Program Records

About the Program	Bioengineering is an interdisciplinary field that aims to understand, modify or control medical systems by integrating material sciences and engineering. It fabricates the devices that help diagnose and treat diseases and designs the products that provide the traceability of physiological functions. In other words, bioengineering applies basic science and engineering principles into life and living systems through laboratories and aims to perform research that helps to elongate human lifetime and improves life quality. Bioengineering focuses on different fields such as biomedical computing and screening, biomedical device technology, and regenerative medicine. It works on bioinspired materials, organ and tissue substitutes, smart drug delivery systems, sensor-chip systems for disease diagnosis and treatment, devices designed to monitor diseases, and other assisted biomedical materials. It also comprises biosynthesis of animal and plant products, cellular and molecular engineering, recombinant DNA technology, improvement and control of the foods, and new biotechnological products with high added value such as GMO.
Program Objectives	Bioengineering graduates will be able to 1. provide original and innovative solutions to local and global problems through interdisciplinary education and perspective gained by integration of medicine and basic sciences to engineering 2. take part in research and development projects in national and international organizations 3. undertake the design, production, and control of the products as a researcher and entrepreneur
Qualification Awarded	Bachelor's Degree
Length of Program & Credits	4 years (excluding one year of English Preparatory Program) 240 ECTS
Level of Qualification	First Cycle (Bachelor's) Degree; EQF-LLL Level 6, QF-EHEA Level 1
Mode of Study	Full Time
Field of Study	Bioengineering
Admission Requirements	High school graduation certificate; Placed by National Higher Education Exam (YKS) scores; Proof of English proficiency (TOEFL or Abdullah Gül University English Proficiency Exam) For foreign students: admission requirements announced by the university
Recognition of Credit Mobility	Courses taken from another program can be transferred based on Abdullah Gul University Undergraduate Education and Exam Regulation by the respective administrative board.
Graduation Requirements & Regulations	a) All courses in the curriculum must be completed with a minimum grade of D or S. b) Student has to complete all courses in the program curriculum with a minimum GPA of 2.00. c) At least half of the total credit of the curriculum must be taken in AGÜ except for the international joint degree programs conducted with the contracted higher education institutions abroad. d) Except for international exchange programs conducted with contracted higher education institutions abroad and partnering international undergraduate degree programs, the last two semesters must be completed at AGÜ.
Occupational Profiles of Graduates	Bioengineers can be employed in the industrial fields such as health care, medical devices, and drug research in different departments such as research

	and development, quality control and marketing besides academic career in universities.
Access to Further Studies	Graduates may apply to second cycle (Level 7 or Level 8) degree programs.
Assessment & Grading Policy	Based on Abdullah Gul University Undergraduate Education and Examination Regulation rules;

Letter Grade	Coefficient	Score	Status	Letter Grade	Status
A	4.00	90-100	Pass	NA	Not Attended
A-	3,67	87-89	Pass	W	Withdrawn
B+	3,33	83-86	Pass	I	Incomplete
B	3,00	80-82	Pass	T	Transferred
B-	2,67	77-79	Pass	S	Satisfactory
C+	2,33	73-76	Pass	U	Unsatisfactory
C	2,00	70-72	Pass	P	In Progress
C-	1,67	64-69	Conditional Pass	EX	Exempt
D+	1,33	56-63	Conditional Pass		
D	1,00	50-55	Conditional Pass		
F	0,00	0-49	Failed		

Program Outcomes

PO1. Apply knowledge of mathematics, science, and engineering to bioengineering problems.
PO2. Understand scientific and ethical values.
PO3. Identify, formulate, and solve complex and unexpected engineering problems.
PO4. Evaluate the accuracy and relevancy of knowledge and skills acquired; define and assess learning needs; direct learning processes; plan and manage activities required for professional development.
PO5. Ability to share their opinions or solution offers to the problems, supporting these with qualitative and quantitative data.
PO6. Have enough competency in a foreign language to follow the literature in bioengineering and communicate with their peers.
PO7. Ability to use computer software, communication, and information technologies required in bioengineering competently.
PO8. Ability to work in interdisciplinary subjects; to work in a team or as individuals.
PO9. Have skills to use modern devices required for the practices.
PO10. Awareness of environmental protection and work/laboratory safety.
PO11. Awareness of the universal and social effects of engineering practices on health, environment, and safety.
PO12. Have competency in keeping up with global innovations and developments in bioengineering and related fields and awareness of sustainable development.

