NEAR EAST UNIVERSITY

DEPARTMENT OF BIOMEDICAL ENGINEERING

Course Catalogue

CONTENTS

This course catalogue is developed to give information about the Biomedical Engineering programme to all who are interested in the Near East University, Department of Biomedical Engineering eg. future students, parents, academics, universities and institutions, bodies abroad.

The catalogue includes key information about the duration of the programme, mode of study, course description, credit and grading system etc. of the programme.

We hope you can find the necessary information to your questions about the Department of Biomedical Engineering and the course programme.

Sincerely

Assoc. Prof. Dr. Terin Adalı

Chairperson

Biomedical Engineering (BME) Programme

1. General Information about the Department of Biomedical Engineering

Near East University, Department of Biomedical Engineering was founded in 2008. The Department of Biomedical Engineering operates under the administration of the Faculty of Engineering.

The aims of the Biomedical Engineering Department are; bringing up experienced and knowledgeable individuals equipped with theoretical and practical information related to the discipline, and at the same time, bring up competent individuals who are able to contribute to the developments and research studies in the field, and be managers and instructors to continue to bring up qualified people who can effectively serve in this field.

By providing high quality educational opportunities, the vision of the Department of Biomedical Engineering is to be the most prestigious department of engineering so far is existing within the geography It is positioned in by bringing up individuals having the ability to adapt to the changes upcoming throughout the world, achieving international success and thus becoming leading engineers.

Biomedical Engineering Department currently offers the following programs:

- BS Degree in Biomedical Engineering
- MS Degree in Biomedical Engineering
- PhD. Degree in Biomedical Engineering

The department has two sections: English and Turkish, thus, the language of instruction is English and Turkish.

Mode of Study and Type of program

The Bachelor's degree program is classified as a full time program. The Bachelor's degree program is aimed at Turkish, Cypriots and Foreign students, and teaching is given in English language. Studies in foreign universities can be included in the student's degree in NEU, if they are suitable to substitute studies in the NEU degree program. The Department of Biomedical Engineering also has foreign teachers and researchers, which makes it possible to widen both the educational and cultural perspective.

Website of the higher education institute - http://www.neu.edu.tr

2. **Official length of programme**:

Length of the program is 4 years (excluding one year of English preparatory class for English programme),2 semesters per year, 16 weeks per semester.

3. Profile of the Programme and Method of Education

Undergraduate curriculum according to Academic Regulation for Undergraduate Studies is arranged by the Biomedical Engineering Department and becomes effective upon the decision of the Engineering Faculty Board and approval of the University Senate.

The Biomedical Engineering Program takes four years and leads to a Bachelor's degree of Science in Computer Engineering. The Bachelor's degree requires the completion of 279 ECTS credits. The curriculum of the Bachelor's Degree in Biomedical Engineering was planned according to recommendations of ASIIN's subject-specific criteria (The Technical Committee 02, TC 02 and The Technical Committee 10, TC 10). The curriculum is classified into curricular categories represented in Table 1. A number of credits and a weight of a category in the program are indicated in Table 1. It includes studies of mathematics and science, studies of English and social science courses, studies of biomedical science and biomedical engineering obligatory courses, studies of biomedical engineering electives courses, bachelor's thesis and practical training.

Table 1: Curricular categories of the program

Category	Notation	Credit	Weight, %
Mathematics	MT	15	9.93
Basic Science	BS	12	8
English Composition & Social Science	ECS	14	9.3
Life Science	LS	4	2.7
Obligatory Biomedical Engineering Courses	OBME	81	53.6
Elective Biomedical Engineering Courses	EBME	19	12.58
Graduation Projects	GP	6	4.00
Summer Internship	SI	0	0
	Total	151	100

Each module is assigned a number of semester credit hours, according to the number and types of formal activities within a given week. These are determined as follows:

- Lecture hours: presentation of material in a classroom setting
  - 3 credit hour = 4 "hour" of lecture per week
  - 2 credit hour = 2 "hour" of lecture per week
- Laboratory hours: formal experimentation in a laboratory setting
  - 1 credit hour = 2 "hour" laboratory session per week
- Recitation hours: problem-solving sessions, etc. in support of lecture material
  - 1 credit hour = 2 "hour" of recitation per week

The professional competence acquired in the required subject studies is further developed by elective subject choices. In the Bachelor's Degree Program the portion of elective studies is 9.93 %. In exceptional cases, the elective subject can be chosen from other degree programs, if it is suitable for the degree. The application has to be approved by the Head of Biomedical Engineering Department. With technical respect free electives on offer, students of the Bachelor's degree program may choose a certain specialization track to get a more distinguished qualifications profile.

Teaching methods: The Bachelor's program is full-time, on-campus program. The teaching methods applied in the Degree Program in Biomedical Engineering include lectures, classroom and laboratory exercises, computer training, different kinds of assignments, seminars, excursions, and Case-exercises. The courses also involve group and project work which train the social competences of the students.

The Department of Biomedical Engineering appreciates modern concepts and new methods in teaching and education methods that support educational objectives in addition to traditional methods. Traditional class attendance is compulsory for all courses except graduation projects. Problem solving sections of knowledge based courses are integrated with the theory sections.

The Department of Biomedical Engineering aims to reach its educational objectives by using several teaching methods. Both the traditional and modern teaching methods are employed at the department. Traditional teaching methods are face-to-face lectures and are class based, requiring all students to attend classes. At least 70% of class attendance is compulsory for all the courses. Lectures are conducted using standard computer based presentations in the form of pre-prepared slides. In addition, white boards and marker pens are used whenever necessary in order to explain difficult topics in greater detail, or to answer student questions. Students are encouraged to take notes during the presentations and ask questions if there are points that they are not clear about. Electronic copies of the slides are sent to students by e-mail after each class, and students are encouraged to go through the slides in their own time and make sure that they understand all presented information.

In addition to traditional teaching methods, a variety of other methods are used to support the teaching. Most computer based learning requires the use of computers as part of the learning process. Students use the departmental computer laboratories for their practical work in order to improve their practical skills. Students use computers in the laboratory under the supervision of either a teaching assistant or an instructor.

Educational methods used for the students can be classified into **teacher centered and student centered**. In **Teacher-Centered Approach**, the Teachers are the main authority figure. The primary role of the student is to passively receive information (via lectures and direct instruction) with an end goal of testing and assessment. It is the primary role of teachers to pass knowledge and information onto their students. In this model, teaching and assessment are viewed as two separate entities. Student learning is measured through objectively scored tests and assessments. In **Student-Centered Approach**, the teachers are an authority figure, teachers and students play an equally active role in the learning process. The teacher's primary role is to coach and facilitate student learning and overall comprehension of material. Student learning is measured through both formal and informal forms of assessment, including group projects, student portfolios, and class participation. Teaching and assessments are connected; student learning is continuously measured during teacher instruction. Commonly used teaching methods may include class participation, demonstration, recitation, memorization, or combinations of these.

4. Qualification Awarded

Biomedical Engineer (BME) (Bachelor's Degree/ first cycle in Bologna System)

Level of Qualification: Qualifications Framework- European Higher Education Area (QF-EHEA): 1

5. Access requirement(s)

The admissions and entry requirements ensure that the students who are admitted to the degree program possess the required competences. Bachelor's degree modules are fully taught in English, and thus, good English skills are required.

Students admitted to the department come from three sources:

- Local students, who are citizens of the Turkish Republic of Northern Cyprus (TRNC)
- Students from Turkey, who are Turkish citizens
- Students from other countries (foreign students)

All students are admitted to the university after they complete their high school studies successfully and obtain high school graduation diplomas.

Local students must sit for the Near East University entrance examination and obtain a pass mark from this examination. Successful students are admitted to the university, but not necessarily to the Biomedical Engineering Department.

Students from Turkey must select the Near East University and the Biomedical Engineering Department as their choice, and they must obtain successful pass marks from the Turkish university entrance examinations (prepared and administered by the Higher Education Council of Turkey, YOK). Those who obtain the required marks are admitted to the university, but not necessarily to the Biomedical Engineering Department.

Students from other countries are admitted to the university based on the results of their high school graduation diplomas.

Because the medium of teaching is in English, the level of their English is assessed by the Faculty of English language. Those students who have certificates and who have already passed English Language proficiency examinations are exempt from the English preparation school and are admitted directly to the department where they are enrolled for the first year and first semester of their studies. Those students whose levels of English writing and communication skills are below the required standards are admitted to the English preparatory school of the university. The English preparatory school offers concentrated teaching of the English language reading, writing, and communication skills. The duration of the preparatory

school is one academic year. Successful students are admitted to the department at the end of their studies at the English preparatory school.

6. Qualification Requirements

151 Near East University Credits (Near East University Credit is contact hour based) which is total279 ECTS credits must be completed after being successful in the courses to become a graduate of the Biomedical Engineering department.

