

# **Systems and Biomedical Engineering Program Specifications (Reg. 2019)**

**Ver. 2024-2025**

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## Program Specifications

### 1. General

#### 1.1. Basic Information

<b>Program Title</b>	Systems and Biomedical Engineering
<b>Program Type</b>	<u>Single</u>
<b>Department</b>	Biomedical and Systems Engineering Department
<b>Program Director</b>	Prof. Dr. Ahmed EL-Bialy,  (Head of Biomedical and Systems Engineering Department)
<b>Program Co-ordinator</b>	Dr. Mostafa Elhussien
<b>Dates of Program Regulation Approval</b>	2019
<b>Year of Operation</b>	2024-2025
<b>Date of Department Council Approval</b>	11-9-2024
<b>Date of Academic Council Approval</b>	18-9-2024

#### 1.2 Staff Members

The Systems and Biomedical Engineering Program is taught by 18 highly qualified staff members, 7 of them are full time employees, and 6 staff members are part time. In addition to 5 full time employed staff members from other department.

**Appendix 1** shows the staff members' names, and teaching responsibilities

#### 1.3 External Evaluators:

Prof. Dr. Manal Abd-El Wahed was assigned as External Evaluator in 2020-2021 **Appendix2**

Prof. Dr. Ahmed Hisham Kandil was assigned as External Evaluator in 2021-2022 **Appendix2**

Prof. Dr. Mohamed Abou zahad was assigned by The National Authority for Quality Assurance and Accreditation of Education “NAQAAE” as External Evaluator in 2022-2023

Received “External Evaluator Report”, as well as department response to deal with its findings, are listed in **Appendix2**



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## **2. Professional Information**

### **2.1. Preamble**

Biomedical Engineering is the application of multidisciplinary engineering and scientific concepts to the field of medicine and healthcare. The Biomedical Engineering degree combines the strong academic engineering education provided within the field of Engineering programs with the excellent research and teaching activities in the field of Biomedical and Life Sciences and with the inter level research activity in the hospitals in Biomedical Engineering. The blending of these multidisciplinary activities provides the basis for the development of engineers with a good knowledge of the application of engineering skills to the biomedical field.

The mission of the biomedical engineering program is to educate students to become significant contributors in the fields of health care, technical support and development in biomedicine and biomedical engineering. Such a program links technical fundamentals in science, engineering from various disciplines and the life sciences in combination with team building, societal and ethical issues, and communication and leadership skills.

### **2.2. Program Vision, Mission and Aims**

#### **2.2.1. Program Vision**

"يسعى قسم الهندسة الطبية على استمرار ثقة المجتمع في خريجيه وتبوء مكانه بين الاقسام المناظرة في الكليات والمعاهد الأخرى."

**“Systems and Biomedical Engineering Department seeks to maintain the community’s confidence in the graduates and to take its place among the corresponding departments in other college.”**

#### **2.2.2. Program Mission:**

"إعداد مهندسين مبدعين قادرين على تلبية احتياج سوق العمل في مجال الهندسة الطبية و تطوير البحث العلمي لرفع مستوى الخدمات الطبية المقدمة في مصر."

**“Preparing creative engineers capable of meeting the needs of the labor market in the field of biomedical engineering and developing scientific research to raise the level of medical services provided in Egypt”**



## 2.2.3. Program Aims:

### الأهداف التنفيذية للبرنامج

تم تحديد وصياغة الأهداف التنفيذية للبرنامج وتم اعتمادها في مجلس القسم بتاريخ 2021/9/6

الأهداف الرئيسية	الأهداف التنفيذية
1. تقديم برنامج أكاديمي متطور وذو كفاءة ومضمون الجودة	1.1 تطوير ورفع كفاءة المقررات الدراسية (نظرياً وعملياً)
	1.2 تطوير ورفع كفاءة المعامل الدراسية
	1.3 تطوير ورفع كفاءة أساليب التعليم والتعلم
	1.4 تطوير ورفع مصداقية أساليب التقييم
	1.5 تطبيق منظومة لضمان جودة العملية التعليمية
2. اكساب الطالب وخريج البرنامج مهارات وامكانيات متوافقة مع متطلبات سوق العمل وملئمة لتطوراتها.	2.1 تطوير مهارات الطالب العلمية والعملية والشخصية طبقاً لمتطلبات سوق العمل.
	2.2 تحفيز وتنمية ابداعات ومواهب الطلبة
3. دعم وتنمية البحث العلمي	3.1 تشجيع وتدعيم التعاون في مجال الدراسات العليا مع الجامعات المصرية والدولية لأعضاء هيئة التدريس وأعضاء الهيئة المعاونة
	3.2 تنمية ورفع كفاءة امكانيات المعامل البحثية
	3.3 تشجيع الاستفادة من المشروعات البحثية الممولة (العلمية والتطبيقية)
	3.4 تشجيع وتدعيم المشاركة في نشر الأبحاث في الدوريات العلمية والمؤتمرات العلمية الدولية