TQF-HE & Program Outcomes Coverage

	Competences					
	Knowledge Theoretical Conceptual	**Skills** Cognitive Practical	Work Independently and Take Responsibility	Learning	Communication And Social	Work Independently and Take Responsibility
P01	X		X	X		
PO2					X	
PO3	X		X			
PO4					X	X
PO5	X		X	X	X	
PO6				X		
PO7				X	X	
PO8		X	X			X
PO9	X	X		X		X
PO10					X	
PO11			X		X	
PO12	X	X	X			

Institutional & Program Outcomes Coverage

	IO1	IO2	IO3	IO4	IO5	IO6	IO7
P01	X						
PO2	X	X					
PO3	X				X		
PO4	X				X		X
PO5					X		
PO6						X	
PO7					X		
PO8					X	X	X
PO9			X	X			
PO10			X				X
PO11	X				X		
PO12	X				X		

Curriculum Summary

	Courses	Credit	ECTS
AGU Signature Courses GLB101, GLBXXX	5	15	20
YÖK/HEC Courses ENG101, ENG102, TURK101, TURK102, HIST201, HIST202, OHS401, OHS402	8	19	18
Compulsory XXX	26	89	146
Non-Technical Electives XXX	3	9	10
Technical Electives XXX	8	24	40
Summer Practice XXX	0	0	6
TOTAL	**50**	**156**	**240**

ABDULLAH GÜL UNIVERSITY
Bioengineering Undergraduate Program

1st Year (Freshman Year / FALL Semester)

Course Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
MATH151	Calculus I		5	0	5	6
BENG105	Introduction to Programming		3	2	4	6
BENG102	General Chemistry		3	2	4	5
ENG 101	English I		4	0	4	4
GLB 101	AGU Ways		3	0	3	4
BENG101	Introduction to Bioengineering		2	0	2	2
PHYS101	Physics I		3	2	4	5
	Total Credits					32

1st Year (Freshman Year / SPRING Semester)

Course Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
MATH152	Calculus II	MATH 151	5	0	5	6
GLB XXX	Global Issues Elective I		3	0	3	4
ENG 102	English II		4	0	4	4
BENG104	Principles of Organic Chemistry	BENG 102	4	0	4	4
PHYS102	Physics II		3	2	4	5
BENG103	Biology for Life Sciences		3	0	3	4
CP100.BENG	Career Planning		1	0	1	1
	Total Credits					28

2nd Year (Sophomore Year / FALL Semester)

Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
BENG201	Biochemistry	BENG 103	3	0	3	6
BENG202	Fluid Dynamics in Bioengineering	MATH 152	3	0	3	6
GLB XXX	Global Issues Elective II		3	0	3	4
TURK XXX	Turkish Language Pool		2	0	2	2
BENG203	Thermodynamics for Bioengineers	MATH 152	3	0	3	6
MATH205	Differential Equations	MATH152	4	0	4	5
	Total Credits					29

2nd Year (Sophomore Year / SPRING Semester)

Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
BENG204	Cell and Molecular Biology	BENG103	3	0	3	5
BENG205	Heat and Mass Transfer	MATH 152	3	0	3	5
MBG 210	Sciences and Ethics		2	0	2	4
BENG207	Microbiology		3	0	3	5
BENG216	Bioengineering Laboratory I		1	4	3	6
GLB XXX	Global Issues Elective III		3	0	3	4
TURK XXX	Turkish Language Pool		2	0	2	2
	Total Credits					31

3rd Year (Junior Year / FALL Semester)

Course Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
BENG316	Bioengineering Laboratory II	BENG204 BENG207	1	4	3	7
GLB XXX	Global Issues Elective IV		3	0	3	4
HIST 2XX	History of Turkey Pool		2	0	2	2
BENG303	Bioprocess Engineering		3	0	3	6
BENG309	Genetics		3	0	3	6
	Concentration Area Electives					5
						30

3rd Year (Junior Year / SPRING Semester)

Course Code	Course Name	PreReq	Lec.	Lab	Credits	ECTS
BENG318	Bioengineering Laboratory III		1	4	3	7
HIST 2XX	History of Turkey Pool		2	0	2	2
BENG302	Biomaterials Science		3	0	3	6
BENG319	Biomedical Electronics and Measurement		4	2	5	6
XXX	Nontechnical Elective Course					4
	Concentration Area Electives					5
	Total Credits					30

TRACK SELECTION*

4th Year (Senior Year / FALL Semester)

Course Code	Course Name	PreReq.	Lec.	Lab	Credits	ECTS
BENG491	Capstone Project I**		0	2	1	8
	Concentration Area Elective					5
	Concentration Area Elective					5
	Concentration Area Elective					5
OHS 401	Occupational Health and Safety I		2	0	2	1
BENG493	Summer Internship		0	2	1	6
	Total Credits					30

** 1st and 2nd year core courses must be completed (passed).

4th Year (Senior Year / SPRING Semester)

Course Code	Course Name	PreReq.	Lec.	Lab	Credits	ECTS
BENG492	Capstone Project II***	BENG 491	0	2	1	8
OHS 402	Occupational Health and Safety II		2	0	2	1
	Concentration Area Elective					5
	Concentration Area Elective					5
	Concentration Area Elective					5
XXX	Nontechnical Elective Course					3
XXX	Nontechnical Elective Course					3
	Total Credits					30