ECTS is a credit system designed to make it easier for students to move between different countries. Since they are based on the learning achievements and workload of a course, a student can transfer their ECTS credits from one university to another so they are added up to contribute to an individual's degree programme or training. ECTS helps to make learning more student-centred. It is a central tool in the Bologna Process, which aims to make national systems more compatible.

ECTS also helps with the planning, delivery and evaluation of study programmes, and makes them more transparent (http://ec.europa.eu/education/ects/ects_en.htm) .

7. Converting US College Credit Hours (semester credit hours-SCH) to ECTS

ECTS is the most commonly used credit system in Europe. The major difference between the European Credit System ECTS and the US College Credit system is that the first is based on student workload and the second on contact hours. The ECTS is oriented towards the time required for a student to meet the intended study outcomes, while the U.S. system is more oriented towards the time a faculty member needs to teach.

Here is an example of conversion of credits from ECTS to Semester Credit Hours for a college or university in the U.S.: 1.67 ECTS = 1.00 US College Credit Hours

Conversion standards may vary between higher education institutions in the U.S.

(http://www.mastersportal.eu/articles/1110/what-you-need-to-know-about-academic-credit-systems-in-the-us.html)

A student is required to have minimum pass grade from each course and obtain minimum 2.00/4.00 cumulative Grade point Average (cumulative GPA) **.**

The students who have successfully completed the programme should be able to be science-based, skilled and competent **Biomedical Engineering specialist** prepared to meet the challenges of practicing computer engineering in the 21st century, and **researchers** who are prepared to conduct computer engineering research focused on bettering the human condition and advancing the fundamental understanding of computer engineering.

8. Arrangements for transfer from another Biomedical Engineering department (Recognition of Prior Learning)

A student wishing a transfer from another university: the student must prove her/his English Proficiency if s/he wishes to attend the English Section.. At the time of OSS examination the candidate's entrance score must not be less than the lowest score for admission to the Near East Biomedical Engineering Department. The transcript and course

content of the applicant is examined by the department and the student is then accepted to the appropiate year of the programme.

For further details please contact:

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9. Examination Regulations, Assessment and Grading

The examinations are a way of finding out whether the module objectives have been accomplished. Every module in the degree programme has an examination. The type of examination to be held is laid down in each module description.

At the commencement of the teaching term, students are informed as to examination requirements. All the examinations are done during the examination week. The lectures are cancelled during the examination week. Every effort is made to ensure that no more than one examination is taken by a student on the same day.

The assessment procedures, marking criteria, and examination regulations are available for the students to examine if they wish so. The regulations cover the student absences due to illness, financial, or other reasons.

Written examinations are done for each module except the graduation projects. There are some modules that make oral examinations which are indicated in Project/Presentation/ Report activities of the module.

There are two written examinations for each module: mid-term examination, and final examination. The mid-term examinations are done around 6 weeks after the start of a new semester. The final examinations are done at the end of each semester. The examination dates are published in the university calendar at the beginning of each semester.

Students are allowed only to take one make-up exam. The date and time of the make-up exams are announced by the department.

Students who fail in exam are allowed to get re-sit exam at the end of any semester.

The graduation projects are completed in 2 semesters. Students are assigned supervisors for the duration of their graduation projects. Students can carry out their graduation project externally in the industry after approving their topic and supervisor by the department. Graduation project assessment consists of the preparation of a bound report by the student, and also an oral presentation to jury members. The jury members are selected from the departmental staff according to the topic of the presentation and there must be at least 2 members at the jury. Students are expected to prepare slides and present their projects orally. The presentation time is 10-15 minutes for each student. At the end of the presentation 5 minute time is allocated to questions. The assessment depends on the style of the presentation, command of the language, confidence of the student, the ability to answer the questions, and the content of the project. Each jury member fills in a separate assessment form. The final grading is taken to be the average grade given by all the jury members.

10. Grading Scheme and Grades

PERCENTAGE	COURSE GRADE	GRADE POINTS	
90-100	AA	4.00	(Excellent)
85-89	BA	3,30-3,95	(Excellent)
80-84	BB	3,00-3,45	(Very Good)
75-79	CB	2,50-2,95	(Very Good)
70-74	CC	2,00-2,45	(Good)
65-69	DC	1,50-1,90	(Good)
60-64	DD	1,00-1,40	(Good)
50-59	FD	0,50-0,90	(Failed)
0-49	FF	0,00	(Failed)

11. Occupational Profiles of Graduates

Graduates of the Department of Biomedical Engineering have an opportunity to be employed as system engineers, computer engineers and specialists in this field, system programmers, design engineers, programmers, information technology specialists, communication network engineers, and in a variety of private and public establishments.

The Department of Biomedical Engineeringhas good relations with the governmental and private organizations and companies in North Cyprus and Turkey, thereby ensuring up to date study program in regard to scientific expertise and regional industrial needs. Curriculum of the department is kept up to date by offering new core/ elective courses upon the regional requirements, the demand of employers, international organizations and job market representatives.

The graduates can find the job in the governmental and private organizations and companies where they can work as

The Work Areas of Biomedical Engineering Department:

The main employment areas of biomedical students are as follows:

- In health institutions – such as state hospitals, private hospitals, and health clinics.
- In government offices – such as Ministry of Health and health departments of municipalities.
- In manufacturing firms – such as firms employing design engineers for manufacturing medical products, quality control engineers, and so on.
- In representative firms – such as support engineers and consultants in firms that sell medical equipment.
- In educational establishments – such as lecturers in universities and in colleges offering training on health issues.

The main employment areas of biomedical engineers can be summarized as follows:

- In the firms manufacturing medical equipment and tools.
- In firms that manufacture artificial organs.
- In units developing equipment and sensors for analyzing the blood.
- In the units in charge of setup and maintenance of electronic equipment for the monitoring of patients in intensive care units, and in operations.
- In the firms that design, develop and manufacture ultrasound, x-ray, magnetic resonance and similar medical imaging systems.
- In the firms that design specialized medical systems.
- In the establishments that carry out research for the modeling of the circulatory system, absorption, and breathing and similar physiologic systems.
- In the firms that design, develop, and manufacture all type of medical equipment used in hospitals.
- In the units in charge of setup and maintenance of all types of medical equipment used in hospitals.
- In the departments and firms that are interested in the development of existing medical electronic equipment, and for designing new medical equipment.
- In the foundations which offer medical training.

The modules in the degree structure are also closely linked to the research conducted in the department and provide a path to post graduate studies. Moreover, a large majority of Bachelor's projects are completed in cooperation with industry in various projects either at the university or in companies, and thus provide a link to the professional field and a path to future employment in specialist tasks in these research areas.

Practical relevance of the program is achieved by:

- lectures given by professionals from various fields;
- laboratory lessons;
- renewing course contents periodically based on the job market needs;
- implementing new courses based on the job market needs;
- guest lecturers delivered by engineering practitioners;
- providing project based learning in courses with term projects;
- providing graduation projects that involve practical applications both in manufacturing and service sectors;
- organizing international and domestic academic seminars and workshops;
- a summer practice (internship) in order to integrate knowledge and theory to practice in the fields of Biomedical Engineering.

A summer practice is included in the Bachelor's degree. A summer practice is lasted 40 working days.

12. Programme Director

Assoc. Prof. Dr. Terin Adalı (Chairperson)
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13. Key Learning Outcomes

Learning outcomes of the BSc program include development of:

Upon completion of BSc. In Biomedical Engineering, students will demonstrate the ability to:

1- Apply knowledge of Mathematics, Natural Science and Engineering with relevance to Life Science and multidisciplinary context of Engineering Science.

2- Analyze, design and conduct experiments, as well as to analyze and interpret.

3- Design system component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

4- Function on multidisciplinary teams.

5- Design work by using simulation, modelling and test and integration in a biomedical problem solving oriented way.

6- Display an understanding of professional and ethical responsibility.

7- Communicate effectively aware of non-technical effects of engineering.

8- Search Biomedical related technical literature and other information sources.

9- Recognize of the need for, and an ability to engage in life-long learning.

10- Exhibit a knowledge of contemporary issues.

11- Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.

14. Courses List with Near East University credits and ECTS

List of courses of taken each year are given below.