Main Aims	Executive Aims
1 Providing an advanced, efficient and quality-assured academic program	1.1 Developing and raising the efficiency of academic courses (Theoretically and Practically)
	1.2 Developing and raising the efficiency of study laboratories
	1.3 Developing and raising the efficiency of teaching and learning methods
	1.4 Developing and raising the credibility of evaluation methods
	1.5 Implementing a system to ensure the quality of the educational process
2 Providing the student and graduate of the program with skills and capabilities that are compatible with the requirements of the labor market and appropriate to its developments.	2.1 Developing the student's scientific, practical and personal skills in accordance with the requirements of the labor market.
	2.2 Motivating and developing students' creativity and talents
3 Support and develop scientific research	3.1 Encouraging and strengthening cooperation in the field of graduate studies with Egyptian and international universities for faculty members and supporting staff members
	3.2 Developing and raising the efficiency of research laboratories' capabilities
	3.3 Encouraging benefit from funded research projects (scientific and applied)
	3.4 Encouraging and supporting participation in publishing research in scientific journals and international scientific conferences





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### وتؤهل الدراسة بالقسم خريجها للقيام بالآتي:

	<b>Educational Aims</b>	<b>الأهداف التعليمية:</b>	
A1	Designing medical and prosthetic devices and their components and connecting them to hospital networks and the Internet	تصميم الأجهزة الطبيه والتعويضييه ومكوناتاتها وربطها بشبكات المستشفيات والأنترننت	A1
A2	Designing medical software, bioinformatics, the fields of medical imaging, archiving, compressing, storing, and transferring various medical data, x-ray images, and heart, brain, and muscle imaging, in accordance with international standards in data representation and transfer to and from hospitals and medical units, and communication via Internet networks, whether central or local.	تصميم البرمجيات الطبيه والمعلوماتيه الحيويه ومجالات التصوير الطبي وأرشفة وضغط وتخزين ونقل البيانات الطبيه المختلفه وصور الأشعه ورسوم القلب والمخ والعضلات وتبعاً للمقاييس العالميه في تمثيل البيانات ونقلها من وإلى المستشفيات والوحدات الطبيه والتواصل عبر شبكات الأنترننت سواء مركزيه أو محليه.	A2
A3	Establishing the required specifications for medical devices requested by hospitals and medical units.	وضع المواصفات المطلوبه للأجهزه الطبيه التي تطلبها المستشفيات والوحدات الطبيه.	A3
A4	Diagnosis, maintenance and repair of medical devices.	تشخيص وصيانة وإصلاح الأجهزة الطبيه.	A4
A5	Training, design and implementation in the fields of medical programming and systems	التدريب والتصميم والتنفيذ في مجالات البرمجه الطبيه والنظم	A5
A6	Hospital design, planning, installation, supervision and follow-up of all hospital equipment	تصميم المستشفيات والتخطيط والتركيب والإشراف والمتابعه لكل أجهزة المستشفيات	A6
A7	Systems design for medical devices	تصميم النظم للأجهزة الطبيه	A7
A8	Identify and control the impact of biomedical engineering on society from an environmental, economic, social and cultural point of view.	تحديد والتحكم في تأثير الهندسة الطبيه الحيويه على المجتمع من وجهة نظر بيئية واقتصادية واجتماعية وثقافية.	A8
A9	Planning and implementing research work, evaluating results, and drawing conclusions	تخطيط وتنفيذ العمل البحثي وتقييم النتائج واستخلاص النتائج.	A9