*** Capstone Project I should be passed.

***Student will decide tracks and then choose concentration area electives provided for each track.**

Concentration Area Electives*

Bioengineering A: Biomaterials and Tissue Engineering					
Code	Course Name	Lec.	Lab	Credits	ECTS
BENG304	Tissue Engineering	3	0	3	5
BENG426	Polymer Science	3	0	3	5
BENG305	Artificial Organs	3	0	3	5
BENG427	Tissue Biomaterial Interaction	3	0	3	5
BENG429	Controlled Drug Delivery	3	0	3	5
BENG430	Biomedical Polymers	3	0	3	5
BENG431	Nanofabrication	3	0	3	5
BENG432	Tissue Engineering and Regenerative Medicine	3	0	3	5
BENG433	Nanoparticles for Biomedical Applications	3	0	3	5
BENG434	Stem Cell Technology and Regenerative Medicine	3	0	3	5
BENG436	Drug Design and Discovery	3	0	3	5
BENG437	Bioorganic and Medicinal Chemistry	3	0	3	5
BENG438	Introduction to Bionanotechnology	3	0	3	5
Bioengineering B: Genetics and Bioprocess Engineering					
Code	Course Name	Lec.	Lab	Credits	ECTS
BENG 310	Recombinant DNA Technology	3	0	3	5
MBG 402	Computational Biology	3	0	3	5
MBG 403	Human Genetic Disorders	3	0	3	5
MBG 405	Molecular Evolution	3	0	3	5
MBG 406	Molecular Medicine	3	0	3	5
MBG 407	Stem Cells	3	0	3	5
MBG 408	Biomolecules	3	0	3	5
MBG 409	Cancer Biology	3	0	3	5
MBG 410	Micro Array Data Analysis	3	0	3	5
MBG 411	Model Organisms	3	0	3	5
MBG 412	Immunology	3	0	3	5
MBG 413	Biotechnology	3	0	3	5
MBG 414	Biomaterials	3	0	3	5
MBG 415	Cell and Tissue Engineering	3	0	3	5
MBG 416	Developmental Biology	3	0	3	5
MBG 417	Basics of Neuroscience	3	0	3	5
MBG 418	Neural system	3	0	3	5
MBG 419	Functional Genomics	3	0	3	5
MBG 421	RNA Biology	3	0	3	5
MBG 425	Population Genetics	3	0	3	5
MBG 426	Histology of Tumors	3	0	3	5
MBG 428	Epigenetics	3	0	3	5
MBG 430	Virology	3	0	3	5
MBG 431	Human Physiology	3	0	3	5
BENG 435	Separation Techniques	3	0	3	5
MBG 435	Disease and Genetics	3	0	3	5
BENG439	Metabolic Engineering	3	0	3	5
BENG420	Data Mining	3	0	3	5
Bioengineering C: Biomedical Electronics					
Code	Course Name	Lec.	Lab	Credits	ECTS
BENG 306	Bioinstrumentation	3	0	3	5
BENG 307	Biomedical Sensors and Transducers	3	0	3	5

BENG 308	Microprocessors and Microcontrollers in Biomedical Engineering	3	0	3	5
BENG 410	Biomedical Signals and Systems	3	0	3	5
BENG 411	Cardiovascular Engineering	3	0	3	5
BENG 412	Numerical Methods for Biomedical Engineering	3	0	3	5
BENG 413	Neural Engineering	3	0	3	5
BENG 414	Biomechatronics	3	0	3	5
BENG 415	Clinical Engineering	3	0	3	5
BENG 416	Biophotonics	3	0	3	5
BENG 418	Machine Learning	3	0	3	5
BENG 419	Fundamental of BioMEMS	3	0	3	5
BENG 421	Biomedical Image Processing	3	0	3	5
BENG 422	Biomedical Signal Processing	3	0	3	5
OTHER AREA ELECTIVES					
BENG 443	Regulations and IP Rights in Bioengineering	3	0	3	5
BENG 441	Scientific Writing and Understanding	3	0	3	5
BENG 442	Entrepreneurship in Bioengineering	3	0	3	5
XBEN 445	Technical Transfer Elective	3	0	3	5
XBEN 446	Technical Transfer Elective	3	0	3	5
XBEN 447	General Transfer Elective	3	0	3	5
BENX131	Digital Learning Platform Transfer Elective 1	1	0	1	3
BENX132	Digital Learning Platform Transfer Elective 2	1	0	1	3
BENX141	Digital Learning Platform Basic Level Transfer Elective 1	1	0	1	4
BENX142	Digital Learning Platform Basic Level Transfer Elective 2	1	0	1	4
BENX151	Digital Learning Platform Advanced Transfer Elective 1	1	0	1	5
BENX152	Digital Learning Platform Advanced Transfers Elective 2	1	0	1	5

GLB Electives

GLB 102	Innovation and Entrepreneurship	3	0	3	4
GLB 201	Food and Health	3	0	3	4
GLB 202	Immigration and Population	3	0	3	4
GLB 301	Sustainability	3	0	3	4

Non-technical Electives

Teknik olmayan seçmeli dersler	
Ders Kodu	**Ders Adı**
JPN 101	Japanese I
KRN 101	Korean Language I
CHN 101	Chinese I
WTC 101	Weight Training and Conditioning
EDU 101	Creative Drama