BSc in Biomedical Engineering

FRESHMEN

First Year, Fall Semester (18/18 credits, 30/30 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
AIT101/ TUR100	Atatürk's Principles Reforms/ Turkish for Foreigners*	(2,0) 0	2	ECS	-
BME101	Introduction to Biomedical Engineering	(3,0) 3	3	OBME	-
PHY101	General Physics I	(3,2) 4	6	BS	-
BME104	Chemistry for Life Sciences	(3,2) 4	6	LS	-
ENG101	English I	(3,0) 3	4	ECS	-
MTH101	Calculus I	(4,0) 4	6	MT	-

First Year, Spring Semester (21/39 credits, 33/63 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME102	Biochemistry for Life Sciences	(3,2) 4	6	OBME	BME104

BME110	Medical English	(3,0) 3	5	OBME	-
ENG102	English II	(3,0) 3	5	ECS	ENG101
MAT102	Calculus II	(4,0) 4	6	MT	MTH101
MTH113	Linear Algebra	(3,0) 3	5	MT	MTH101
PHY102	General Physics II	(3,2) 4	6	BS	PHY101

SOPHOMORE

Second Year, Fall Semester (22/61 credits, 34/97 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME202	Biomaterials	(3,2) 4	6	OBME	BME102
ECC106	Intr. To Computer Programming	(3,2) 4	6	BS	-
ECC204	Electrical Circuits	(3,2)4	6	OBME	PHY102
MTH201	Differential Equations	(4,0) 4	6	MT	MAT101
ENG201	English Communication Skills	(3,0) 3	5	ECS	ENG102
NTE	Non-Technical Elective	(3,0)3	5	ECS	-

Second Year, Spring Semester (20/81 credits, 44/141 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME210	Anatomy & Physiology	(3,0) 3	5	OBME	BME102
BME260	Electromagnetic Theories	(3,0) 3	5	OBME	PHY102
BME250	Biostatistics	(3,0) 3	5	OBME	-
ECC205	Basic Electronics	(3,2) 4	6	OBME	ECC204
ECC001	Digital Logic Processes	(3, 2) 4	6	OBME	ECC106
NTE	Non-Technical Elective	(3,0) 3	5	ECS	-
BME200	Internship I	(0, 0) 0	12	SI	-

JUNIOR

Third Year, Fall Semester (20/101 credits, 29/170 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
ECC301	Microprocessors	(3,2) 4	6	OBME	ECC106

ECC008	Signals and Systems	(4,2) 4	6	OBME	-
BME311	Biomedical Instrumentations I	(3,2) 4	6	OBME	-
BME320	Biomechanics	(3,0) 3	5	OBME	BME210
BME310	Biomedical Electronics	(3,2) 4	6	OBME	ECC205

Third Year, Spring Semester (18/119 credits, 40/210 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME340	Modelling of Biological Systems	(3,0) 3	5	OBME	BME250
BME350	Radiology Physics	(3,0) 3	5	OBME	PHY101
BME303	Biomedical Imaging	(3,2) 4	6	OBME	-
BME312	Biomedical Instrumentations II	(3,2) 4	6	OBME	BME311
BME321	Artificial Organs	(3,2) 4	6	OBME	BME202
BME300	Internship II	-	12	SI	BME200

SENIOR

Fourth Year, Fall Semester (16/135 credits, 33/243 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME400	Graduation Projects I	(3,0) 3	12	OBME	
BME401	Instrumental Analysis for Biomedical	(3,2) 4	6	OBME	
BME452	Biomedical Signal Processing	(3,0) 3	5	OBME	
TE	Technical Elective	(3,0) 3	5	EBME	
TE	Technical Elective	(3,0) 3	5	EBME	

Fourth Year, Spring Semester (14/149 credits, 30/273 ECTS)					
Course Code	Course Name	(Hour) Credit	ECTS	Category	Prerequisite
BME402	Graduation Projects II	(3, 0) 3	12	OBME	BME400
BME435	Bioinformatics	(3, 0) 3	5	OBME	BME250
TE	Technical Elective	(3,0) 3	5	EBME	-
TE	Technical Elective	(3,0) 3	5	EBME	-
TE	Technical Elective	(3,0) 3	5	EBME	-

* AIT101 is a module for Turkish students.

YIT101 is a module for foreign students
In first semester AIT101 Atatürk's Principles Reforms course is designated for the students of Turkish nationality, the course YIT101 Turkish for Foreigners – for oversee students (foreigners).
MT: Mathematics, BS: Basic Science, ECS: English Composition and Social Sciences, LS: Life Sciences, OBME: Obligatory Biomedical Engineering Courses, EBME: Elective Biomedical Engineering Courses, GP: Graduation Projects, SI: Summer Internship.

Technical Elective Courses

Course Code	Course Title	Credit	ECTS
COM 463	Digital Image Processing	3	5
COM 416	Computer Networks	3	5
EE 457	Robotics Systems	3	5
EE 432	Mechatronics	3	5
BME 302	Advanced Microcontrollers	3	5
BME 458	Biomedical Equipment Design	3	5
BME 433	Medical Biology	3	5

Course Code	Course Title		
COM 463	Digital Image Processing	3	5
COM 416	Computer Networks	3	5
EE 457	Robotics Systems	3	5
EE 432	Mechatronics	3	5
BME 302	Advanced Microcontrollers	3	5

BME 458	Biomedical Equipment Design	3	5
BME 433	Medical Biology	3	5
BME 438	Ultrasound Systems	3	5
BME 431	Cardiac Mechanics	3	5
BME 441	Orthopedic Biomechanics	3	5
BME 442	Advanced Biomedical Sensors	3	5
ECC 456	Economics for Engineers	3	5

Non-Technical Elective

Course Code	Course Title		
MAN101	Introduction to Management	3	5
ECON101	Introduction to Economics	3	5
FRE101	French I	3	5
FRE102	French II	3	5
GER101	German I	3	5
GER102	German II	3	5
PHIL101	Introduction to Philosophy	3	5
HIST103	History of Civiliztion	3	5
POL101	Political Science I	3	5

15. Objectives and contents of the course:

The educational objectives of the Degree Program in Biomedical Engineering reflect the mission of Near East University. The Bachelor of Science program in Biomedical Engineering prepares the students to achieve the following career and professional objectives.

- To acquire a strong foundation in Biomedical Engineering area relevant to the current needs of industry to allow them to successfully compete for demanding and high quality jobs
- Analyze problems, propose algorithmic solutions, and implement them correctly and efficiently by applying their knowledge of mathematics, computing, systems and development tools.
- Propose engineering solutions using the information and communication technologies for the related problems of industry and government.
- To acquire clear communication abilities, ethical and social responsibilities for teamwork.
- Make positive contributions to their community and society by applying skills and abilities learned during their undergraduate program in computer engineering
- Improve knowledge and skills through lifelong learning and graduate studies.

The individual courses are described below. These courses are offered by the Biomedical Engineering Department together with the objective of each module.

FIRST YEAR

BME101Introduction to Biomedical Engneering
Objectives of the Course:
The main goals of BME 101 are to introduce you to the engineering profession, the application of engineering science to biomedical problems and your study of biomedical engineering
Course description:
This course is designed for biomedical engineering undergraduate students. The purpose of the course is to provide biomedical engineering background on technical aspects. Brief introduction to the field of biomedical engineering is given; biomedical devices, medical instrumentation and medical imaging systems are introduced to familiarize the students for the upcoming years of study. Students are provided with overviews of the major physical techniques that engineers have used to explore in biomedical engineering level.

ECC106 Introduction to Programming
Objectives of the Course:
To familiarize the students with computers and computing fundamentals.To be able to analyze and design a solution to a given problem. To enable the students to write structured programs using C programming Language.
Course description:
Algorithm development. Elements of C. Structure of a C program, data types, constants, input and output of integer numbers, real numbers. Variables, expressions and assignments. Input and output functions. Control Structures. Selection- If statement, multiple selection- switch statement. Iteration- while, do-while, for operators. User-defined functions, arrays and subscripted variables, single and multi dimensional arrays. Array and functions. Pointers, pointers and strings. Structures, creating structures. Structure as function argument. Subprograms. Files. File operations.Application programs will be developed in a laboratory environment using the C language.

MTH 101 Calculus I 4 Credits
Objectives of the Course:

Learn more about your academic program, Learn about limits, derivatives. Study integrals, definite integrals. To introduce the basic properties of determinants and some of their applications

Course description:

Functions, limits and continuity. Derivatives. Rules of differentiation. Higher order derivatives. Chain rule. Related rates. Rolle's and the mean value theorem. Critical Points. Asymptotes. Curve sketching. Integrals. Fundamental Theorem. Techniques of integration. Definite integrals. Application to geometry and science. Indeterminate forms. L'Hospital's Rule.

PHY 101 General Physics I 4 Credits

Objectives of the Course:

Be able to know the basic laws of mechanics.To apply those laws for solving problems. To be able to us his/her knowledge in the fields of other sciences and/or engineering. Understanding how physics approach and solve problems in mechanics.

Course Description

Measurement, vectors, kinematics, force, mass. Newton's laws, applications of Newton's laws. Work and kinetic energy. Conservation of linear momentum. Impulse, collisions, rotation, moments of inertia. Torque, angular momentum, conservation of angular momentum, static equilibrium.

