing and manufacturing products.

Implementation and Operation: Experiment, test, implement the process; Evaluate and appraise the process; Optimize and improve the process; Manage the implementation and operation process.

2.3. Career Opportunities

Graduates have the ability to both conduct basic research and have practical thinking about the ability to develop application products according to social needs. Materials science bachelors can work in 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 for electricity, electronics, optoelectronics, telecommunications, energy, environment, health, biotechnology, chemistry, polymer-composite materials (engineering and civil plastics, packaging, paints, rubber...), etc.

In addition, graduates of the program can work in research and teaching at universities, colleges, vocational schools, research institutes as well as work at departments and agencies under local and central governments (departments of science & technology, departments of natural resources & environment;...) or have enough opportunities and knowledge to be able to integrate well when studying for a Master's and Doctoral degree in countries with advanced science and technology.

3. Total of credits: 131 (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 December 31, 2020, 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 program.
- Satisfy the conditions in Article 17 of the Regulations on university training issued together with Decision No. 1175/QD-KHTN dated December 31, 2020, 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)**		**37**		**37**		
		Specialized (3)		**30**		**30**		
		1	Polymer and Composite Materials Specialization	30		30	130	**131**
		2	Biomedical Materials Specialization	30		30	130	

No	KNOWLEDGE BLOCK			NUMBER OF CREDITS (CR)			Total accumulated credits upon graduation (1+2+3+4)	NOTE
				Mandatory	Elective	Total		
		3	Thin Film Materials Specialization	30		30	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

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**	**165**	**0**	**0**		

7.1.2. Social Sciences - Economics - Skills - Law

No	Code	Course Name	Credit	NUMBER OF LESSONS	Course type	Note

				Theory	Practice	Exercise		
1	BAA000041	General Law	3	45	0	0	M	
2	BAA00005	General Economics	2	30	0	0	E	Choose 1 of 4 courses
3	BAA00006	General Psychology	2	30	0	0	E	
4	BAA00007	Methodology of Creativity	2	30	0	0	E	
5	MST00005	Academic and Professional Skills	2	30	0	0	E	
6	GEO00002	Earth Sciences	2	30	0	0	E	Choose 1 of 2 courses
7	ENV00001	General environment	2	30	0	0	E	
Sub-Total			**7**					

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 37 credits from the courses according to the following table:

a) **Required Courses**: 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	Thesis		
1	MSC10007	Organic Chemistry	3	30	0	30	0	M	
2	MSC10001	Electrodynamics	2	22.5	0	15	0	M	
	MSC10003	Quantum mechanics	2	22.5	0	15	0	M	
3	MSC10004	Fundamental of Solid State Science	3	45	0	0	0	M	
4	MSC10009	Basic biology	3	45	0	0	0	M	
5	MSC10006	Fundamental chemistry of transition and non-transition elements	2	45	0	0	0	M	
6	MSC10002	Thermodynamics	3	37.5	0	15	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	37.5	0	15	0	M	
10	MSC10013	Material Characterization Methods 2	3	37.5		15	0	M	
11	MSC10008	Polymer and composite materials	3	37.5	0	15	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
12	MSC10014	Material Fabrication Methods Practice	3	0	90	0	0	M	
14	MSC10005	Metals, semiconductors, and insulators Materials	2	22.5	0	15	0	M	
Sub-Total			**37**						

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	MSC10210	Mechanical Properties of Polymer	3	45	0	0	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	MSC10212	Polymer Processing Technology	3	37.5	0	15	0	M	
6	MSC10211	Composite and nanocomposite materials	3	45	0	0	0	M	
7	MSC10207	Modification of polymers	3	45	0	0	0	M	
8	MSC10206	Polymer Blends	2	30	0	0	0	M	
9	MSC10205	Polymer Additives	3	45	0	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
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	
Sub-Total			**30**	**322.5**	**120**	**75**	**180**		