ECON 222	Economics for Engineers
ECON 340	Industrial Organization
ECON 341	Turkish Economy
ECON 343	Economy of the Middle East
ECON 349	Introduction to Financial Engineering
ECON 350	Experimental Economics
ECON 417	Institutional Economics
ECON 442	Game Theory
ECON 345	Behavioral Economics
ECON 348	Culture and Economy
ECON 407	Financial Markets and Institutions
BA 430	Tourism Management
BA 432	Modern Banking
BA 434	Decision Making
BA 438	Modern Manufacturing System
BA 125	Business Communications
BA 403	Business Ethics and Corporate Social Responsibility
BA 415	Cost Accounting
BA 433	Supply Chain Management
BA 435	SME Finance
BA 439	Global Marketing
BA 301	Organizational Behaviour
ARCH 112	Media Literacy
ARCH 122	Materials & Behaviors
ARCH 132	Architectural History & Theory 1
ARCH 224	Structures 2
ARCH 232	Architectural History & Theory 3
ARCG 106	Arts & Crafts
ARCG 303	Anatolian Cities in History
ARCG 304	Civilizations & Cities
ARCG 305	Accessible City
ARCD 101	Digital Fabrication
ARCD 102	Site Analysis
ARCG 104	Photography
ARCD 106	Product Design & Fabrication
ARCD 305	Traditional Housing Culture in Anatolia
ARCG 105	Model Making
ARCD 103	Design Methods and Praxis
ARCA 101	Experimental Design Studio
ARCH 512	Fictional Space
ARCH 634	Modern Social Theory
SOC 101	Introduction to Social Science

SOC 402	The City & Literature
POLS 391	Topics in International Relations
PSY 202	Psychology for Everyday Life
SOC 101	Introduction to Social Science
BENG 526	Basic Patent Principles in Science and Engineering
FRE 101	French I
FRE 102	French II
RUS 101	Basic Russian I
ESP 101	Spanish
EDU 201	You are What You Dream of
BA 203	Marketing Management
BA 429	Technology Management
BA 344	Consumer Behavior
BA 346	Basic Principles of Patent Practice
BA 311	Globalization and International Business
ARCD 301	Playing with the Past
ARCG 103	Bicycle and the City
ARCG 112	Applied Fine Arts
ARCG 103	Architectural Image and Materials
ARCH 371	Graphic Design
SOC 373	Health and Politics
POLS 312	History and the Politics of EU
POLS 322	Global Political Economy
POLS 371	International Migration
MSNE 350	Innovation and Technology Commercialization for Entrepreneur Engineers
MSNE 455	Waste Treatment and Recycling
FLE 181	Introduction to Russian Language and Culture

Courses Descriptions

Code	**BENG101**
Name	**Introduction to Bioengineering**
Hour per week	2 (2+0)
Credit	2
ECTS	2
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	-
Content	This course covers the history and basic concepts of bioengineering which integrates biology and medicine into engineering principles. It aims to show different branches of bioengineering generated by its interdisciplinary nature. Topics in this course include the definition and history of bioengineering; biomaterials, tissue engineering, regenerative medicine, biomedical engineering, bioprocess engineering, genetics, drug delivery, nanotechnology, bioinformatics, 3D bioprinting, and artificial organs.

Code	**BENG102**
Name	**General Chemistry**
Hour per week	5 (3 + 2)
Credit	4
ECTS	5
Level/Year	Undergraduate/1
Semester	Fall
Type	Compulsory
Prerequisites	-
Description	This course provides an introduction to the chemistry of biological, inorganic, and organic molecules. The emphasis is on basic principles of atomic and molecular electronic structure, thermodynamics, acid-base and redox equilibria, chemical kinetics, and catalysis.

Code	**BENG103**
Name	**Biology for Life Sciences**
Hour per week	3 (3+0)
Credit	3
ECTS	4
Level/Year	Undergraduate / 1
Semester	Spring
Type	Compulsory
Prerequisites	
Description	In this course, the processes of thermoregulation, osmoregulation and their importance to control the body's temperature and water balance will be covered. The course aims at the process of chemical regulation and its importance in the vertebrate endocrine system with hormones. Topics in this course include introductory information about movement and locomotion and the processes of human reproduction, development and embryonic development, and the nervous system's structure and function, and also the differences between innate and adaptive immune responses.

Code	**BENG 104**
Name	**Principles of Organic Chemistry**
Hour per week	4 (4 + 0)
Credit	4
ECTS	4
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	BENG 102
Description	This organic chemistry course focuses on the understanding to identify the structure of organic molecules and the functional groups, principles of organic stereochemistry, organic reaction mechanisms, and methods used for the synthesis of organic compounds. This course also gives introductory information about synthetic polymers and polymerization techniques.

Code	**BENG105**
Name	**Introduction to programming**
Hour per week	5 (3 + 2)
Credit	4
ECTS	6
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	-
Description	Introduction to Programming course is intended for students with little or no programming experience. The course aims to show students the role computation can play in solving problems. The basic principles of Object- Oriented programming will be introduced via the Python programming language and laboratory exercises in biopython.