BME 104 ChemistryFor Life Sciences 4 credits

Objectives of the Course:

Develop fundamental principles of theoretical and applied chemistry for life sciences, Develop scientific inquiry, complexity, critical thinking, mathematical and quantitative reasoning. Explain phenomena observed in the natural world. Develop basic laboratory skills

Course Description

A basic course with emphasizing the metric system. Matter and measurement; atoms, molecules and ions; mass relations in chemistry, stoichiometry; gases; electronic structure and the periodic table; covalent bonding; thermochemistry; acids and bases.atoms. Chemical bonding.

ENG 101 English I 3 Credits

Objectives of the Course:

To develop students' language skills and capacity to conduct writing task through the vocabulary, listening and speaking skills.To develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language. To give learners the language they need for real-life, hands-on task like explaining a process or analyzing risk and to put into practice the academic skills that they will need to use during their educations.

Course Descriptions.

This course offers intermediate levels include wide range of grammatical structures and vocabulary of English in order to built onto the foundation established at the Preparatory School. This course aims to bring the students to a level that will enable them fulfill the requirements of main courses of their departments. Students will be encouraged to read a variety of texts as well as chapters from textbooks so that they can pursue their undergraduate studies at the university without major difficulty. ENG 101 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

MTH 102 Calculus II 4 Credits

Sequences and Infinite Series; The integral test, comparison test, geometric series, ratio test, alternating series. Power series, Taylor series. Parametric equations and Polar coordinates. Functions of several variables, limits, continuity, partial derivatives, chain rule, extreme of functions of several variables. Multiple integrals: Double integrals, Area, volume, double integral in polar coordinates, surface area, triple integrals, spherical and cylindrical coordinates.

PHY 102 General Physics II 4 Credits

Objectives of the Course:

Be able to know the basic laws of electricity and magnetism. To apply those laws for solving problems. To be able to use his/her knowledge in the fields of other sciences and/or engineering. Understanding how physics approach and solve problems in electricity and magnetism.

Course Descriptions.

Electrical charges. Coulomb's law. Electrical fields. Gauss's law. Electrical potential. Capacitance and dielectrics. Current and resistance. Direct current circuits. Magnetic fields. Sources of the magnetic field. Faraday's law of induction. Inductance and inductors.

Prerequisite: PHY 101

ENG 102 English II 3 Credits

Objectives of the Course:

to develop the students' capacity to conduct writing task through the vocabulary, listening and speaking skills ; to reinforce and consolidate the language and skills that the students have learned from earlier courses ; to develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language; to develop students' language skills to prepare them for their future professional life

Course Descriptions.

This course offers the students a wide range of grammatical structures and key language and vocabulary of English in the technical, industrial, and scientific sectors at intermediate level for everyday communication at work. This course aims to bring the students to a level that will enable them to fulfill the requirements of the main courses of their departments. The ability to evaluate, analyze and synthesize information in written discourse will be highlighted. Documentation in writing will be introduced at the beginning of the course, in order to solidly establish the skill by the end. Students will learn the discourse patterns and structures to be used in different essay types that they need for real life, hands-on tasks like explaining process, organizing schedules, reporting or progress, or analyzing risk.

MTH 113 Linear Algebra 3 Credits

Objectives of the Course:

To provide a student with methods for solving systems of linear equations .To introduce the basic properties of determinants and some of their applications. To show that the notion of a finite-dimensional, real vector space is not as remote as it may have seemed when first introduced . To deal with magnitude and direction in inner product spaces .To study linear transformations. To consider eigenvalues and eigenvectors and solve the diagonalization problem for symmetric matrices

Course Description

System of linear equations: elementary row operations, echelon forms, Gaussian elimination method. Matrices: elementary matrices, invertible matrices. Determinants: adjoint and inverse matrices, Crammer's rule. Vector spaces: linear independents, basis, dimension. Linear mapping. Inner product spaces: Gram-Schmit ortogonalization. Eigenvalues and eigenvectors, Cayley-Hamilton theorem, diagonalization.

BME202Biomaterials4 Credits

Objectives of the Course:

On completion of this course you should be able to:

1 Develop a thorough understanding on biomaterials and biocompatibility.

2 Develop a thorough understanding ability to characterize biomaterials in terms of physical chemical properties,

3 Develop a thorough understanding on the characterization of biomaterials on their electrical, optical, X-Ray adsorption, acoustic and Ultrasonic properties.

4 Develop skills to understand how to biometals, biocomposites, biopolymers and bioceramics in biomedical applications.

Course Description

Introduction to biomaterials, Biocompatibility, The structure of solids, Imperfections in crystals, super cooled and network solids, Composite material structure, Characterization of materials, Mechanical thermal properties, Phase diagrams, Strengthening by Heat Treatments, Surface properties and adhesion, Electrical, optical, X-Ray Absorption, Acoustic and ultrasonic characterization of materials, metallic implant, Ceramic implant, Polymeric implant and composite materials. The course emphasizes the fundamental properties of biomaterials.

BME 210Anatomy & Physiology 4 Credits
Objectives of the Course:
At the end of the course the student should be able to,

- Understand nomenclature of clinical medicine and biological sciences Able to understand basic concepts of anatomy, function, organelles
- Able to understand histology, composition and function of the 4 types of tissues.
- Able to understand micro-anatomy and physiology at the introductory level.
- Able to understand neural and peripheral nervous system
- Able to understand cardiovascular system.
- Able to understand renal and respiratory Systems

Course Description
Introduction to the subject of human anatomy and physiology. The neurological system, the cardiovascular system, calculations related to the cardiovascular system, the respiratory system, calculations related to the respiratory system, the urinary system, calculations related to the urinary system, mechanisms of physiologic control, the digestive system.

BME200 Internship I Noncredit
The minimum time for this practice in an organization is four weeks (30 working days). The main objective is to observe a company in an original setting and answer questions on the fundamental areas of Computer Engineering and Information Science. A written report summarizing the training experience is required.

MTH 201 Differential Equations 4 Credits
Objectives of the Course:
Introducing first, second and higher order differential equations, and the methods of solving these equations.
Emphasizing the important of differential equations and its engineering application. Introducing the Laplace transform and its applications in solving differential equations and other engineering applications.Introducing the series method in solving differential equations.
Course Description
Ordinary and partial differential equations. Explicit solutions, Implicit Solution. First-order differential equations, separable, homogenous differential equations, exact differential equations. Ordinary linear differential equations. Bernoulli differential equations. Cauchy-differential equations. High-order ordinary differential equations. Introduction to Laplace transforms. Introduction to series method for solving differential equations

ECC 204 Electrical Circuits 4 Credits
Objectives of the Course:
Conceptual overview of law and methods in engineering. Teaching Methods of Circuit theory.
Teaching Power in circuits
Course Description
This course is designed for provide an understanding of the fundamentals and analysis of electric circuits. The course encompasses the fundamental concepts of electric circuits, such as Ohm's and Kirchhoff's laws. It develops into the circuit analysis techniques such as nodal and mesh analyses and

the equivalent circuits. Energy storage elements and first order transient circuits are included in the course. The course also covers the analysis of sinusoidal circuits, including the power calculation. Prerequisite: PHY 102

ECC 205 Basic Electronics 4 Credits

Objectives of the Course:

To provide a general background of semiconductors to the students. To provide physical and electrical properties of basic electronic devices; diodes, transistors, operational amplifiers. To provide the analysis of basic diode, transistor and operational amplifier circuits

Course Description

Semiconductors. The P-N junction diode, equivalent models, diode circuits, switching, rectification, DC power supplies, Zener diodes. The bipolar junction transistor, large-signal model. DC transistor circuit analysis, biasing. Common-emitter, common-collector and common-base configurations. JFET operation and biasing.

Prerequisite: EE 207

ENG 201 English Communication Skills 3 Credits

Objectives of the Course:

Reading: to develop the skill of reading for information from a wide variety of authentic Engineering texts. These include longer specialist reading texts to provide challenging reading for students already proficient in this field, and gain the ability to read and understand vacancy announcements and write an appropriate cover letter/letter of intent, CV to deliver a academic presentation in English.

Speaking: to develop the ability to participate in exchanges of information and opinions in the context of IT and Engineering, provide explanations of features of Mechanical, Computer, Electronics, Biomedical, Food and Automotive Engineering. To develop communication skills for the job market which is becoming increasingly common to have give presentation in English.

Writing: to write instructions, descriptions and explanations about topics in Engineering. Write a cover letter and interview winning C.V.

Language :to consolidate and extend the student's understanding and use of structures and function common to Engineering at intermediate and advanced levels. Through the chosen texts they can learn also the vocabulary and expression that need when giving oral presentation. Giving a presentation in a foreign language is real challenge, even for those who have a good knowledge of the language.

