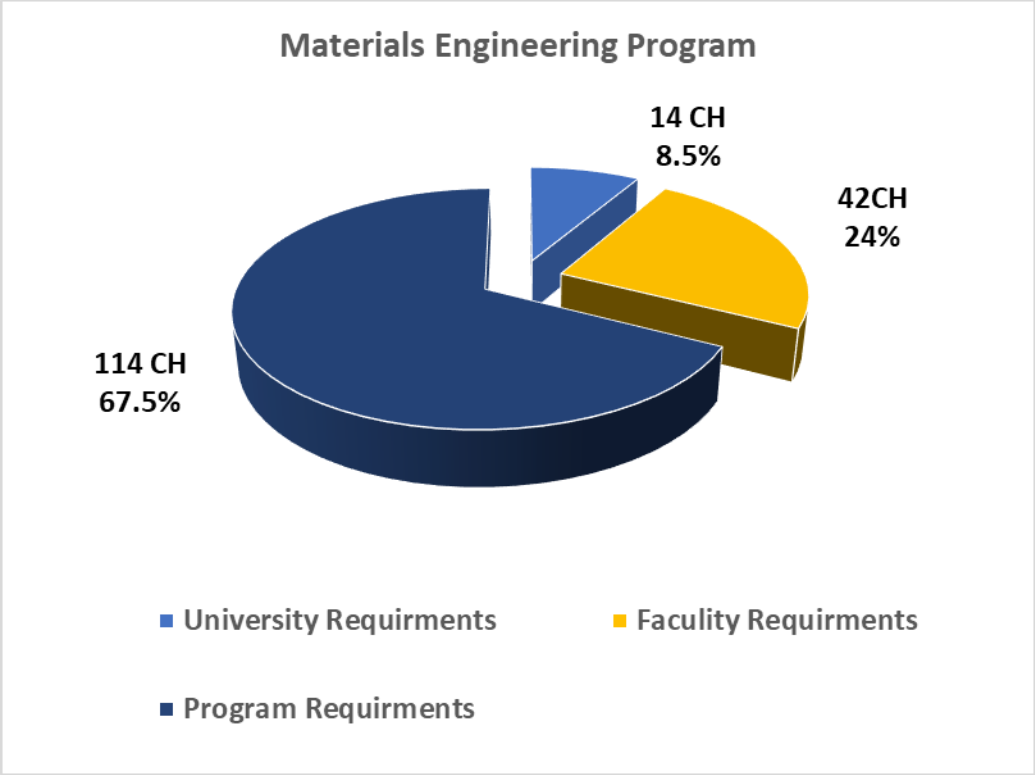
Materials Engineering Program



Program Description

The program aims to supply the students with the basic and global concepts of science and technology in order to comprehend the relation between materials' structure and its properties and applications, which will open the field to develop and manufacture materials with special properties that suits the required application. This will help in developing various industries and setting specifications and criteria for quality assurance. Materials engineering applications incorporates different metals, ceramics, plastics, composite materials, semiconductors and other materials that could be used in electronics, communication, environmental, medicine, biotechnology, nanotechnology and other applications. Now this field attracts global attention which makes it important to be included into the higher educational system in Egypt.

Program Mission

The mission of materials engineering program is to provide the graduates with a well-rounded engineering education with specific emphasis on materials science and engineering. The program aims not only to cope the daily development in engineering materials world but even to have a leading role in this development in industry and academia by providing a graduate of solid scientific foundation and developing his creative thinking regarding processing, structure, properties, and performance of materials.

Career Prospects

Materials engineers have versatile opportunities in manufacturing, petrochemical, ore extraction, consulting firms, research entities and educational institutes or other similar organizations.

Possible jobs are Material engineer, design engineer, metallurgist, product developer, research assistant, quality engineer, biomedical engineer, patent examiner and technical sales engineer.

Duties of material engineer are material selection, material design, processing, testing and characterization of materials and data, quality control, training, and documentation

University Requirements:

The student will study (7) General Education Elective Courses (humanities) selected by him from the following list of courses, with a total of (14) credit hours.