Code	**BENG201**
Name	**Biochemistry**
Hour per week	3 (3 + 0)
Credit	3
ECTS	6
Level/Year	Undergraduate/2
Semester	Fall
Type	Compulsory
Prerequisites	BENG103
Description	This course examines the chemical and physical properties of the cell and its building blocks, with special emphasis on the structures of proteins and principles of catalysis, as well as the chemistry of organic / inorganic cofactors required for chemical transformations within the cell. Topics encompass the basic principles of metabolism and regulation in pathways, including glycolysis, gluconeogenesis, fatty acid synthesis / degradation, pentose phosphate pathway, Krebs cycle and oxidative phosphorylation

Code	**BENG202**
Name	**Fluid Mechanics in Bioengineering**
Hour per week	3 (3+0)
Credit	3
ECTS	6
Level/Year	Undergraduate/2
Semester	Fall
Type	Compulsory
Prerequisites	-
Description	This class provides bioengineering students with an introduction to principal concepts and methods of fluid mechanics. Topics covered in the course include properties of fluid, dimensional analysis, pressure, open systems and control volume analysis, mass conservation of mass and energy, momentum balances for moving fluids, laminar and turbulent flows through pipes, friction loss, compressive fluid, transportation and mixing of fluid, pumps and compressors, and flow measurement techniques. Students will work to formulate the models necessary to study, analyse, and design fluid systems through the application of these concepts, and to develop the problem-solving skills essential to good engineering practice of fluid mechanics in practical applications.

Code	**BENG203**
Name	**Thermodynamics for Bioengineers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	6
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	MATH152
Description	This course presents the laws of thermodynamics and their applications to biological systems. Topics cover first, second, and third laws of thermodynamics, open and closed systems, enthalpy and specific heat and Gibbs free energy. It also covers the applications of Gibbs free energy in biological systems such as photosynthesis, ATP hydrolysis, PCR, protein stability and so on.

Code	**BENG204**
Name	**Cell and Molecular Biology**
Hour per week	3 (3 + 0)
Credit	3
ECTS	4
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	
Description	The main purpose of this course is to provide the students an insight into topics relevant to cell and molecular biology. Cells are still in contact with their surroundings, and students can learn how they interact with their surroundings (cell-to-cell communication, chemical signaling, receptors). Cell cycle, transcription, adhesion molecules, translation of proteins and the cytoskeleton will be studied by students. In the lectures, cancer, motor proteins and cell signaling will be discussed.

Code	**BENG205**
Name	**Heat and Mass Transfer**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	MATH152
Description	The course will give an introductory treatment of the governing laws for heat and mass transfer. The following topics are covered: Steady state and transient conduction, fundamentals and engineering treatment of convection heat transfer, heat transfer with phase change (boiling/condensation), radiation heat transfer and heat exchangers. Both analytical and numerical solution methods are presented.

Code	**BENG207**
Name	**Microbiology**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	
Description	This course covers history of microbiology, microscopes, taxonomy and cell culture, energetics and catabolism, energy production, types of microbes, microbial nutrition and growth, control of microbial growth, DNA replication/plasmids, transcription and translation, genetic exchange/mutation, epidemiology and disease transmission, microorganisms and virulence, defenses against disease, and carbon nitrogen cycles.

Code	**BENG216**
Name	**Bioengineering Laboratory I**
Hour per week	5 (1 + 4)
Credit	3
ECTS	6
Level/Year	Undergraduate /2
Semester	Spring
Type	Compulsory
Prerequisites	-
Description	This applied laboratory course covers following practices: 1) Sterilization and aseptic techniques, media preparation and transfer of microorganisms, 2) Gram staining and microscopic observation of microorganisms, 3) Microbial growth and growth curve and microbial cell count, 4) Isolation and preservation of microorganisms from environment..

Code	**BENG 302**
Name	**Biomaterials Science**
Hour per week	3 (3 + 0)
Credit	3
ECTS	6
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	-
Description	This course provides the knowledge of material's use for the health-related purposes. In the content of this course, biomaterial's definition, material types used for biomaterial preparation, techniques for structural and physicochemical characteristics of biomaterials, testing of biocompatibility, wound healing mechanism in the body and applications will be addressed.

Code	**BENG303**
Name	**Bioprocess Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	6
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	
Description	This course integrates several engineering and biological core concepts. Bioprocess engineering applies the engineering principles to biological systems. Topics covered include enzyme kinetics, cell growth and metabolism, fermentation and bioreactor design, downstream processing and integrated bioprocesses important to biotech industries.

Code	**BENG 304**
Name	**Tissue Engineering**
Hour per week	3 (3+0)
Credit	3
ECTS	5
Level/Year	Undergraduate/3
Semester	Fall
Type	Elective
Prerequisites	-
Description	This course integrates the principles and methods of engineering and life sciences toward the fundamental understanding of structure-function relationships in mammalian tissues, especially as they relate to the development of biological substitutes to restore or improve the damaged tissue/organ function. Current concepts and strategies including cell culture techniques, scaffold design, tissue and cell transplantation, artificial organs, and *in vivo* tissue regeneration is introduced, as well as their respective biomedical applications.