Course Description

To reinforces and consolidates the language and 4 skills that students have learned from earlier courses, as well as developing their level of knowledge, communicative capacity, and ability to analyse and reflect on language. Course on upper -intermediate AND ADVANCED levels include interesting and up-to-date topics, encouraging students to recognize the importance of acquiring a foreign language in a modern context, prepare them to for their future professional life. Prerequisite: ENG 102

BME 301 Biomedical Sensors4 Credits

Objectives of the Course:

By the end of this course, students should be able to,

- Develop a thorough understanding on basics of biomedical sensors and biomedical transducers
- Develop a thorough understanding on basics ofdata acquisition
- Develop a thorough understanding on basics of sensor characteristics and sensor design.
- Identify the different types of biopotential sensors.
- Identifythedifferenttypes of opticalsensors
- Discuss the operating principle, calibration, parameters and applications of all types of biomedical sensors.

Course Description

This course is designed for biomedical engineering undergraduate students. The purpose of this course is provide biomedical sensors background on technical aspects.

1. The goal of the course is to provide students with an in-depth knowledge and understanding of the principles of biomedical sensors with a particular emphasis on solving design problems involving commonly encountered in biomedical electronics.

2. The specific course objectives are to review the fundamentals of biomedical sensor design, to expose to students to problem-oriented design, to expose the students to problems particular to biomedical applications, to integrate the physiological concepts with sensor design and to prepare the students for solving design problems in any area of biomedical engineering.

BME310 Biomedical Electronics 4 Credits
Objectives of the Course:

- The goal of the course is to provide students with an in-depth knowledge and understanding of the principles of electronic circuits with a particular emphasis on solving design problems involving commonly encountered in biomedical electronics.
- The specific course objectives are to review the fundamentals of electronic circuit design, to expose to students to problem-oriented design, to expose the students to problems particular to biomedical electronics circuits, to integrate the physiological concepts with electronic design and to prepare the students for solving design problems in any area of biomedical engineering.

Course Description
This course is designed for biomedical engineering undergraduate students. The purpose of this course is provide biomedical instrumentation background on technical aspects that encompasses working principles of electronic components.

ECC001 Digital Logic Systems 4 Credits
Objectives of the Course:
To develop a thorough understanding on combinational digital circuit design using logic gates. To develop a thorough understanding on sequential digital circuit design using flip flops. Simplify logic functions using Boolean algebra methods. Simplify logic functions using Karnaugh maps. Design of digital building blocks such as adders, multiplexers and decoders. Analysis of number systems
Course Description
Introduction to number systems and codes. Boolean algebra and logic gates. Simplification of switching functions. Combinational logic. Combinational circuit design with programmable devices. Introduction to sequential devices. Modular sequential logic. Analysis and synthesis of synchronous sequential circuits. Sequential circuits with programmable logic devices. Introduction to microprocessors programming.
Prerequisite: COM 121

BME102Biochemistry for Life Sciences 4 Credits
Objectives of the Course:
The objectives are to develop your knowledge capabilities in chemistry that are particularly relevant to the biologicaland life sciences.
This course contributes to the development of the following program learning outcomes:
1.0 Demonstrate a coherent understanding of science by:
1.1 Demonstrating an understanding of the scientific method and an ability to apply the scientific method in practice.
3.0 Critically analyze and solve scientific problems by:
3.3 Demonstrating the ability to employ and apply appropriate critical and analytical thought in a scientific manner.
4.0 Demonstrate effective communication of science by:
4.2 Demonstrating your ability to write technical and scientific reports.
5.0 Demonstrate accountability for your own learning and scientific workby:
5.3 Demonstrating your ability to work responsibly safely and ethically.

Course Description:
This course is designed for engineering students. Emphasis is placed on the relationship between molecular architecture and the functional properties of biomolecules, and the thermodynamic, unceasing, and self regulating nature of living processes. Students are also provided with overviews of the major physical and chemica ltechniques that engineers have used to explore life at the molecular level.
Prerequisite: BME 104

BME 110 Medical English 3 Credits
Objectives of the Course:
The purpose of this course is to help students become familiar with medical terms that are broadly used in health sciences.
Course Description
This course is designed to help students understand root of Latin and Greek words and their combinations.
Prerequisite: -

BME300 Internship II Noncredit
A minimum of four weeks (30 working days) of training in companies involving observation of the computer system and the software. The main objective is to observe a company in an original setting and answer questions on the fundamental areas of Biomedical Engineering and Life Science. A written report summarizing the training experience is required.

ECC 301 Microprocessors 4 Credits
Objectives of the Course:
Teaching the microprocessor as a programmable digital system element. To illustrate some basic concepts of microprocessors through the use of assembly language programming. To give the principles of hardware design; To provide an understanding of a microprocessor based system as a combination of hardware and software subsystems and their interactions
Course Description
Introduction to microprocessors. Architecture of microprocessors and instruction sets. Interrupts. Memories. Parallel and serial input/output programming. Microprocessor based system design. Microprocessors applications.
Prerequisite: COM 254

BME 350Radiology Physics 3 Credits
Objectives of the Course:
- Understand structure of atom and production of radiation
- Understand principles of imaging techniques such as X-ray imaging, MRI and Ultrasound imaging
- Provide knowledge of Nuclear Medicine and radiation

Course Description
This course covers the essential physics of radiological imaging modalities. The main topics; radiation and the atom, interaction of radiation with matter, X-ray production, X-ray tubes, nuclear magnetic resonance, magnetization properties, characteristics of ultrasound, interactions of ultrasound with matter, radioactivity and nuclear transformation, radionuclide production and radiopharmaceuticals, radiation detection, radiation protection, dosimeter and radiation biology.
Prerequisite: BME 260

BME 303Biomedical Imaging 4 Credits
Objectives of the Course:

The goal of the course is to provide students with an in-depth knowledge and understanding of the principles of biomedical imaging with a particular emphasis on solving design problems involving commonly encountered in biomedical imaging.

The specific course objectives are to review the fundamentals of biomedical imaging devices design, to expose to students to problem-oriented design, to expose the students to problems particular to biomedical applications, to integrate the physiological concepts with biomedical device design and to prepare the students for solving design problems in any area of biomedical engineering.

Course Description

This course is designed for biomedical engineering undergraduate students. The purpose of this course is provide biomedical imaging background on technical aspects**.**

Prerequisite:-

BME312Biomedical Instrumentations II4 Credits

Objectives of the Course:

1. Develop a thorough understanding on basics of some electrochemical properties of human body
2. Develop a thorough understanding on basics of some biomedical measurements
3. Develop a thorough understanding on basics of some biomedical instrumentation design logic
4. Develop a thorough understanding on basics of clinical applications of some biomedical instrumentation devices.

Course Description

This course is designed for biomedical engineering undergraduate students. The purpose of this course is provide biomedical instrumentation background on technical aspects.

Prerequisite: BME311

BME435 Bioinformatics 3 Credits

Objectives of the Course:

The purpose of this course is to help students become familiar with bioinformatics tools and biological data.

Course Description:

This course is designed to help students to understand biological data and their organization, classification by using computer's processing power and algorithms.

Prerequisite: BME250

BME321Artificial Organs 4 Credits

Objectives of the Course:

The objectives are to develop your knowledge capabilities in artificial organs that are particularly relevant to the biomedical sciences.

This course contributes to the development of the following program learning outcomes:

1.0 Demonstrate a coherent understanding of science by:

1.1 Demonstrating an understanding of the scientific method and an ability to apply the scientific method in practice.

3.0 Critically analyze and solve scientific problems by:

3.3 Demonstrating the ability to employ and apply appropriate critical and analyticalt hought in a scientific manner.

4.0 Demonstrate effective communication of scienceby:

4.2 Demonstrating your ability to write technical and scientific reports.

5.0 Demonstrate accountability for your own learning and scientific work by:

5.3 Demonstrating your ability to work responsibly safely and ethically.

Course Description
The important goal of this course is to thought technologies that will maintain, improve or even restore the function of diseased organs. The growing need for these technologies is substantial. Improved healthcare has resulted in an increased life spanforthe general population and when coupled with a growing shortage of donor organs, makes it clear that organ assistance and substitution devices will play a larger role in managing patients with end-stage disease by providing a bridge to recovery or transplantation.
Prerequisite: BME 202

BME401Instrumental Analysis 3 Credits
Objectives of the Course:
The objectives are to develop your knowledge capabilities in artificial organs that are particularly relevant to the biomedical sciences.

This course contributes to the development of the following program learning outcomes:

1.0 Demonstrate a coherent understanding of science by:
1.1 Demonstrating an understanding of the scientific method and an ability to apply the scientific method in practice.
3.0 Critically analyze and solve scientific problems by:
3.3 Demonstrating the ability to employ and apply appropriate critical and analytical thought in a scientific manner.
4.0 Demonstrate effective communication of science by:
4.2 Demonstrating your ability to write technical and scientific reports.
5.0 Demonstrate accountability for your own learning and scientific work by:
5.3 Demonstrating your ability to work responsibly safely and ethically.

