Bachelor of Science in Biomedical and Instruments Engineering

2023-2024

General Program Presentation

Graduating with a Bachelor of Science in Biomedical and Instruments Engineering necessitates the successful completion of a total of 132 credit hours (CH). These credit hours are distributed across different requirements, encompassing courses that are essential as well as those that can be chosen as elective courses. The table below shows how 132 credit hours are distributed across requirements:

Table 1: BIE credit hours distribution.

General Education Requirements	36 Credits
College Requirements	43 Credits
Program Requirements	53 Credits (9 Electives)
Total Credits Hours	132 Credits

1) General Education (36 Credits)

Students here are required to complete 36 credit hours distributed over five sections as follows:

Communication (9 Credits)

Table 2: General education communication courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
ENL101	English for Academic Studies	(3 credits)	3		ICT095*
ENL102	English Composition	(3 credits)	3	ENL101 ICT 095	
ENL201	Writing and Research	(3 credits)	3	ENL102	

*Preparatory Program; ICT 095 Information Technology Basics.

Innovation and Creativity (6 Credits)

Table 3: Innovation and Creativity Ethics compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN150	Professionalism and Ethics	(3 credits)	3		

Table 4: General education innovation and creativity elective courses (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN131	Creativity and Problem Solving	(3 credits)	3		
BUS101	Entrepreneurship Essentials	(3 credits)	3		
ENI110	Intro. to Innovation and Creativity	(3 credits)	3		
ENI140	Design Thinking	(3 credits)	3		
ENI150	Innovation in Business Models	(3 credits)	3		

ENI160	Innovation and Globalization	(3 credits)	3

Global Citizen (6 Credits)

Table 5: General education global citizen compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
INF120	Computers and Information Systems	(3 credits)	3	ICT095	

Table 6: General education global citizen elective courses (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
GEN201	Globalization and Sustainability	(3 credits)	3		
GEN202	Global Citizenship in the Digital Age	(3 credits)	3		
BUS201	Global Economics and Trade	(3 credits)	3		

Art and Humanities (9 Credits)

Table 7: General education art and humanities compulsory course.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
HST 101	Islamic Culture and Values	(3 credits)	3		

Table 8: General education art and humanities elective course group I (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
HST102	Kuwait History	(3 credits)	3		
ARB101	Arabic Communication skills	(3 credits)	3		
ART101	Art Appreciation	(3 credits)	3		
ART102	Intro. to Media and Communication	(3 credits)	3		

Table 9: General education art and humanities elective course group II (students should select one course from the following list).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
PHL101	Introduction to Philosophy	(3 credits)	3		
LAW101	Law and Society	(3 credits)	3		
PSY 101	Introduction to Psychology	(3 credits)	3		
SOC 101	Introduction to Sociology	(3 credits)	3		

Math and Science (6 Credits)

Table 10: General education math and science courses (6 credits).

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite	Note
MAT101	Calculus I	(3 credits)	3	IMP099* or Equivalent		
PHY101	Physics I	(3 credits)	3		MAT101	

*Preparatory Program: IMP099 Precalculus.

2) College Requirements (43 Credits)

- **Math and Science (**21 Credits**)**

Table 11: Math and Science courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
PHY105	Physics I Lab	(1 credit)	3		PHY101
MAT102	Calculus II	(3 credits)	3	MAT101	
MAT201	Calculus III	(3 credits)	3	MAT102	
PHY102	Physics II	(3 credits)	3	PHY101 MAT101	
PHY107	Physics II Lab	(1 credit)	3	PHY105	PHYS102
CHM101	Chemistry I	(3 credits)	3		
CHM105	Chemistry I Lab	(1 credit)	3		CHM101
MAT202	Linear Algebra	(3 credits)	3	MAT101	
MAT240	Differential Equations	(3 credits)	3	MAT102	

- **Engineering requirements (**22 Credits**)**

Table 12: Engineering courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
ENG205	Electrical and Electronic Circuits	(3 credits)	3	PHY102 MAT102	
ENG206	Electrical and Electronic Circuits Lab	(1 credit)	3	ENG205 PHY107	
ENG207	Programming	(3 credits)	3	MAT202	
ENG208	Introduction to Energy and Sustainability	(3 credits)	3	PHY102 CHM101 CHM105	
ENG204	Engineering Mechanics	(3 credits)	3	PHY102	

ENG304	Engineering Probability & Statistics	(3 credits)	3	MAT102
ENG308	Numerical Methods	(3 credits)	3	MAT201 MAT240
ENG309	Engineering Project Management and Economics	(3 credits)	3	ENG304

3) Program Requirements (53 Credits):

- **Program Requirements (44 Credits)**

Table 13: Program courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
BIE101	Human Biology for Engineers	(3 credits)	3		
BIE201	Biochemistry	(3 credits)	3	CHM101 BIE101	
BIE202	Biochemistry Lab	(1 credits)	3		BIE201
BIE203	Human Anatomy and Physiology	(3 credits)	3	BIE101	
BIE301	Biofluids and Biomedical Transport Phenomena	(3 credits)	3	ENG204 MAT240	
BIE302	Biomaterials	(3 credits)	3	BIE203 BIE202	
BIE303	Biomaterials Lab	(1 credits)	3		BIE302
BIE304	Biomechanics	(3 credits)	3	BIE203 BIE301	
BIE350	Signal Measurement Principles and control systems	(3 credits)	3	ENG205 ENG304	
BIE351	Signal Measurement Principles and Control Systems Lab	(1 credit)	3		BIE350
BIE352	Instrumentation, Measurements, and Data Acquisition	(3 credits)	3	BIE350	
BIE353	Instrumentation, Measurements, and Data Acquisition Lab	(1 credits)	3		BIE352
BIE371	Medical Imaging Systems	(3 credits)	3	BIE350	
BIE451	Instrumentation Design	(3 credits)	3	BIE352	
BIE452	Instrumentation Design Lab	(1 credit)	3		BIE451
BIE401	Biomedical Molecular and Nano Devices	(3 credits)	3	BIE304 BIE371	
BIE490	Capstone Design 1	(3 credits)	3	Program Approval	
BIE491	Capstone Design 2	(3 credits)	3	BIE490	

- **Program Electives (9 Credits)**

Table 14: Program elective courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite

BIE453	Electromagnetics Principles & Applications	(3 credits)	3	BIE350
BIE454	Instrumentation Electronics	(3 credits)	3	BIE350
BIE460	Process Instrumentation	(3 credits)	3	BIE352
BIE461	Safety and Reliability	(3 credits)	3	BIE451
BIE462	Communication Protocols	(3 credits)	3	BIE352
BIE466	Sensors Design	(3 credits)	3	BIE451
BIE480	Internship	(3 credits)	3	Program Approval
BIE410	Biomechanics and Modelling of Human Movement	(3 credits)	3	BIE302 BIE304
BIE411	Cellular and Molecular Biomechanics	(3 credits)	3	BIE201 BIE304
BIE412	Rehabilitation Engineering	(3 credits)	3	BIE304
BIE413	Biomedical Algorithms and Solutions	(3 credits)	3	BIE304
BIE414	Image Processing	(3 credits)	3	BIE371
BIE415	Biomedical Optics	(3 credits)	3	BIE302 BIE371
BIE416	Medical Devices Design and Manufacturing	(3 credits)	3	BIE302 BIE304
BIE495	Special Topics in Biomedical Engineering	(3 credits)	3	Program Approval
BIE496	Special Topics in Instrumentation Engineering	(3 credits)	3	Program Approval

- Students can take up to three credits of technical electives from another program or institution.