Code	**BENG 305**
Name	**Artificial Organs**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course provides the general knowledge of artificial systems used as substitutes or replacements for the organs in the body. It also describes the biomimetics strategy for this purpose. The topics in the course are heart assist devices, artificial liver, dialysis systems, organ tissue engineering, and ethical/economic issues and regulations.

Code	**BENG 306**
Name	**Bioinstrumentation**
Hour per week	3 (3+0)
Credit	3
ECTS	5
Level/Year	Undergraduate / 3
Semester	Fall
Type	Elective
Prerequisites	None
Description	The purpose of the course is to provide biomedical instrumentation background on technical aspects. Biomedical measurement systems are introduced in detail. Students are provided with overviews of the primary physical techniques that engineers have used to explore biomedical engineering levels. This course provides the basic concept of medical instrumentation, basic sensors and principles, amplifiers and signal processing and the origin of biopotentials.

Code	**BENG307**
Name	**Biomedical Sensors and Transducers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	None
Description	In this course, the bio-sensing and biosensors with their application methods and fields will be reviewed. In the first part of the course, receptors and analytes in biosensors: receptor immobilization, specificity, binding constants, kinetics, diffusion will be focused on. This is followed by electrochemical and optical sensors/transducers, optical methods: fluorescence, luminescence, fiber optics, applications of the mass sensitive sensors. The scope of this course includes diagnostics and other biosensor applications based on sensitivity, selectivity and stability characteristics.

Code	**BENG 308**
Name	**Microprocessors and Microcontrollers in Biomedical Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring
Type	Elective
Prerequisites	This course requires basic knowledge of C programming
Description	This course introduces students to embedded system design and programming concepts. The course has lab hours where students have hands on experience on the state-of-the-art ARM Cortex M microcontrollers. The topics include Microcontroller structure (Memory, units, busses), ARM Assembly, I/O, implementations in higher level libraries, Interrupt Controller, Timers, Direct Memory Access, Real Time OS, and Matlab for Embedded systems.

Code	**BENG309**
Name	**Genetics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	6
Level/Year	Undergraduate
Semester	Fall, Spring
Type	Compulsory
Prerequisites	
Description	This course will focus on teaching the structure of DNA, prokaryotic and eukaryotic gene expression, the molecular process of gene expression, genetic regulatory system, Meiosis, mitosis, Mendelian and non-Mendelian genetics, translation and Proteins, Gene Mutation, DND repair and Transposition, Epigenetics, Emerging Roles of RNA and Gene Therapy.

Code	**BENG310**
Name	**Recombinant DNA Technology**
Hour per week	3 (3 + 0)
Credit	3
ECTS	4
Level/Year	Undergraduate
Semester	
Type	Elective
Prerequisites	
Description	The main purpose of this course is to provide the students with an insight into techniques relevant to cell and molecular biology. The course will cover gene primer designing, databases for finding gene and gene sequence, restriction enzymes, gene cloning, transfection/transformation, DNA delivery, Polymerase Chain Reactions, cell culture, and gene editing technologies (CRISPR, TALEN, etc.). Chip-seq, single-cell RNA-sequence. This knowledge enables students to understand the basic principles of techniques used in molecular biology and genetics.

Code	**BENG 316**
Name	**Bioengineering Laboratory II**
Hour per week	5 (1+4)
Credit	3
ECTS	7
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	-
Description	This course focuses on the recombinant production of a bioproduct, in which students will gain hands-on experience in molecular biology and bioprocess engineering. Students will clone a gene of interest using PCR and insert it into an expression system to construct a plasmid. Then, the plasmid will be transformed into host bacteria for the expression and production of the bioproduct. The expression and production will be checked by SDS-PAGE and HPLC, respectively. Finally, students will scale up the production of a bioproduct in the bioreactor.

Code	**BENG 318**
Name	**Bioengineering Laboratory III**
Hour per week	5 (1 + 4)
Credit	3
ECTS	7
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	-
Description	This course focuses on the applications of the three tracks (biomedical electronics, genetics&bioprocessing, biomaterials&tissue engineering) within the curriculum.

Code	**BENG319**
Name	**Biomedical Electronics and Measurement**
Hour per week	6 (4 + 2)
Credit	5
ECTS	6
Level/Year	Undergraduate/3
Semester	Spring
Type	Compulsory
Prerequisites	-
Description	This course introduces the fundamentals of Biomedical Electronics. It consists two main parts: Electric Circuits and Electronic Devices. In Electric Circuits part, DC circuits will be covered. In Electronic Devices part; Semiconductor Diodes, Diode Applications, Bipolar Junction Transistors (BJT) and DC Biasing of BJTs topics will be covered.