7.2.2.2. Biomedical 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	MSC10301	Complexes and metal complex	2	22,5	0	15	0	M	
2	MSC10302	Specialized Biology	2	30	0	0	0	M	
3	MSC10312	Tissue Technology	3	45	0	0	0	M	
4	MSC10304	Functional biomedical materials	3	45	0	0	0	M	
5	MSC10307	Surface Modification of Materials	3	37.5	0	15	0	M	
6	MSC10308	Physicochemical Laboratory	2	0	60	0	0	M	
7	MSC10309	Biochemical Laboratory	2	0	60	0	0	M	
8	MSC10305	Molecular Techniques in Diagnostics	3	45	0	0	0	M	
9	MSC10306	Biomedical engineering	3	45	0	0	0	M	
10	MSC10303	Biosensor	3	37.5		15	0	M	
11	MSC10310	Biomedical Materials synthesis Laboratory 1	2	0	60	0	0	M	
12	MSC10311	Biomedical Materials synthesis Laboratory 2	2	0	60	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
Sub-Total			30						

7.2.2.3. Thin Film 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	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	
10	MSC10104	Materials synthesis and Characterization Laboratory 2	2	0	60	0	0	M	
11	MSC10112	Sound-thermal insulation and mechanical materials	2	30	0	0	0	M	
12	MSC10114	Gas sensor materials	2	30	0	0	0	M	

No	Code	Course Name	Credit	NUMBER OF LESSONS				Course type	Note
				Theory	Practice	Exercise	Thesis		
13	MSC10115	Photocatalytic Materials	2	30	0	0	0	M	
14	MSC10116	Electrical Memory Materials and Devices	2	30	0	0	0	M	
Sub-Total			**30**						

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

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

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

No.	COURSE CODE	COURSE NAME	No. of Credits	Hours			M/O	ECTS
				Theory	Practice	Excersise		
Semester 1								
1	CSC00003	Informatics	3	15	60	0	M	5.5
2	CHE00001	General chemistry 1	3	30	30	0	M	5

3	MSC00010	Introduction To Materials Science	2	30	0	0	M	3.0
4	BAA00011	English 1	3	30	30	0	M	5.0
5	BAA00004	Introduction to Vietnamese Law System	3	45	0	0	M	4.5
6	BIO00001	General Biology 1	3	45	0	0	M	4.5
7	PHY00001	*General physics 1 (Mechanics - Thermodynamics)*	3	45	0	0	M	4.5
8	MTH00003	Calculus B1	3	45			M	5.0
9	BAA00021	Physical education 1	2	15	30		M	6
10	BAA00030	National defense education	4				M	8.5
Total			**17**					
Semester 2								
1	BAA00101	Principles of Marxist and Leninist	3	45	0	0	M	4.5
2	BAA00102	Marxist-Leninist Political Economy	2	30	0	0	M	7.5
3	CHE00002	General chemistry 2	3	30	0	30	M	5.5
4	BAA00012	English 2	3	30	30	0	M	6
5	MTH00002	Advanced mathematics C	3	45	0	0	M	4.5
6	PHY00002	General physics 2 (Electromagnetic - Optics)	3	45	0	0	M	4.5
7	BAA00005	General economics	2	30	0	0	O 1	
8	BAA00007	Methodology of creativity	2	30	0	0	O 1	
9	BAA00006	General psychology	2	30	0	0	O 1	3
10	GEO00002	Earth Science	2	30	0	0	O 2	3
11	ENV00001	Environmental Studies	2	30	0	0	O 2	
12	BAA00022	Physical education 2	2	15	30	0	M	3.5
Total			**18**					
Semester 3								
1	MSC00001	General Materials Science	3	45	0	0	M	**4.5**