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
ASU011	Technical English Language	0	4	100	2	2	0	4
ASU111	Human Rights	2	2	50	2	1	0	3
ASU112	Report Writing and Communication skills	3	4	100	2	2	0	4
ASU113	Professional Ethics and Legislations	3	4	100	2	2	0	4
ASU114	Selected Topics in Contemporary Issues	2	2	50	2	0	0	2
-	ASU Elective (1)	2	3	75	2	1	0	3
-	ASU Elective (2)	2	2	50	2	0	0	2
	Total	14	17	425	12	6	0	18
Pool of ASU Elective (1) Courses								
ASU321	Innovation and Entrepreneurship	2	3	75	2	1	0	3
ASU322	Language Course – can accept equivalent certificates	2	3	75	2	1	0	3
ASU323	Introduction to Accounting	2	3	75	2	1	0	3
ASU324	History of Engineering and Technology	2	3	75	2	1	0	3
Pool of ASU Elective (2) Courses								
ASU331	Human Resources Management	2	2	50	2	0	0	2
ASU332	History of Architecture	2	2	50	2	0	0	2
ASU333	Introduction to Marketing	2	2	50	2	0	0	2
ASU334	Building Safety and Fire Protection	2	2	50	2	0	0	2
ASU335	Literature and Arts	2	2	50	2	0	0	2
ASU336	Business Administration	2	2	50	2	0	0	2

Faculty Requirements:

Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
PHM011	Basic Mathematics	0	4	100	2	2	0	4
ENG111	Field Training	0	12	300	0	10	15	25
PHM012	Mathematics (1)	3	5	125	3	2	0	5
PHM013	Mathematics (2)	3	5	125	3	2	0	5
PHM021	Vibration and Waves	3	5	125	3	1	1	5
PHM022	Electricity and Magnetism	3	5	125	3	1	1	5
PHM031	Statics	3	5	125	2	2	1	5
PHM032	Dynamics	3	5	125	2	2	1	5
PHM041	Engineering Chemistry	3	5	125	2	1	2	5
PHM111	Probability and Statistics	2	4	100	2	2	0	4
MDP081	Production Engineering	3	5	125	2	0	3	5
MDP011	Engineering Drawing	3	6	150	1	3	2	6
CEP011	Projection and Engineering Graphics	3	6	150	1	3	2	6
CSE031	Computing in Engineering	2	4	100	2	0	0	2
ENG011	Fundamentals of Engineering	2	4	100	2	1	0	3
-	Structures and Properties of Materials Elective	2	4	100	2	1	1	4
-	Engineering Economy Elective	2	4	100	2	1	0	3
-	Project Management Elective	2	4	100	2	1	0	3
Total		42	76	1900	34	23	14	71
Pool of Structures and Properties of Materials Elective Courses								
MDP151	Structures and Properties of Materials	2	4	100	2	1	1	4
EPM211	Properties of Electrical Materials	2	4	100	2	1	1	4
CES151	Structures and Properties of Construction Materials	2	4	100	2	1	1	4
Pool of Engineering Economy Elective Courses								
MDP231	Engineering Economy	2	4	100	2	1	0	3
ARC471	Feasibility Studies	2	4	100	2	1	0	3
ARC463	Renewable Energy Systems and Economics	2	4	100	2	1	0	3
UPL271	Society and Housing Economics	2	4	100	2	1	0	3
UPL471	Urban Economics	2	4	100	2	1	0	3
EPM119	Engineering Economy and Investments	2	4	100	2	1	0	3
CEI261	Engineering Economics and Management	2	4	100	2	1	0	3
CES171	Engineering Economics and Finance	2	4	100	2	1	0	3
Pool of Project Management Elective Courses								
MDP232	Industrial Project Management	2	4	100	2	1	0	3
ARC371	Architecture Project Management	2	4	100	2	1	0	3
EPM411	Project Management for Electrical Engineering	2	4	100	2	1	0	3
CSE441	Software Project Management	2	4	100	2	1	0	3
CES271	Project Management Essentials in Construction	2	4	100	2	1	0	3

Program requirements:

General Specialization Courses for Materials Engineering Program

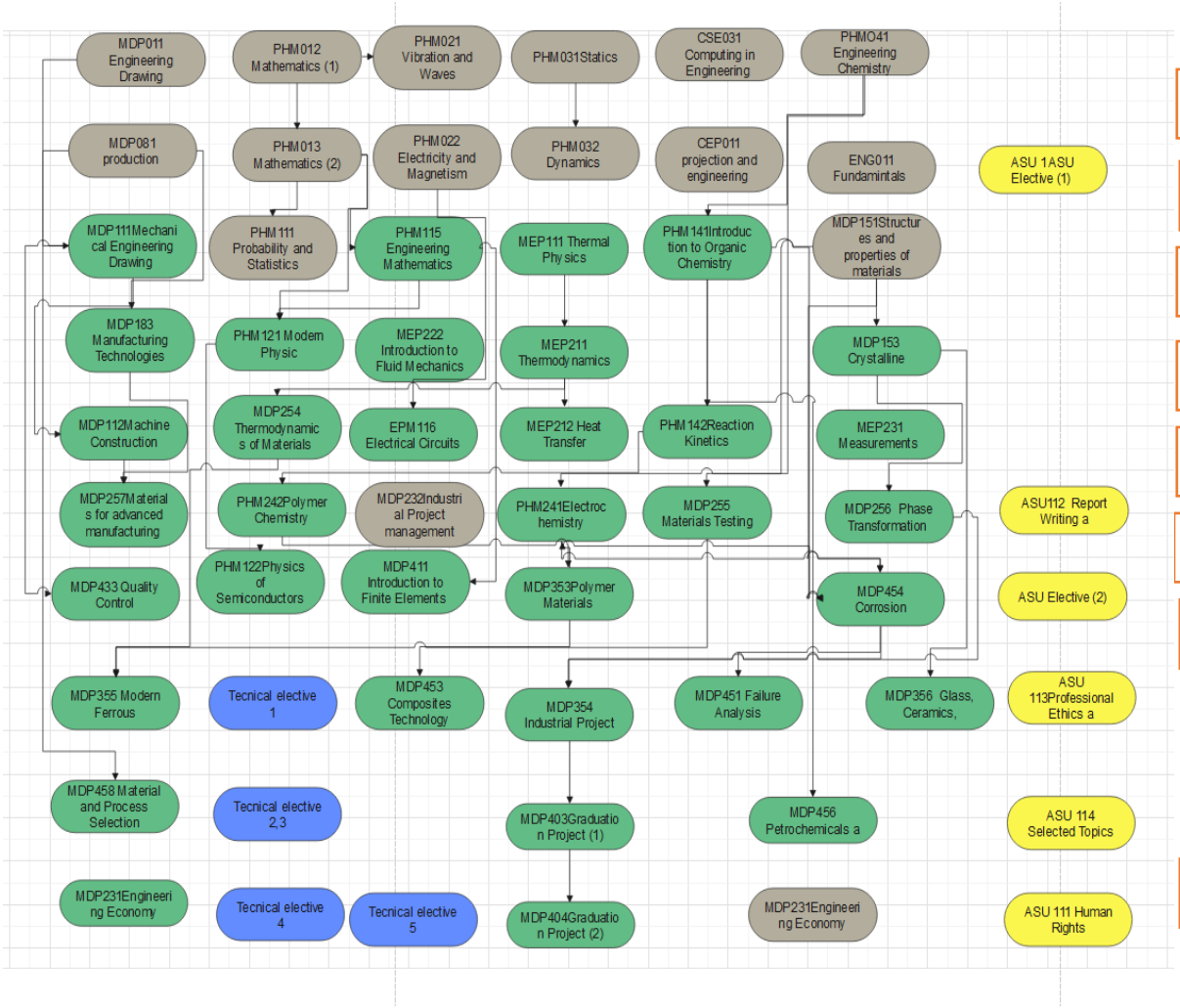
Code	Course Title	Credits and SWL			Contact Hours			
		CH	ECTS	SWL	Lec	Tut	Lab	TT
	Ain Shams University Requirements	14	17	425	12	6	0	18
	Faculty of Engineering Requirements	42	76	1900	34	23	14	71
PHM115	Engineering Mathematics	3	5	125	3	2	0	5
PHM121	Modern Physics and Quantum Mechanics	3	5	125	3	1	1	5
PHM122	Physics of Semiconductors and Dielectrics	3	5	125	2	2	0	4
PHM141	Introduction to Organic Chemistry	2	5	125	2	0	1	3
PHM142	Reaction Kinetics and Chemical Analysis	3	6	150	3	0	1	4
PHM241	Electrochemistry	3	6	150	3	0	1	4
PHM242	Polymer Chemistry	3	6	150	3	0	1	4
MDP111	Mechanical Engineering Drawing	3	6	150	1	3	2	6
MDP112	Machine Construction	3	5	125	2	2	0	4
MDP433	Quality Control	3	5	125	2	2	0	4
MEP111	Thermal Physics	2	4	100	1	2	0	3
MEP211	Thermodynamics	4	6	150	3	2	1	6
MEP212	Heat Transfer	4	8	200	2	2	3	7
MEP222	Introduction to Fluid Mechanics	3	5	125	3	1	1	5
MEP231	Measurement and Instrumentation	2	5	125	1	0	3	4
EPM116	Electrical Circuits and Machines	4	6	150	3	2	1	6
MDP411	Introduction to Finite Elements	3	5	125	2	2	0	4
MDP256	Phase Transformation and Heat Treatment	3	5	125	2	2	2	6
MDP451	Failure Analysis	3	5	125	3	0	1	4
MDP453	Composites Technology	3	5	125	3	0	2	5
MDP454	Corrosion	3	5	125	3	0	1	4
MDP458	Material and Process Selection	2	4	100	2	1	0	3
MDP153	Crystalline Structures of Materials	3	5	125	2	2	0	4
MDP254	Thermodynamics of Materials	3	5	125	2	2	2	6
MDP255	Materials Testing and Behaviour	3	6	150	2	2	2	6
MDP257	Materials for Advanced Manufacturing Technology	2	4	100	2	1	1	4
MDP353	Polymer Materials	3	6	150	3	0	2	5
MDP354	Industrial Project	3	6	150	1	0	6	7
MDP355	Modern Ferrous and Non-Ferrous Making	2	5	125	2	1	0	3
MDP356	Glass, Ceramics, and Binding Materials	3	6	150	2	2	0	4
MDP456	Petrochemicals and Polymer Products	2	4	100	2	1	0	3
MDP183	Manufacturing Technologies	4	6	150	3	2	2	7
	Materials Engineering Elective (1)	3	5	125	2	2	0	4
	Materials Engineering Elective (2)	3	5	125	2	2	0	4
	Materials Engineering Elective (3)	3	5	125	2	2	0	4
	Materials Engineering Elective (4)	3	5	125	2	2	0	4
	Materials Engineering Elective (5)	3	5	125	2	2	0	4
MDP403	Materials Engineering Graduation Project (1)	3	6	150	1	0	6	7
MDP404	Materials Engineering Graduation Project (2)	3	6	150	1	0	6	7
	Total	170	300	7500	131	78	63	272