## 2.3. Program Learning Outcomes (LO's)

### 2.3.1. Learning Outcomes

	Program Competency-based NARS	Learning Objectives (LO's)(Measurable)
	<i>Level A General</i>	
A1	Identify <b>medical &amp; health-related complex problems</b> , formulate and solve engineering problems by applying engineering fundamentals, basic <b>&amp; medical</b> sciences and mathematics.	A1.1. Identify & formulate problems by applying engineering fundamentals, basic & medical sciences and mathematics. A1.2. Solve problems by applying engineering fundamentals, basic & medical science and mathematics.
A2	Develop and conduct appropriate experimentation and/or simulation, analyze and interpret data, assess and evaluate findings, and use <b>proper</b> analyses <b>techniques</b> and objective engineering judgment to draw conclusions.	A2.1. Develop and conduct appropriate experimentation and/or simulation, A2.2. Analyze and interpret data A2.3. Assess and evaluate findings, A2.4. Use analyses techniques and objective engineering judgment to draw conclusions
A3	Apply engineering design processes to produce cost-effective solutions <b>to medical and physiological problems</b> that meet specified needs with consideration for global, cultural, social, economic, environmental, ethical, <b>safety</b> and other aspects as appropriate to the discipline and within the principles and contexts of sustainable design and development.	A3.1. Apply engineering design processes. A3.2. Acquire knowledge about global, cultural, social, economic, environmental, ethical, <b>safety</b> aspects.
A4	Utilize contemporary technologies <b>in different multidisciplinary interrelated fields</b> , codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles.	A4.1. Utilize contemporary technologies in different multidisciplinary interrelated fields, A4.2. Acquire knowledge about codes of practice and standards, quality guidelines, health and safety requirements, environmental issues and risk management principles
A5	Practice research techniques and methods of investigation as an inherent part of learning.	A5.1. Practice research techniques as an inherent part of learning. A5.2. Practice methods of investigation as an inherent part of learning.
A6	Plan, supervise and monitor implementation of engineering projects, taking into consideration other trades requirements.	A6.1. Acquire basic project management skills. A6.2. Practice project management skills
A7	Function efficiently as an individual and as a member of multi-disciplinary and multi-cultural teams	A7.1. Acquire proper soft skills



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A8	<i>Communicate effectively – graphically, verbally and in writing – with a range of audiences using contemporary tools.</i>	<i>A8.1. Acquire different communication skills</i>
A9	<i>Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.</i>	<i>A9.1. Use creative, innovative and flexible thinking. A9.2. Acquire entrepreneurial and leadership skills</i>
A10	<i>Acquire and apply new knowledge and to practice self, lifelong and other learning strategies.</i>	<i>A10.1. Practice self, lifelong and other learning strategies</i>
<b>Level B Specialty (Biomedical)</b>		
B1	<i>Analyze different physiological data and systems and build models of hybrid engineering systems using the proper scientific and engineering concepts, tools and technologies to simulate, analyze and solve medical problems.</i>	<i>B1.1. Analyze different physiological systems. B1.2. Design engineering systems able to perform specific functions.</i>
B2	<i>Estimate and measure the functions of physiological systems and parameters under specific conditions and evaluate their responses with proper engineering methodologies and technologies.</i>	<i>B2.1. Design experimental systems to acquire data or control function. B2.2. Analyze and interpret physiological data. B2.3. Design systems to control</i>
B3	<i>Design, model and analyze multidisciplinary engineering systems or component for a specific application in healthcare (such as diagnosis and prognosis) and identify the proper engineering tools and methods to optimize this design</i>	<i>B3.1. Design multidisciplinary engineering systems or component for a specific application B3.2. Model and analyze multidisciplinary engineering systems B3.3. Identify the proper engineering tools and methods to optimize design</i>
B4	<i>Adopt suitable national and international standards and codes to design, operate, inspect and maintain medical equipment and systems and healthcare services.</i>	<i>B4.1. Adopt suitable national and international standards and codes</i>
<b>Level D Inter-Disciplinary (Medical &amp; Healthcare Sciences)</b>		
D1	<i>Describe the normal structure of the human body and its major organs, systems and explain their functions and Recognize and respond to the complexity, uncertainty, and ambiguity inherent with its functions</i>	<i>D1.1. Describe the normal structure of the human body D1.2. Recognize the complexity, uncertainty, and ambiguity</i>
D2	<i>Adopt strategies and apply measures that promote patient safety and Improve the healthcare service quality</i>	<i>D2.1. Adopt strategies to promote patient safety D2.2. Apply measures that promote patient safety. D2.3. Improve the healthcare service quality</i>



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D3	<i>Recognize the economic, psychological, social, and cultural factors that imposed when dealing with healthcare and patient health.</i>	<i>D3.1. Recognize the economic, psychological, social, and cultural factors</i>
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### 2.3.2. Attributes of the Graduates