2	BAA00103	Scientific Socialism	2	30	0	0	M	**3**
3	BAA00104	Revolution Lines of Vietnam Communist Party	3	45	0	0	M	**3**
4	BAA00103	Ho Chi Minh's ideology	2	30	0	0	M	**3**
5	BAA00013	English 3	3	30	30	0	M	5
6	CHE00081	General Chemistry Laboratory 1	2	0	60	0	M	**4**
7	PHY00081	Labwork on General Physics	2	0	60	0	M	**4**
8	MTH00040	Probability And Statistics	3	45	0	0	M	**4.5**
9	PHY00004	Quantum-Atoms-Nuclear	3	45	0	0	M	**4.5**
Total			**18**					
Semester 4								
1	BAA00014	English 4	3	30	30	0	M	5
2	MSC10007	Organic Chemistry	3	30	0	30	M	5
3	MSC10001	Electrodynamics	2	22.5	0	15	M	3.5
4	MSC10003	Quantum mechanic	2	22.5	0	15	M	3.5
5	MSC10004	Fundamentals of Solids Science	3	45	0	0	M	4.5
6	MSC10009	Basic Biology	3	45	0	0	M	4.5
7	MSC10006	Chemistry Of Non-Transition And Transition Elements	3	45	0	0	M	4.5
8	MSC10002	Thermodynamic	3	37.5	0	15	M	5
Total			**19**					
Semester 5								
1	MSC10010	Material Synthesis Methods 1	2	30	0	0	M	**3**
2	MSC10011	Material Synthesis Methods 2	2	30	0	0	M	**3**
3	MSC10015	Material Characterization Techniques 1	3	37.5	0	15	M	**5**
4	MSC10013	Material Characterization Techniques 2	3	37.5	0	15	M	**5**
5	MSC10008	Polymer and Composite Materials	3	37.5	0	15	M	**5**
6	MSC10014	Materials Synthesis Laboratory	3	0	90	0	M	**6**

7	MSC10005	Metal – Semiconductor – Insulator Materials	2	22.5	0	15	M	**3.5**
Total			**18**					
Semester 6 (Polymer and Composit major)								
1	MSC10210	Mechanical Properties of Polymer	3	45	0	0	M	4.5
2	MSC10203	Technology of Synthesis and Recycle of Polymers	2	30	0	0	M	3
3	MSC10209	Rubber: Chemistry and Technology	2	30	0	0	M	3
4	MSC10212	Processing Technology of Polymer	3	37.5	0	15	M	5
5	MSC10211	Composite and Nanocomposite Materials	3	45	0	0	M	4.5
6	MSC10207	Modification of polymer	3	45	0	0	M	4.5
Total			**16**					
Semester 6 (Thin-film major)								
1	MSC10107	Surface and Interface Science of Solids	2	22.5	0	15	M	3.5
2	MSC10105	Thin film Physics	3	37.5	0	15	M	5
3	MSC10101	Chemical Defects in Materials	2	225	0	15	M	3.5
4	MSC10108	Computational Materials	2	30	0	0	M	3
5	MSC10109	Micro and Nano Electronic Engineering	3	37.5	0	15	M	
6	MSC10110	Surface functionalization of materials	2	22.5	0	15	M	3.5
7	MSC10103	Materials synthesis and Characterization Laboratory 1	2		60		M	**4**
Total			**16**					
Semester 6 (Biomedical Materials major)								
1	MSC10301	Coordination and Organometallic Compounds	2	22.5	0	15	M	3.5
2	MSC10302	Specialized Biology	2	30	0	0	M	3
3	MSC10312	Tissue Technology	3	45	0	0	M	4.5
4	MSC10308	Physicochemical Laboratory	2	0	60	0	M	4

5	MSC10309	Biochemical Laboratory	2	0	60	0	M	4
6	MSC10304	Fundamental Biomedical Materials	3	45	0	0	M	
Total			**14**					
Semester 6 (Magnetic Materials major)								
1	KVL601	Introduction to Magnetic Materials	3	37.5	15		M	
2	KVL206	Chemical Defects in Materials	2	22.5	15		M	
3	KVL602	Bulk magnetic materials	3	37.5	15		M	
4	KVL332	Thin film Physics	3	37.5	15		M	
5	KVL529	Surface and interface Science of Solid	2	37.5	15		M	
6	KVL523	Coordination and Organometallic Compounds	2	22.5	15		M	
Total			**15**					
Semester 7 (Polymer and Composit major)								
1	MSC10204	Polymer Testing Characterization Methods	3	37.5	0	15	M	5
\2	MSC10206	Polymer Blend	2	30	0	0	M	**3**
3	MSC10205	Polymer Additives	3	45	0	0	M	**4.5**
4	MSC10208	Specialization Seminar	2	0	60	0	M	**4**
5	MSC10202	Mechanical Polymers Laboratory	2	0	60	0	M	**4**
6	MSC10201	Polymer Synthesis Laboratory	2	0	60	0	M	**4**
Total			**14**					
Semester 7 (Thin-film major)								
1	MSC10111	Materials and Devices for Energy storage	2	30	0	0	M	**3**
2	MSC10112	Sound-thermal insulation and mechanical materials	2	30	0	0	M	**3**
3	MSC10113	Fuel cells	2	30	0	0	M	**3**
4	MSC10114	Gas sensor materials	2	30	0	0	M	**3**
5	MSC10115	Photocatalytic Materials	2	30	0	0	M	**3**
6	MSC10116	Electrical Memory Materials and Devices	2	30	0	0	M	
7	MSC10104	Materials synthesis and Characterization Laboratory 2	2	0	60	0	M	**4**