Course Description
This course is designed to give students practical experience using modern analytical instrumentation and to provide students with the background theory and principles of operation.
Prerequisite: -

BME 320 Biomechanics 3 Credits
Objectives of the Course:
This course aims to understand the importance of biomechanics and to understand the importance of developing different systems and apply them to different systems.
To provide a student with the necessary tools for the critical evaluation of existing and future programming languages. To investigate the imperative and declarative paradigms and languages. To teach the concepts and principles of constructions of different programming languages. To assess of a programming language as a tool for software construction, enable a student to evaluate and choose a language to match the problem. To study a declarative paradigm by teaching fundamentals of Lisp programming language

Course Description
This course is an undergraduate level biomechanics course, which emphasizes as a basis for understanding biomechanics and their applications. The course focuses on a important role of biomechanics in diverse areas of growth, development, tissue remodelling and homeostasis. Topics include cellular biomechanics, hemodynamics, the circulatory system, the interstitium, ocular biomechanics, the respiratory system, muscles and movement and skeletal biomechanics. This course covers the fundamental concepts of biomechanics (biology, fluid mechanics, thermodynamics, anatomy or physiology) behind the design of real biomedical problems with biomechanical concepts.
Prerequisite: BME202

BME 311 Biomedical Instrumentations I4 Credits

Objectives of the Course:

1.The goal of the course is to provide students with an in-depth knowledge and understanding of the principles of biomedical instrumentation with a particular emphasis on solving design problems involving commonly encountered in biomedical instrumentation.

2. The specific course objectives are to review the fundamentals of biomedical instrumentation design, to expose to students to problem-oriented design, to expose the students to problems particular to biomedical applications, to integrate the physiological concepts with biomedical device design and to prepare the students for solving design problems in any area of biomedical engineering.

Course Description

This course is designed for biomedical engineering undergraduate students. The purpose of this course is provide biomedical instrumentation background on technical aspects.

Prerequisite: -

ECC008 Signals and Systems 4 Credits

Objectives of the Course:

Teaching the basic of Signals and Systems. To understand mathematical descriptions and representations of continuous and discreet time signals and systems.To develop input-output relationships for Linear Time Invariant Systems (LTIS). To understand the impulse response of a system and the convolution operator.To teach analysis of the signals in time domain, z domain and frequency domain. To teach Fourier and Laplace Transform analysis for continuous-time LTIS. To teach z-Transform analysis for discrete time systems. To understand sampling theory; To teach the basic of filtering, the basic of feedback concepts. To provide a modeling of the systems in time domain, z domain and frequency domain using software programs

Course Description

Properties of continuous and discrete-time signals and systems. Basic signal modifications. Memory, causal, stable, linear and time-invariant systems. Stochastic processes and noise. Impulse response, transfer function. Convolution. Fourier series and transforms. Laplace transform. Sampling and modulation. Interpolation methods. Filtering. Sampling. Analysis of discrete time systems. Time domain analysis. Difference equation models. Frequency domain analysis. Orthogonal expansion of signals. Z domain analysis, Z- transform. Mapping s-plane into z-plane. Inverse Z-transform. Properties of z transform. Z plane. Discrete time LTI system .Frequency domain analysis. Discrete and fast Fourier transforms. Filtering. Digital filters.

Prerequisite: MAT201

BME250Biotatistics 3 Credits

Objectives of the Course:

Understanding the concept of data analysis. Understanding the concept of probability and the concept of random variables. Understanding the difference between discrete and continuous random variables. Understanding the concepts of expectation, variance and standard deviation. Understanding the concepts of probability mass functions and cumulative distribution function for discrete, continuous and joint distributions. Understanding and learning the different types of discrete and continuous distributions.

Course Description

Definition of probability. Sample space and events. Permutations and combinations. Conditional probability and Bayers theorem. Random variables. Discrete and continuous distrubutions. Moment generating function. Expectation, variance, covariance and correlation. Condition densities and regression and transformation of variables. Descriptive statistics.

Prerequisite: MAT 102

BME340 Modellingof Complex Biological Systems 3 Credits

Objectives of the Course:

The objective of this course is to introduce students the concepts of mathematicalmodeling and analysis of biological systems using both computer simulation and mathematical techniques.

Course Description

This course introduces the current approaches for mathematical modeling and analysis of biological systems using both computer simulation and mathematical techniques. The course reviews the basics of modeling methodology, stochastic and deterministic models, numerical and analytical methods, and model validation. Examples throughout the course are drawn from, biochemical networks, Biochemical Kinetics, Metabolic Networks,Gene Regulatory Networks, and Electrophysiology. Prerequisite: BME250

BME 400Graduation Projects I3 Credits

Objectives of the Course:

The purpose of the Graduation Projects I is to assure/ascertain that the students have acquired the skills, knowledge and concepts necessary to perform well when they leave the university. Each student will use educational tools to broaden his/her knowledge about a particular, self-selected topic. Students are also expected to show how proficient they are in solving real world problems with certain constraints for the outcome-based evaluation by the review board. Students are expected to show their abilities on designing, developing, orally presenting and documenting a project.

Course Description

Graduation project leading to B.S. degree, arranged between a student and the faculty member. Analysis, requirement specification and design phases of a computer system. Issues related to project design and presentation. Engineering ethics. Projects will be inspired from real life biomedical problems and students are expected to come up with a professional quality design solution by applying life sciences and biomedical engineering methods. At the end of the semester, the students are expected to complete the requirement specification, analysis and design phases of a reallife computer engineering problem as a team and present their work. They are expected to get familiar to ethical problems of the profession.

BME402 Graduation Projects II 3 Credits

Course description:

Continuation of their research that start in BME 400 course. Application of new scientific methods for solving different engineering problems and their modelling, development different software packages, analysis, design a prototype and investigation of new research areas in computer engineering fields. Students prepare (write) the graduation project.

Course Description

Continuation of their research that start in BME400 course. Application of new scientific methods for solving different engineering problems and their modelling, development different software packages, analysis and investigation of new research areas in computer engineering fields. Students prepare (write) the graduation project.

ECC301 Microprocessor Systems 4 Credits

Objectives of the Course:

Teaching the microprocessor systems architectures, instruction set, addressing modes. To use of assembly language programming for Input/output devices, processing and interfacing. To give the principles of hardware design. To provide an understanding of a microprocessor system as a combination of hardware and software subsystems and their interactions

Course Description

Microprocessor architecture, The Intel x86 family architecture. The Intel 80386 microprocessor: Addressing and memory, segmentation, and protection mechanisms. Tasking, virtual memory, and exceptions. I/O programming, . Memory paging mechanism, Special instructions of 80386 and 80486,

Pentium, Architectural features, data acquisition systems. Advanced CISC and RISC microprocessors. Microcontrollers. Microcontroller program development. Using microcontrollers in embedded applications.
Prerequisite: ECC001

COM 420 Neural Networks 3 Credits
Objectives of the Course:
Teaching the basics of neural networks. To illustrate the basic applications of neural networks using Matlab. To give the principles of neural networks approaches
Course Description
The Neural network paradigm and fundamentals. Training by error minimization. Back propagation algorithms. Feedback and recurrent networks. Hopfield network, Genetic algorithms. Probability and neural networks. Optimizations and constraint.

ECC 431 Economics for Engineers 3 Credits
Objectives of the Course:
Discuss principles and economic analysis of decision making. Discuss cost concepts, make-versus-purchase studies; Analyze principles of money-time relationships. Work on cash flow analysis. Analyze application of money-time relations. Analyze supply and demand relations. Analyze price and demand relations.Analyze breakeven point analysis and effects of inflation on money-time relationships
Course Description
Principles and economic analysis of engineering decision making. Cost concept. Economic environment. Price and demand relations. Competition. Make-versus-purchase studies. Principles and applications of money-time relations. Depreciation. Many and banking. Price changes and inflation. Business and company finance.

COM 451 Introduction to Artificial Intelligence 3 Credits
Objectives of the Course:
To familiarize students with Artificial Intelligence techniques for building well-engineered and efficient intelligent systems. To have a basic understanding of some of the more advanced topics of AI such as learning, natural language processing. To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs. To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. Artificial Intelligence Programming using Prolog and VPX will be provided to help students with the programming part of the course.
Course Description
Problem solving methods, heuristic search, game-playing, knowledge acquisition, knowledge representation, logical inference, planning, reasoning under uncertainty, decision theory, expert systems and application, Prolog/LISP programming, learning, perception, and natural language understanding

16. Sample copy of diploma supplement

At the end of program the diploma supplement which is given to all graduates of our university free of charge. It ıs arranged in English.

