University of Technology

الجامعة التكنولوجية

Bachelor of Applied Science –
Medical and industrial material science

بكالوريوس علوم تطبيقية - علم المواد الطبية والصناعية

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1. Mission & Vision Statement

Vision Statement

The Medical and industrial material science academic staff of the Applied Sciences Division at Technology University believe that students come to understand the discipline of Medical and industrial material through a combination of coursework, laboratory experiences, research, and fieldwork. The variety of instructional methods leads students to a balanced understanding of the scientific methods used by Materials to make observations, development, and application of materials in the fields of medicine and industry. It encompasses the study of various materials, their properties, and how they can be manipulated and optimized for specific purposes.

Mission Statement

The Medical and industrial materials science academic staff pursues a multifaceted charge at Technology University. The Program seeks to provide all Medical and industrial material students with fundamental knowledge of the basic materials (polymers, metals, ceramics, structural materials, organic materials, biological and nuclear materials), their composite materials, how to prepare them, and study their properties (structural, optical, mechanical, insulating, electrical, physical, and biological properties). To see the extent of their

use in medical and industrial applications, as well as a deeper understanding of a selected focus area within the Materials sciences.

The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field Materials specializing in medical applications (materials used in food packaging, treatment transport, dental fillings, dental industry, and replacement organs) or Industrial applications (solar cells, batteries, plastic and concrete tubes, and electrolytic materials) to pursue advanced degrees in the Applied Materials sciences. The Medical and industrial material program also provides the necessary fundamental knowledge of the applied sciences, the Environmental Studies degree. In addition, The Medical and industrial material courses provide a critical laboratory science experience for those students seeking to complete the general education requirements.

2. Program Specification

Programme code:	BSc- Medical and industrial material science	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

Material science is a multidisciplinary field that explores the properties, structure, and behavior of materials. It combines principles from physics, chemistry, and engineering to understand and manipulate the structure of materials at the atomic and molecular levels. The goal of material science is to develop new materials or improve existing ones for various applications.

Level 1 exposes students to the basics of materials, suitable for progression to all programs within the Medical and industrial materials program group. Program-specific core topics are covered at Level 2 preparing for research subject specialist modules at Levels 3 and 4. A Materialist graduate is therefore trained to appreciate how research informs teaching, according to the University and School Mission statements.

At Levels 2, 3, and 4 students are free to choose more than half of their module credits with the proviso a range of modules are selected that reflect the complexity of

Materials forms, both Medical and industrial, to ensure the breadth of knowledge expected of a graduate degree. This allows students to develop their own wide-ranging interests in Materials. Decisions on what to study are made with input from personal tutors.

The research ethos is developed and fostered from the start via practicals, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3, and 4. At Level 4 all students carry out an independent research project, which may be a xx-credit library or data analysis project, or a xx-credit field or laboratory-based project.

Academic tutorials are held at Levels 1 and 2 with the same tutor, who is also the personal tutor, providing continuity and progressive guidance. Level 1 and 2 tutorials include a number of workshops to teach skills, e.g., library use and presentation skills, followed by assessed exercises, e.g., essays and talks, as opportunities to practice these skills in a subject-specific context.

International years and Industrial placements are also offered and individual needs are discussed with the appropriate tutor and accommodated wherever possible.

3. Program Goals

1. To provide a comprehensive education in Medical and industrial materials science that stresses scientific reasoning and problem-solving across the spectrum of disciplines within materials.
2. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry-level jobs in any area of materials.
3. To provide extensive hands-on training in electronic technology, statistical analysis, laboratory skills, and field techniques.

4. To provide thorough training in written and oral communication of scientific information.
5. To enrich students with opportunities for alternative education in the area of materials through undergraduate research, internships, and study abroad.

4. Student Learning Outcomes

Materials science is the study of the relationships between the composition, structure, processing, and properties of materials. They investigate different types of materials, including metals, ceramics, polymers, composites, semiconductors, and biomaterials. By understanding how materials are formed, how their atoms are arranged, and how they respond to external forces and environmental conditions, scientists can design materials with specific properties and functionalities.

The graduate works as an examiner for the above materials at work in the Ministry of Health in hospitals as well as in nuclear medicine and oncology centers due to his study of radioactive isotopes and nuclear materials. The graduate worker works as an examiner in the Ministry of Planning, resorts, specifications, and standards for products and their properties, and the extent to which they are subject to standard specifications at work in the Ministry of Planning, Science and Technology, and the working in the Ministry of Health and Education affiliated to the Ministry of Industry, Trade and Industry, fillings manufacturing departments and the manufacture of teeth and organs.

Outcome 1

Identification of Complex Relationships (Materials characterization)

Graduates will be able to illustrate the analysis and measurement of material properties, such as mechanical strength, electrical conductivity, thermal behavior, and optical properties. Techniques such as microscopy, spectroscopy, and diffraction are used to examine materials at different scales.

Outcome 2

Oral and Written Communication

Graduates will be able to formally communicate the results of Materials characterization using both oral and written communication skills.

Outcome 3

Laboratory and Field Studies

Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.

Scientific Knowledge

Graduates will be able to demonstrate a balanced concept of how scientific knowledge develops, including the historical development of foundational theories and laws and the nature of science.

Outcome 5

Data Analyses

Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.

Outcome 6

Critical Thinking

Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

University of Technology is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Grade Point Average (GPA)

1. The GPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   GPA of a 4-year B.Sc. degrees:

   GPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ...] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MATH111	Mathematics	63	112	7.00	C	
HURI112	Human Rights	18	32	2.00	S	
ANCH113	Analytical Chemistry	78	97	7.00	B	
COSC114	Computers science	78	47	5.00	B	
MASP115	Materials Science Principles	63	112	7.00	B	
WORSH11	workshops	45	5	2.00	S	

Semester 2 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
PHYS121	Physics	93	82	7.00	C	
INPC122	Inorganic and Physical Chemistry	78	97	7.00	B	
ENLA123	English LanguageI	33	17	2.00	B	
BISP124	Biological Science Principles	63	112	7.00	B	
ENDR125	Engineering Drawing	63	62	5.00	B	
WORSH11	workshops	45	5	2.00	S	

Semester 3 | 30 ECTS

Semester 4 | 30 ECTS

Semester 5 | 30 ECTS

Semester 6 | 30 ECTS

Semester 7 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request

Semester 8 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request

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