	<i>Program General Graduate Attributes</i>	<i>المواصفات العامة لخريج البرنامج</i>
1.	<i>Master a wide spectrum of engineering knowledge and specialized skills and can apply acquired knowledge using theories and abstract thinking in real life situations <b>related to healthcare challenges</b>.</i>	متمكن من مجال واسع من المعارف الهندسية والمهارات التخصصية وقادر على تطبيقها باستخدام النظريات العلمية والتفكير المجرد في مواقف واقعية متعلقة بتحديات ومشكلات في مجال الرعاية الصحية.
2.	<i>Apply analytic critical and systemic thinking to identify, diagnose and solve <b>medical problems</b> of wide range of complexity and variation with engineering tools <b>and techniques</b>.</i>	قادر على تطبيق التفكير التحليلي النقدي المنظم للتعرف على وتشخيص وحل المشكلات المتغيرة والمعقدة في مجال الرعاية الصحية باستخدام التقنيات والأدوات الهندسية.
3.	<i>Behave professionally and adhere to engineering ethics and standards.</i>	يتصرف باحترافية ويلتزم بأخلاقيات ومعايير المهنة.
4.	<i>Work in and lead a heterogeneous team of professionals from different engineering specialties and <b>healthcare workers</b> and assume responsibility for own and team performance;</i>	قادر على قيادة - أو العمل من - ضمن فريق من المحترفين ذوي التخصصات الهندسية المختلفة والعاملين في مجال الرعاية الصحية وتحمل مسؤولية عمله أو مسؤولية عمل الفريق الذي يقوده.
5.	<i>Recognize his/her role in promoting the engineering <b>and healthcare</b> fields and contribute in the development of the profession and the community;</i>	يقدر دوره في تنمية مجالات العمل الهندسي والرعاية الصحية ويسهم في تطوير المهنة والمجتمع.
6.	<i>Value the importance of the environment, both physical and natural, and work to promote sustainability <b>and safety</b> principles;</i>	يقدر قيمة البيئة من حوله ويعمل على تدعيم مبادئ الاستدامة والسلامة.
7.	<i>Use techniques, skills and modern engineering tools necessary for engineering practice;</i>	قادر على استخدام التقنيات والمهارات الهندسية الحديثة واللازمة لممارسة المهن الهندسية.
8.	<i>Assume full responsibility for own learning and self-development, engage in lifelong learning and demonstrate the capacity to engage in post- graduate and research studies;</i>	يتحمل مسؤولية تعليم الذات وتطويرها وقادر على التعلم خلال حياته المهنية ويظهر القدرة في المشاركة في الدراسات البحثية ما بعد التخرج.
9.	<i>Communicate effectively using different modes, tools and languages with various audiences; to deal with academic/professional challenges in a critical and creative manner;</i>	يتواصل بكفاءة في الأحوال المختلفة وبأدوات ولغات مع المحيطين به في بيئة العمل ويتعامل مع التحديات الأكاديمية والمهنية بإبداع.
10.	<i>Demonstrate leadership qualities, business administration and entrepreneurial skills.</i>	يملك مقومات القيادة وإدارة الأعمال ومهارات بدء وإدارة المشروعات.
	<i>Program Specific Graduate Attributes</i>	<i>المواصفات التخصصية لخريج البرنامج</i>
11.	<i>Work to maintain health and promote human wellbeing.</i>	يحرص على الحفاظ على الصحة العامة ويعزز رفاهية الإنسانية.
12.	<i>Provide -quality and safe patient-centered care, focusing on primary health care and dealing with common health problems in his/her community.</i>	يضمن العمل على تقديم رعاية آمنة وذات جودة محورها المريض ويركز على مشكلات الرعاية الصحية في مجتمعه.
13.	<i>Work effectively with other health care professionals respecting their roles and their contribution to the team.</i>	يعمل بكفاءة مع العاملين في مجال الرعاية الصحية ويقدر دورهم واسهاماتهم في العمل.



## 2.4. Curriculum Structure and Contents

### 2.4.1. Program Content:

The program includes 73 courses, total (258) Contacts Hours equivalent to (170) Credit Hours  
الهيكل الرئيسي لبرنامج الهندسة الحيوية الطبية والمنظومات (لائحة 2019) طبقاً للجنة قطاع الدراسات الهندسية والتكنولوجية والصناعية