The diploma supplement is a document the purpose of which is to provide sufficient independent data to improve the international “transparency” and fair academic and professional recognition of qualifications (diplomas, degrees, certificates, etc.). It is designed to provide a description of the nature, level, context,

content and the status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgments, equivalence statements or suggestions about recognition

DIPLOMA SUPPLEMENT

This Diploma Supplement model was developed by the European Commission, Council of Europe and UNESCO/CEPES. The purpose of the supplement is to provide sufficient independent data to improve the international 'transparency' and fair academic and professional recognition of qualifications (diplomas, degrees, certificates etc.). It is designed to provide a description of the nature, level, context, content and status of the studies that were pursued and successfully completed by the individual named on the original qualification to which this supplement is appended. It should be free from any value judgements, equivalence statements or suggestions about recognition. Information in all eight sections should be provided. Where information is not provided, an explanation should give the reason why.

1. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

1.1. Family name(s)
1.2. Given name(s)

1.3. Place and date of birth:
1.4. Student identification number:

2. INFORMATION IDENTIFYING THE QUALIFICATION

2.1. Name of the qualification and (if applicable) the title conferred
Biyomedikal Mühendisi Biomedical Engineering

2.2. Main field(s) of study for qualification
BIOMEDICAL ENGINEERING

2.3. Name and status of awarding institution
YAKIN DOĞU ÜNİVERSİTESİ, ÖZEL ÜNİVERSİTE
NEAR EASTUNIVERSITY, PRIVATE UNIVERSITY

2.4. Name and type of institution administering studies
SAME AS 2.3.

2.5. Language(s) of instruction/examinations
ENGLISH

3. INFORMATION ON THE LEVEL OF THE QUALIFICATION

3.1. Level of qualification
First Cycle

3.2. Official length of program
Normally 5 Years (excluding 1 year English Preparatory School, if necessary), 2 semesters per year, 14 weeks per semester.
8 SEMESTERS, 264 ECTS (European Credit Transfer System)
A full academic year is equivalent to ECTS (> = 60) units and each semester to ECTS (> = 30),(1 ECTS = 30 hours). Each course is credited with a number of ECTS (>=2) according to the student's workload (contact hours, laboratory work, examination, self-study, presentation etc.) and accumulation of credits (ECTS) is accomplished after successful completion of the course.

3.3. *Access requirement(s)*
High school diploma
Placement through a centralized national university placement examination
NEU Private Examination

4. INFORMATION ON THE CONTENTS AND RESULTS GAINED

4.1. Program requirements
The Bachelor of Science degree is awarded to students who have successfully completed all courses in the curriculum, including
60 working days summer practice and have obtained cumulative grade point average (CGPA) value at least 2.00 on a 4.00 scale and have no failing grades. The objectives are to provide the fundamentals of contemporary biomedical engineering education and to supply an overall and comprehensive outlook on biomedical engineering profession. It is also aimed to provide the graduates with the abilities to adapt to the technological improvements in the field, with the verbal and written communication skills and also with the knowledge on ethical issues of the profession.

4.2 Learning Outcome of the program
Upon completion of BSc. In Biomedical Engineering, students will demonstrate the ability to:

1- Apply knowledge of Mathematics, Natural Science and Engineering with relevance to Life Science and multidisciplinary context of Engineering Science.
2- Analyze, design and conduct experiments, as well as to analyze and interpret.
3- Design system component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4- Function on multidisciplinary teams.
5- Design work by using simulation, modelling and test and integration in a biomedical problem solving oriented way.
6- Display an understanding of professional and ethical responsibility.
7- Communicate effectively aware of non-technical effects of engineering.
8- Search Biomedical related technical literature and other information sources.
9- Recognize of the need for, and an ability to engage in life-long learning.
10- Exhibit a knowledge of contemporary issues.
11- Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.

4.3. Program details and the individual grades/marks/ECTS obtained
Please see the next page

4.4 Mode of Study
.Full-Time

4.4. Grading scheme, grade translation and grade distribution guidance:
For each course taken, the student is assigned one of the following grades by the course teacher.
For BSc in Biomedical Engineering degree, students must obtain at least DD or S from each course and have a CGPA of not less than 2.00 out of 4.00 and have completed all the courses and summer practices in the program. The total credit points for a course are obtained by multiplying the coefficient of the final grade by the credit hours. In order to obtain the GPA for any given semester, the total credit points are divided by the total credit hours. Students who obtain a CGPA of 3.00-3.49 at the end of a semester are considered as "Honor Students" and those who obtain a CGPA of 3.50-4.00 at the end of a semester are considered as "High Honor Students" and this is recorded in their academic report. The letter grades, the quality point equivalents are:

Percentage Course	Coefficient	Grade	Percentage Course	Coefficient	Grade
90-100	4	AA	70-74	2	CC
85-89	3.5	BA	65-69	1.5	DC
80-84	3	BB	60-64	1	DD
75-79	2.5	CB	59 and below	0	FF

I- Incomplete **S**- Satisfactory Completion, **U**-Unsatisfactory, **NA**-Not Attended, **E**-Exempted, **W**– Withdrawn

ECTS grade distribution and grade descriptors:

NEU Grade	ECTS Grade	Percentage of successful students normally achieving the grade	Definition
AA	A	Best 5%	Excellent - outstanding performance with only minor errors
BA	B	Next 5 %	Very Good - above the average standard but with some errors
BB	B	Next 10 %	Very Good - above the average standard but with some errors
CB	C	Next 15 %	Good - generally sound work with a number of erros.
CC	C	Next 25 %	Good - generally sound work with a number of errors.
DC	D	Next 25 %	Satisfactory - fair but with significant shortcomings.
DD	E	Next 15 %	Sufficient - performance meets the minimum criteria.
FD	FX		Fail - some more work required before the credit can be awarded.
FF	F		Fail - considerable work is required.

4.5 Overall Classification of the Qualification: CGPA: **2,80 (> =)** /4.00 **Final Grade of the Degree: 2,07**

5. INFORMATION ON THE FUNCTION OF THE QUALIFICATION

5.1. Access to further study
May apply to second cycle programs.

5.2. Professional status conferred
This degree enables the holder to exercise the profession.

6. ADDITIONAL INFORMATION

6. 1. Additional information
To be eligible for an BSc. (Bachelor of Science) degree at Near East University Faculty of Engineering, all summer practices should be successfully completed. These practices are:
BME200 Internship I (ECTS = 10)
BME300 Internship II. (ECTS = 10)

6.2. Further Information Sources
Department web sitehttps://neu.edu.tr/academic/faculties/faculty-of-engineering/departments/department-of-biomedical-engineering/
University web site https://neu.edu.tr/
The Council of Higher Education of Turkey
http://www.yok.gov.tr
Higher Education Planning, Evaluation Accreditation and Coordination of North Cyprus Council Web site
http://www.ncyodak.eu/

Diploma No: 38888 Diploma Date: 15.01.2018

Near East Boulevard, Nicosia – North Cyprus+90 392 680 2000

4.3. Program details and the individual grade/marks obtained:

1 (1th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
BME104	CHEMISTRY FOR BIOLOGICAL SCIENCES	4	6	Compulsory	
MTH101	Calculus I	4	6	Compulsory	
PHY101	General Physics I	4	6	Compulsory	
BIOE101	Intr. To Biomedical Engineering	3	5	Compulsory	
ENG101	English I	3	5	Compulsory	
TUR100	Turkish for Foreners	0	2	Compulsory	
AIT101	Atatürk İlke ve İnkılap Tarihi	0	2	Compulsory	
		18	27		

2 (2th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
ENG102	English II	3	5	Compulsory	
MTH102	Calculus II	4	6	Compulsory	
MTH113	Linear Algebra	3	6	Compulsory	
PHY102	General Physics II	4	6	Compulsory	
BME102	Biochemistry			Compulsory	
BME110	Medical English			Compulsory	
		21	33		

3 (3th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
BME202	Biomaterials	4	6	Compulsory	

4 (4nd Semester)

Course Code	Course Name	CR	ECTS	Status	Grade
BME210	Anatomy & Physiology	4	6	Compulsory	

MAT201	Differential Equations	4	6	Compulsory			ECC205	Basic Electronics	4	6	Compulsory	
ECC204	Electrical Circuits	4	6	Compulsory			BME250	Biostatistics	3	5	Compulsory	
ENG210	English Communication Skills	3	5	Compulsory			COM211	Digital Logic Processes	4	6	Compulsory	
ECC106	Intro. To Programming	4	6	Compulsory			BME260	Electromagnetic Theories	3	5	Compulsory	
NTE	Non-Technical Electice	3	5	Elective			NTE	Non-Technical Electice	3	5	Elective	
							BME200	Intership I	0	12	Compulsory	
		22	34						20	44		