Total			**14**					
Semester 7 (Biomedical Materials major)								
1	MSC10303	Biosensors	3	37.5	0	15	M	5
2	MSC10307	Surface Modification of Materials	3	37.5	0	15	M	5
3	MSC10305	Molecular Techniques in Diagnostics	3	37.5	0	15	M	4.5
4	MSC10306	Biomedical engineering	3	45	0	0	M	4.5
5	MSC10310	Biomedical Materials Synthesis Laboratory 1	2	0	60	0	M	4
6	MSC10311	Biomedical Materials Synthesis Laboratory 2	2	0	60	0	M	4
Total			**16**					
Semester 7 (Magnetic Materials major)								
1	MSC10307	Surface functionalization of materials	3	37.5	15	0	M	
2	MSC10403	Low-dimensional magnetic materials	3	45	0	0	M	
3	MSC10404	Magnetical Devices	3	45	0	0	M	
4	MSC10405	Bulk magnetic materials Synthesis Laboratory	2	0	60	0	M	
5	MSC10406	Low-dimensional magnetic materials Laboratory	2	0	60	0	M	
6	MSC10407	Surface functionalization of materials Laboratory	2	0	60	0	M	
Total			**15**					
Semester 8 (Polymer and Composit major)								
A	MSC10295	Graduation thesis	10		300		M	**20**
B	***Seminar + Optional courses (choose 2 of 5 courses)***							
1	MSC10290	Graduation Seminar	6	0	180	0	M	
2	MSC10214	Polymer Materials 1: Coating and Adhesive Materials	**3**	45	0	0	O 2	
3	MSC10215	Polymer materials 2: Packaging and textile	**2**	30	0	0	O 2	

4	MSC10216	Functional Polymeric Materials	**2**	22.5	0	15	O 2	
5	MSC10213	Radiation technology for modification of polymer materials	**2**	30	0	0	O 2	
6	MSC10012	Quality Management Systems	**3**	45	0	0	O 2	
C	***Optional courses (choose 4 of 5 courses)***							
1	MSC10214	Polymer Materials 1: Coating and Adhesive Materials	**3**	45	0	0	O 2	
2	MSC10215	Polymer materials 2: Packaging and textile	**2**	30	0	0	O 2	
3	MSC10216	Functional Polymeric Materials	**2**	22.5	0	15	O 2	
4	MSC10213	Radiation technology for modification of polymer materials	**2**	30	0	0	O 2	
5	MSC10012	Quality Management Systems	**3**	45	0	0	O 2	
Total			**10**					
Semester 8 (Thin-film major)								
A	MSC10195	Graduation thesis	10	0	300	0	M	20
B	***Seminar + 2 courses***							
1	MSC10190	Graduation Seminar	**4**	0	120	0	M	
2	MSC10117	Specialized seminar	**3**	45	0	0	M	4.5
3	MSC10012	Quality Management Systems	**3**	45	0	0	M	4.5
Total			**10**					
Semester 8 (Biomedical Materials major)								
A	MSC10395	Graduation thesis	**10**	0	300	0	M	20
B	***Seminar + 2 courses***							
1	MSC10390	*Graduation Seminar*	**4**	0	120	0	M	
2	MSC10313	Biomedical Materials Engineering and Equipments	**3**	45	0	0	M	
3	MSC10012	Quality Management Systems	**3**	45	0	0	M	
Total			**10**					
Semester 8 (Magnetic Materials major)								

A	MSC10495	Graduation thesis	**10**	0	300	0	M	
B	***Seminar + 2 courses***							
1	MSC10490	*Graduation Seminar*	**4**	0	120	0	M	
2	MSC10408	Magnetic Materials Engineering and Equipments	**3**	45	0	0	M	
3	MSC10012	Quality Management Systems	**3**	45	0	0	M	
Total			**10**					

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