#### (توزيع المقررات فى لائحة 2019 بناء على الاطار المرجعى 2020)

نسبة الساعات المعتمدة	نسبة الساعات الفعلية	عدد الساعات المعتمدة	عدد الساعات الفعلية	اسم المقررات	متطلبات التخرج
9.4%	9.3%	16	24	اللغة الإنجليزية فنية (1) مهارة استخدام الحاسب اللغة الإنجليزية فنية (2) تاريخ الهندسة والتكنولوجيا مقرر اختياري انسانيات (1) مقرر اختياري انسانيات (2) مهارات الاتصال ادارة اعمال إدارة مشروعات	متطلبات الجامعة
26.5%	26.4%	45	68	رياضيات (1) فيزياء (1) ميكانيكا (1) كيمياء (1) رياضيات (2) فيزياء (2) ميكانيكا (2) تكنولوجيا انتاج رياضيات هندسية فيزياء الموجات الطبية كيمياء (2) المعادلات التفاضلية والتحويلات الرياضية رسم هندسى و إسقاط (1) رسم هندسى و إسقاط (2) تدريب ميدانى (1) تدريب ميدانى (2) تدريب ميدانى (3) مقرر اختياري انسانيات (3) مقرر اختياري انسانيات (4)	متطلبات الكلية
35.3%	34.9%	60	90	مقدمة الهندسة الطبية هندسة كهربية (1) هندسة ميكانيكية (1) أساسيات الحاسب هندسة كهربية (2) هندسة ميكانيكية (2) البرمجة والخوارزميات فيزياء الاشعاع الطبى النبائط الإلكترونية والدوائر (1) اشارات كهربية ونظم (1) القياسات الكهربائية (1) هيكل البيانات النبائط الإلكترونية والدوائر (2) اشارات كهربية ونظم (2) القياسات الكهربائية (2) تخطيط وتصميم الشبكات بيولوجى فيسيولوجى (1) علم التشريح	متطلبات التخصص العام



نسبة الساعات المعتمدة	نسبة الساعات الفعلية	عدد الساعات المعتمدة	عدد الساعات الفعلية	اسم المقررات	متطلبات التخرج
				فيسيولوجى (2) كيمياء حيوية الالكترونيات الحيوية والقياسات (1) الالكترونيات الحيوية والقياسات (2) ادارة نظم الهندسة الاكلينيكية نظم تصميم المستشفيات	
28.8%	29.5%	49	76	نظم التحكم (1) أجهزة التحاليل الطبية مقرر إختيارى تخصصى (1) المعلوماتية الحيوية نظم التحكم (2) المعدات الطبية الأساسية مقرر إختيارى تخصصى (2) الذكاء الاصطناعى معدات التصوير الطبى أنظمة رقمية الكترونية (1) هندسة النظم مقرر تميز (1) مقرر إختيارى تخصصى (3) المعدات الطبية المتخصصة أنظمة رقمية الكترونية (2) تحليل ومعالجة الاشارات الرقمية مقرر تميز (2) مقرر إختيارى تخصصى (4) مشروع تخرج (1) مشروع تخرج (2)	متطلبات التخصص الدقيق
% 100	% 100	170	258	المجموع	



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**Year:- Prep. Program:- Systems and Biomedical Engineering**

Code	Course Name	Teaching Hours					Marking				Total
		Lectures	Toutiral hour	Practical hour	Total hours	Credit Hours	Written Exam	Periodic Assess.	Practical/Oral	Exam Duration (hrs)	
PHM 011	Mathematics (1)	2	2	-	4	3	90	60	-	2	150
PHM 013	Physics (1)	2	1	2	5	3	90	30	30	2	150
PHM 015	Mechanics (1)	2	2	-	4	3	90	60	-	2	150
ARC 011	Engineering drawing& Projection (1)	1	2	-	3	2	60	40	-	2	100
CHE 011	Chemistry (1)	2	1	1	4	3	60	20	20	2	100
HUM 013	Computer Skills	1	-	2	3	2	30	10	10	2	50
HUM 011	Technical English language (1)	1	-	1	2	1	30	10	10	1	50
<b>Total</b>		<b>11</b>	<b>8</b>	<b>6</b>	<b>25</b>	<b>17</b>					<b>750</b>

**Prep. Year / 2<sup>nd</sup> Semester**

Code	Course Name	Teaching Hours					Marking				Total
		Lectures	Toutiral hour	Practical hour	Total hours	Credit Hours	Written Exam	Periodic Assess.	Practical/Oral	Exam Duration (hrs)	
PHM 012	Mathematics (2)	2	2	-	4	3	90	60	-	2	150
PHM 014	Physics (2)	2	1	2	5	3	90	30	30	2	150
PHM 016	Mechanics (2)	2	2	-	4	3	90	60	-	2	150
ARC 012	Engineering drawing & Projection (2)	1	2	2	5	2	60	20	20	2	100
PHM 017	Production Technology	1	-	2	3	2	45	15	15	2	75
HUM 014	History of Engineering Technology	2	-	-	2	2	50	25	-	2	75
HUM 012	Technical English language (2)	1	-	1	2	1	30	10	10	1	50
<b>Total</b>		<b>11</b>	<b>7</b>	<b>7</b>	<b>25</b>	<b>16</b>					<b>750</b>