Technical Electives for Materials Engineering

The student should select (5) Elective courses with a total of (15) Credit Hours from the following list:

Pool of Metallic Concentration Elective Courses								
MDP381	Theory of Metal Forming	3	5	125	2	2	1	5
MDP457	Extractive Metallurgy	3	5	125	2	2	0	4
MDP459	Corrosion Control and Cathodic Protection	3	5	125	2	2	0	4
MDP460	Non-destructive Testing of Materials (1)	3	5	125	2	2	0	4
MDP461	Non-destructive Testing of Materials (2)	3	5	125	2	2	0	4
Pool of Polymer Concentration Elective Courses								
MDP462	Polymer Processing	3	5	125	2	2	0	4
MDP463	Materials for Energy Solution	3	5	125	2	2	0	4
MDP464	Surfactants and lubricating Materials	3	5	125	2	2	0	4
MDP465	Rubber and Sealing Materials	3	5	125	2	2	0	4
MDP467	Polymer Testing	3	5	125	2	2	0	4
Pool of Ceramic Concentration Elective Courses								
MDP468	Materials Characterization	3	5	125	2	2	0	4
MDP469	Glasses Materials and Technology	3	5	125	2	2	0	4
MDP470	Ceramic Materials and Technology	3	5	125	2	2	0	4
MDP471	Binding Materials and Technology	3	5	125	2	2	0	4
MDP472	Biomedical Materials	3	5	125	2	2	0	4
MDP473	Introduction to Nano technology	3	5	125	2	2	0	4

Course Tree of Materials Engineering Program



Semester 1

Semester 2

Semester 3

Semester 4

Semester 5

Semester 6

Semester 7

Semester 8

Semester 9

Semester 10

University requirements	
Faculty requirements	
Materials Program courses	
Technical elective courses	