5 (5th Semester) 6 (6th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade		Course Code	Course Name	CR	ECTS	Status	Grade
BME311	Biomedical Instrumentation I	4	6	Compulsory			BME340	Modelling of Biological System	3	5	Compulsory	
BME301	Biomedical Sensors	4	6	Compulsory			BME303	Biomedical Imaging	4	6	Compulsory	
BME310	Biomedical Electronics	4	6	Compulsory			BME350	Radiology Physics	3	5	Compulsory	
BME320	Biomechanics	3	5	Compulsory			BME321	Artificial Organs	3	5	Compulsory	
ECC008	Signals and Systems	4	6	Compulsory			BME312	Biomedical Instrumentation II	4	6	Compulsory	
ECC301	Microprocessors	4	6	Compulsory			BME300	Intership II	0	12	Compulsory	
		23	35						16	38		

7 (7th Semester) 8 (8th Semester)

Course Code	Course Name	CR	ECTS	Status	Grade		Course Code	Course Name	CR	ECTS	Status	Grade
BME401	Instrumental Analysis	3	5	Compulsory			BME402	Graduation Project II	3	12	Compulsory	
BME400	Graduation Project I	3	12	Compulsory			BME435	Bioinformatics	3	5	Compulsory	
BME452	Biomedical Signal Processing	3	5	Compulsory			TE	Technical Elective	3	5	T.Elective	
TE	Technical Elective	3	5	T.Elective			TE	Technical Elective	3	5	T.Elective	
TE	Technical Elective	3	5	T.Elective			TE	Technical Elective	3	5	T.Elective	
		16	33						15	32		

TOTALLOCALCREDITS: 153 - ECTS: 281, CGPA: 2.00

7. CERTIFICATION OF THE SUPPLEMENT

7.1. Date :

7.2. Name and Signature : Ümit Serdaroğlu

7.3. Capacity : Registrar

7.4. Official stamp or seal :

8. INFORMATION ON THE NATIONAL HIGHER EDUCATION SYSTEM

The basic structure of the North Cyprus Education System consists of four main stages as pre-school education, primary education, secondary education and higher education.

Pre-school education consists of non-compulsory programs whereas primary education is a compulsory 8 year program for all children beginning from the age of 6. The secondary education system includes “GeneralHigh Schools” and “Vocational and TechnicalHigh Schools”.

The Higher Education System in North Cyprus is regulated by the Higher Education Planning, Evaluation, Accreditationand Coordination Council (YükseköğretimPlanlama,Denetleme,AkreditasyonveKoordinasyonKurulu – YÖDAK). Established in 1988, the

Council regulates the activities of higher education institutions with respect to research, governing, planning and organization. The higher education institutions are established within the framework of the Higher Education Law. All programs of higher education should be accredited by YÖDAK.

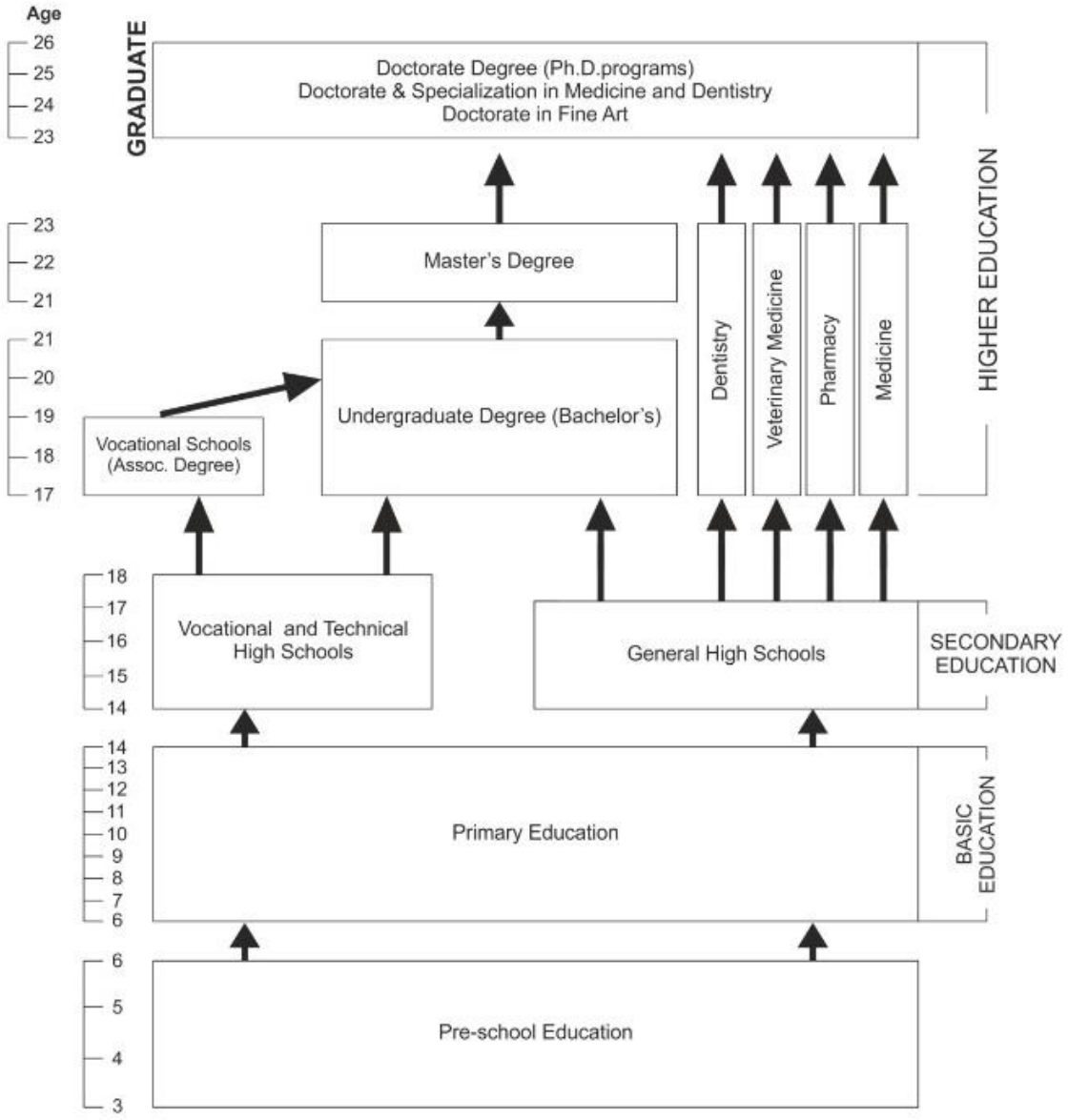
Higher education in North Cyprus comprises all post-secondary higher education programs, consisting of short, first, second, and third cycle degrees in terms of terminology of the Bologna Process. The structure of North Cyprus higher education degrees is based on a two-tier system, except for dentistry, pharmacy, medicine and veterinary medicine programs which have a one-tier system. The duration of these one-tier programs is five years except for medicine which lasts six years. The qualifications in these one-tier programs are equivalent to the first cycle (bachelor degree) plus secondary cycle (master degree) degree. Undergraduate level of study consists of short cycle (associate degree) - (önlisans derecesi) and first cycle (bachelor degree) - (lisans derecesi) degrees which are awarded after the successful completion of full-time two-year and four-year study programs, respectively.

Graduate level of study consists of second cycle (master degree) – (yüksek lisans derecesi) and third cycle (doctorate) – (doktora derecesi) degree programs. Second cycle is divided into two sub-types named as master without thesis and master with thesis. Master programs without thesis consists of courses and semester project. The master programs with a thesis consist of courses, a seminar, and a thesis. Third cycle (doctorate) degree programs consist of completion of courses, passing a qualifying examination and a doctoral thesis. Specializations in dentistry, accepted as equivalent to third cycle programs are carried out within the faculties of dentistry. Specialization in medicine, accepted as equivalent to third cycle programs are carried out within the faculties of medicine, and university hospitals and training hospitals operated by the Ministry of Health.

Universities consist of graduate schools (institutes) offering second cycle (master degree) and third cycle (doctorate) degree programs, faculties offering first cycle (bachelor degree) programs, four-year higher schools offering first cycle (bachelor degree) degree programs with a vocational emphasis and two-year vocational schools offering short cycle (associate degree) degree programs of strictly vocational nature.

Second cycle degree holders may apply to third cycle programs if their performance at the first cycle degree level is exceptionally high and their national central Graduate Education Entrance Examination (ALES) score is also high and their application is approved. The doctoral degree is conferred subject to at least one publication in a cited and refereed journal.

GENERAL STRUCTURE OF THE NORTH CYPRUS EDUCATION SYSTEM



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