*(Handwritten signature)*

**Year:- First**

**Program:- Systems and Biomedical Engineering**

Course Code	Course Name	First Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 151	Electrical Eng. (1)	2	1	1	4	75	30	20	2	125
BIS 153	Mechanical Eng. (1)	2	1	-	3	60	40	-	2	100
BIS 155	Computer Basics	1	1	2	4	60	20	20	2	100
PHM 161	Engineering Mathematics	2	2	-	4	60	40	-	2	100
PHM 163	Physics of Medical Waves	2	1	1	4	60	40	-	2	100
BIS 145	Chemistry (2)	2	1	-	3	60	40	-	2	100
HUM 161	Int. Biomedical Engineering	1	1	-	2	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>12</b>	<b>8</b>	<b>4</b>		<b>Total Semester Marks</b>				<b>725</b>
		<b>24</b>								
Course Code	Course Name	Second Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 152	Electrical Eng. (2)	2	1	1	4	75	30	20	2	125
BIS 154	Mechanical Eng. (2)	2	1	-	3	60	40	-	2	100
BIS 156	Programming & Algorithms	1	1	2	4	60	20	20	2	100
PHM 162	Diff. Equations & Transforms	2	2	-	4	60	40	-	2	100
PHM 164	Physics of Radiation	2	2	-	4	60	40	-	2	100
BIS 158	Electronic Dev. & Systems (1)	2	1	1	4	50	30	20	2	100
BIS 148	Biology	2	-	1	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>13</b>	<b>8</b>	<b>5</b>		<b>Total Semester Marks</b>				<b>725</b>
		<b>26</b>								

\* Electrical Eng. (1),(2)- Mechanical Engineering (1),(2)- Engineering Mathematics and Diff. Equations & Transforms are continuous subjects.





**Year:- Second Program:- Systems and Biomedical Engineering**

Course Code	Course Name	First Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 251	Elect. Signals & Systems (1)	2	1	1	4	50	30	20	2	100
BIS 253	Elect. Measurements (1)	2	1	1	4	50	30	20	2	100
BIS 255	Data Structure	2	1	-	3	50	30	20	2	100
BIS 257	Electronic Dev. & Systems (2)	2	1	1	4	50	30	20	2	100
BIS 241	Physiology (1)	2	-	1	3	60	20	20	2	100
BIS 243	Anatomy	2	-	1	3	60	20	20	2	100
BIS 261	Field Training (1)	-	-	2	2	25	15	10	1	50
Hum 261	Elect. Humanity (1)	2	1	-	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>14</b>	<b>5</b>	<b>7</b>		<b>Total Semester Marks</b>				<b>750</b>
		<b>26</b>								
Course Code	Course Name	Second Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 252	Elect. Signals & Systems (2)	2	1	1	4	50	30	20	2	100
BIS 254	Elect. Measurements (2)	2	1	1	4	50	30	20	2	100
BIS 256	Computer Networks	2	1	2	5	50	30	20	2	100
BIS 242	Physiology (2)	2	-	1	3	60	20	20	2	100
BIS 244	Biochemistry	1	-	1	2	60	20	20	2	100
HUM 262	Comm. Skills	2	1	-	3	60	40	-	2	100
HUM 263	Elect. Humanity (2)	2	1	-	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>13</b>	<b>5</b>	<b>6</b>		<b>Total Semester Marks</b>				<b>700</b>
		<b>24</b>								

\*Electrical Signals and Systems (1),(2)- Elect. Measurements (1),(2)- Physiology (1),(2) are continuous subjects