Code	**BENG410**
Name	**Biomedical Signals and Systems**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall
Type	Elective
Prerequisites	None
Description	This course provides the knowledge of the origins of bioelectric signals, biomedical signal types, and their properties. In the content of this course, artifact removal from biomedical signals: Filtering and time and frequency domain filters, information extraction from the morphology of biomedical signals and frequency characterization of biomedical signals.

Code	**BENG411**
Name	**Cardiovascular Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course provides the knowledge of the molecular basis of cardiovascular development, performance, and pathogenesis. In the content of this course, engineering analysis of cardiovascular functions; and fundamentals of cardiovascular engineering and regeneration.

Code	**BENG412**
Name	**Numerical Methods for Biomedical Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course provides the knowledge of material's use for the health-related purposes. In the content of this course, solutions of system of linear equations, iterative methods, interpolation, cubic splines, numerical differentiation, numerical integration, numerical solution of nonlinear equations, initial value problems, numerical solution of ordinary differential equations, finite difference method, engineering application problems.

Code	**BENG413**
Name	**Neural Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course aims at equipping students with the understanding of neural anatomy, physiology, and neural diseases and fundamental knowledge for the development of diagnostic and therapeutic approaches. The course covers the fundamentals of neuroanatomy and neuroelectrophysiology, action potential formation and propagation on a neuron and between neurons. In order to discuss neural engineering applications for diagnostic and therapeutic first different types of neural diseases are surveyed. Eye (vision) and ear (audition) and related diseases are also introduced. Finally, technologies used in diagnosis of neural diseases such as the anatomical and functional imaging of the brain and neural system, and technologies for the treatment of neural diseases such as deep brain stimulation, retinal implants, cochlear implants and brain-computer interfaces.

Code	**BENG414**
Name	**Biomechatronics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	Biomechanics refers to study of biological movement principles in a mechanics background. Biomechanical models of motor control are derived from physiological principles and complement laboratory studies to promote our understanding of the underlying physiology. Biomechatronics is the growing interdisciplinary science that integrates mechanical engineering, electronics, computer science, and embedded systems with biology and neuroscience to develop prostheses and assistive technologies for patients with neuromuscular skeletal disorders.This course aims to provide an understanding of biomechanical and neuroscientific principles underlying human movement.

Code	**BENG415**
Name	**Clinical Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	In the content of this course, clinical Engineering; in hospitals and medical technology with the purchase of scrap to be revealed until the last process and the key areas of work in the field of biomedical engineering and health professional disciplines to explain the basic course is one of the employees.

Code	**BENG416**
Name	**Biophotonics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course provides the fundamental concepts of optics. In the content of this course, ray optics, wave optics, electromagnetic optics, quantum optics, interference, scattering, diffraction, optical properties of tissues and interaction of light with cells and tissues, the fundamentals of spectroscopic and tomographic imaging.

Code	**BENG418**
Name	**Machine Learning**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	The course presents an introduction to basic machine learning approaches. The main topics include: Supervised learning (support vector machines, decision tree, random forest), Unsupervised learning (hierarchical clustering, k-means clustering, dimensionality reduction). Also, the course will include numerous case studies and applications from various areas.

Code	**BENG419**
Name	**Fundamental of BioMEMS**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	BioMEMS is the application of MEMS (Microelectromechanical Systems) technology in the fields of biomedical and health sciences. Due to their small size (1μm~1mm), BioMEMS have the advantages of low weight, low cost, quick response, high throughput, high efficiency, requiring much less sample/reagent, and easy system integration. BioMEMS found broad applications in disease diagnosis, prevention, and treatment. Various BioMEMS products have been developed, such as microfluidic devices, neural interface devices, μTAS (micro total analysis systems), lab-on-a-chip, DNA chips, micro drug delivery system, microsurgical tools, biosensors. This course introduces to students about the fundamentals of BioMEMS technology, typical BioMEMS devices and their applications.

Code	**BENG421**
Name	**Biomedical Image Processing**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	The description of the course is to show how to extract, model, and analyze information from medical data and applications to help diagnosis, treatment and monitoring of diseases through computer science. Medical image computing is a highly interdisciplinary field involving not only medicine and computer science but also mathematics, biology, statistics, probability, psychology and other fields. Computer science plays the role of a bridge among these disciplines and is critical in the advancement of medical imaging science. The course includes topics in medical image analysis: image segmentation, registration, statistical modeling and applications of computational tools for medicine. It will also include selected topics relating to medical image formation. It will be application oriented.

Code	**BENG422**
Name	**Biomedical Signal Processing**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course covers the following topics: Signal analysis: time and frequency, sampling, digital signals, Fourier transform (FFT), power spectrum estimation, input windows, leakage, overlap, convolution and correlation properties, digital filters, physiological and mathematical models of bioelectricity: cell membrane, resting and action potentials , Nernst equation, volume conduction, prospective inverse problems measurement of bioelectric signals: electrode properties, measurement systems, electrocardiography: origin of EKG, EKG-leads, ECG analysis neurophysiology: nervous system, muscles, EEG, EP, EMG, ERG, EOG , signal analysis, electrostimulation: defibrillation, pacemakers, electrostimulation laboratory experiment: biosignal processing.