**Year:- Third**

**Program:- Systems and Biomedical Engineering**

Course Code	Course Name	First Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 371	Bioelectronics (1)	2	2	1	5	50	30	20	2	100
BIS 373	Syst. Dynamics (1)	2	2	1	5	50	30	20	2	100
BIS 375	Med. Labs Equipment	2	2	-	4	60	40	-	2	100
BIS 38a	Elect. Specialty (1)	2	1	-	3	75	50	-	2	125
BIS 351	Bioinformatics	2	1	-	3	60	40	-	2	100
HUM 363	Business Management.	2	1	-	3	60	40	-	2	100
BIS 361	Field Training (2)	-	-	2	2	25	10	15	1	50
HUM 361	Elect. Humanity (3)	2	1	-	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>14</b>	<b>10</b>	<b>4</b>		<b>Total Semester Marks</b>				<b>775</b>
		<b>28</b>								
Course Code	Course Name	Second Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 372	Bioelectronics (2)	2	2	1	5	50	30	20	2	100
BIS 374	Syst. Dynamics (2)	2	2	1	5	50	30	20	2	100
BIS 376	Basic Medical Equipment	2	2	-	4	60	40	-	2	100
BIS 38b	Elect. Specialty (2)	2	1	-	3	75	50	-	2	125
BIS 352	Artificial Intelligence	2	1	-	3	60	40	-	2	100
HUM364	Project Management.	2	1	-	3	60	40	-	2	100
HUM362	Elect. Humanity (4)	2	1	-	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>14</b>	<b>10</b>	<b>2</b>		<b>Total Semester Marks</b>				<b>725</b>
		<b>26</b>								

\*Bioelectronics and Measurements (1),(2)- System Dynamics (1),(2)- Med. Labs Equipment , Basic Medical Equipment are continuous subjects.



**Year:- Fourth**

**Program:- Systems and Biomedical Engineering**

Course Code	Course Name	First Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 471	Digital Electronic Syst. (1)	2	1	1	4	50	30	20	2	100
BIS 473	System Engineering	2	1	1	4	50	30	20	2	100
BIS 475	Med. Imaging Equipment	2	1	-	3	60	40	-	2	100
BIS 49x	Elect. Distinct. (1)	2	1	-	2	75	50	-	2	125
BIS 48c	Elect. Specialty (3)	2	1	-	3	75	50	-	2	125
BIS 461	Field Training (3)	-	-	2	2	25	10	15	1	50
BIS 463	Graduation . Project (1)	1	1	3	5	50	50	-	-	100
HUM 461	Clinical Syst. Management.	2	1	-	3	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>13</b>	<b>7</b>	<b>7</b>		<b>Total Semester Marks</b>				<b>800</b>
		<b>27</b>								
Course Code	Course Name	Second Semester								Total Course Marks
		Weekly Hours			Total	Total Marks Score			Exam duration (hr)	
		Lecture	Tutorial	Practical		Written	Periodic Assess.	Practical/ Oral		
BIS 472	Digital Electronic Syst. (2)	2	1	1	4	50	30	20	2	100
BIS 474	Digital Signal Processing	2	2	1	5	50	30	20	2	100
BIS 476	Specialized Med. Equipment	2	1	-	3	60	40	-	2	100
BIS 49y	Elect. Distinct. (2)	2	1	-	2	75	50	-	2	125
BIS 48d	Elect. Specialty (4)	2	1	-	3	75	50	-	2	125
BIS 464	Graduation. Project (2)	2	1	3	5	90	60	-	-	150
HUM 462	Hospital Design	2	1	-	2	60	40	-	2	100
<b>Total First Semester Hours</b>		<b>14</b>	<b>8</b>	<b>5</b>		<b>Total Semester Marks</b>				<b>800</b>
		<b>27</b>								

\* Digital Electronic Systems (1),(2)- Med. Imaging Equipment, Specialized Med. Equipment are continuous subjects

\*Graduation Project (1), (2) are continuous subjects and the evaluated by the end of second semester.



(متطلبات التخرج في لائحة 2019 طبقاً للنسب المقررة في الإطار المرجعي 2020)

إجمالي الساعات المعتمدة	الساعات الفعلية	نوعية الموضوعات				متطلبات التخرج
		متطلبات التخصص الدقيق	متطلبات التخصص العام	متطلبات الكلية	متطلبات الجامعة	
16	24					متطلبات الجامعة
45	68					متطلبات الكلية
60	90					متطلبات التخصص العام
49	76					متطلبات التخصص الدقيق
170		49	60	45	16	إجمالي الساعات المعتمدة
	258	76	90	68	24	إجمالي الساعات الفعلية
100%		28.8%	35.3%	26.5%	9.4%	نسبة الساعات المعتمدة
	100%	29.5%	34.9%	26.4%	9.3%	نسبة الساعات الفعلية
		الحد الأقصى 30%	الحد الأدنى 35%	الحد الأدنى 20%	الحد الأدنى 8%	متطلبات التخرج

-From the above table show the contact hour's distribution and the requirement of:

- The Reference Frame 2020.

It is clear from table that the current program fulfills the Reference Frame 2020.

### 2.4.2. Curriculum Mapping

#### Appendix 3:

Learning Outcomes (LO's) of the program to Academic Reference (ARS) Matrix

Learning Outcomes (LO's) of the program to Aims of the program Matrix

Learning Outcomes (LO's) of the program to Attribute of the program Matrix

Learning Outcomes of the program to Teaching and learning methods

Aims of the program to Attribute of the program Matrix

Table a shows the curriculum mapping matrix, relates the program courses to the program LO's.

Table 1b summarizing the program LO's contributed by the individual courses

Table 2b the courses contributing to the individual LO's.

### 2.4.3. Courses Specifications

The detailed program courses specifications are given in **Appendix 4**. These specifications were revised, in view of the issued (NARS - 2018).

## 3. Academic Standards

NAQAAE National Academic Reference Standards (NARS - 2018) were adapted for Level A and B and Medicine National Academic Reference Standards (NARS 2017) was partially adapted for Level D.

The detailed comparison between LO's and NARS 2018 accredited by NAQAAE 2018 is given in **Appendix 3**.

## 4. Program Admission Requirements

- Secondary Egyptian Schools Graduates.
- Secondary School Certificate Graduates of other countries are eligible to join this program if they met the minimum grades set by Admission Office of the Ministry of Higher Education.



- 
- The study begins with a preparatory year for all students before specialization in biomedical and system Engineering. Students' departmental allocation is in accordance with the institute Council regulations.

## 5. Regulations for Progression and Program Completion

- A. The student is considered successful if he passes the examinations in all courses of his class.
- B. The student has promoted to the next higher level if he fails in not more than two subjects of his class or from lower classes,
- C. In addition to the two subjects mentioned in the previous item, the student who fails in two subjects in humanities and social sciences, whether from his class or from lower classes, is admitted to the transfer to the consecutive higher level. Passing successfully in all courses before obtaining the B.Sc.degree is a prerequisite.
- D. The referred student has to sit the examination in the courses in which he has failed together with the students studying the same courses. The student gets a pass grade when he passes the examination successfully. In case the student was considered absent with acceptable excuse in a course, he gets the actual grade,
- E. The grades of the successful student in a course and in the general grade are evaluated as follows:
  - a. **Distinction**: from 85% of the total mark and upwards.
  - b. **Very good**: from 75% to less than 85% of the total mark.
  - c. **Good**: from 65% to less than 75% of the total mark.
  - d. **Pass**: from 50% to less than 65% of the total mark.
- F. The grades of a failing student in a course are estimated in one of the following grades:
  - a. **Weak**: from 30% to less than 50% of the total mark
  - b. **Very weak**: less than 30% of the total mark.
- G. The B.Sc. general grade for students has based on the cumulative marks obtained during all the years of study. The students are then arranged serially according to their cumulative sum.
- H. The student is awarded an honor degree in his cumulative sum is distinction or very good provided that he gets a grade not less than very good in any class of study other than the preparatory year. Moreover, he should have not failed in any examination he has sat in any class other than the preparatory year.

## 6. Teaching & Learning Methods

<i>Method</i>
Lectures/ Online Lectures
Online Presentations / Multimedia
Discussions / Brain storming
Tutorials/ Problem solving
Practical / Laboratory Experiments
Self-Learning Researches / Reports
Site visits / Simulation / Modeling
Projects / Cooperative Work



## 7. Student Assessment (Methods and Rules for Student Assessment)

<i>Tool</i>	
Lecture	Attendance
Class	Attendance
	Work
	Quizzes / Online Quizzes
	Mid-Term / Online MidTerm
Practical	Attendance
	Work
	Lab Test
	Mid-Term
Final Exam	Practical
	Written



## 8. Program Evaluation

<i>Evaluator</i>	<i>Tool</i>
1- Senior students	Questionnaire
2- Alumni	Questionnaire
3- Stakeholders	Questionnaire, Letters, Meeting Minutes
4- External Evaluator(s) ( External Examiner )	Report
5- Other Societal Parties	Questionnaire, Letters, Meeting Minutes

Title	Name	Signature
Program Co-ordinator	Dr. Mostafa Elhussien	
Head of Program	Prof. Dr. Ahmed El-Bialy	
Date of Department Council Approval	11-9-2024	
Date of Academic Council Approval	18-9-2024	