Code	**BENG426**
Name	**Polymer Science**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring/Fall
Type	Elective
Prerequisites	-
Description	This course provides the knowledge about polymeric materials as the most widely used material type for the biomaterial preparation. It covers definition of polymers, classification of raw material resources, structural, mechanical, thermal, electrical, optical and chemical properties of polymers, molecular weight and determination methods, synthesis methods of polymers, industrial production methods, processing techniques.

Code	**BENG427**
Name	**Tissue Biomaterial Interaction**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course covers biomaterials surface characterization, instrumental techniques; wound healing mechanism including protein adsorption, coagulation, inflammation, restoration; assessment of biocompatibility and blood compatibility; approaches to improve compatibility.

Code	**BENG429**
Name	**Controlled Drug Delivery**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course covers the definition of controlled drug delivery, the aim of using this system for drug administration, controlled drug delivery routes, carrier types, release kinetics and applications.

Code	**BENG430**
Name	**Biomedical Polymers**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course covers the concept of biomedical polymers, definition, and classification of medical polymers, characterization, structural analysis and purification methods of medical polymers, the concept of biodegradation and biocompatibility, types of biomedical polymers including synthetic and natural with different applications.

Code	**BENG431**
Name	**Nanofabrication**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course covers introduction to conventional methods in macro and nanofabrication for bioengineering applications, basics of film deposition techniques, optical and electron beam lithography, wet and dry etching methods, applications of micro- and nanofabrication to micro and nanoelectromechanical systems, biomimetics approach to nanofabrication.

Code	**BENG432**
Name	**Tissue Engineering and Regenerative Medicine**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate/3
Semester	Fall or Spring
Type	Elective
Prerequisites	-
Description	This course integrates the principles and methods of engineering and life sciences toward the fundamental understanding of structure-function relationships in mammalian tissues, especially as they relate to the development of biological substitutes to restore or improve the damaged tissue/organ function. Current concepts and strategies including cell culture techniques, scaffold design, tissue and cell transplantation, artificial organs, and *in vivo* tissue regeneration are introduced, as well as their respective biomedical applications.

Code	**BENG433**
Name	**Nanoparticles for Biomedical Applications**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate/3&4
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	Designing functional nanoparticles using various strategies and materials is very important for biomedical applications. Topics covered in this course are nanoparticle behavior in biological environments, design parameters such as targeting, shape effect, administration route, and nanoparticle characterization techniques. Moreover, different types of nanoparticles such as polymeric nanoparticles, carbon nanoparticles, fluorescent nanoparticles, and self-assembled nanoparticles along with their potential applications in biomedicine will be covered at the end of this course.

Code	**BENG 434**
Name	**Stem Cell Technology and Regenerative Medicine**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate/Graduate
Semester	Fall
Type	Compulsory
Prerequisites	-
Description	This course aims at the comprehensive view of the stem cell technology with both embryonic and adult stem cells including characteristics at cellular and molecular levels, signaling transduction, stem cell interactions with their microenvironment and their role in regenerative medicine. In this course, basic technology involving in stem cell research, stem cell transplantation as a standard treatment for vascular, cardiac and bone disorders. Also, this course emphasizes the potential uses and limitations of stem cells for the treatment of hematological diseases, and ethical issues of stem cell applications in the regenerative medicine.

Code	**BENG435**
Name	**Separation Techniques**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	
Description	This course is about the separation and purification of proteins and other soluble/insoluble products from biochemical and/or chemical processes. It covers analytical methods and physical-chemical separation processes such as sedimentation, flocculation, filtration, extraction, drying, precipitation, chromatography, adsorption and crystallization.

Code	**BENG436**
Name	**Drug Design and Discovery**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall
Type	Elective
Prerequisites	
Description	This course covers the understanding of the history of drug design and discovery, strategies of development of new drug candidates and the relationship between drug discovery and chemical biology. Topics include enzyme inhibitors-related biostructure and mechanism-based design and the structure, function and the pharmacology of different receptors.

Code	**BENG437**
Name	**Bioorganic and Medicinal Chemistry**
Hour per week	3 (3+0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring
Type	Elective
Prerequisites	
Description	This course covers the contemporary topics of bioorganic and medicinal chemistry such as QSAR, Drug-receptor interactions, enzymes and molecule interaction, click chemistry, probes for in vitro and in-vivo imaging. This course also covers the understanding relationship between drugs/therapeutics and biological systems.

Code	**BENG438**
Name	**Introduction to Bionanotechnology**
Hour per week	3 (3+0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall, Spring
Type	Elective
Prerequisites	
Description	This course covers understanding cellular components and how they may be used as a constituent of, or may interact with, bionanotechnology. These technologies include bioanalytical techniques; applied genomics and proteomics; nanoparticles, nanostructures and biomimetics; and the interaction of nanomaterials with biological systems. In this course nanomedicine applications and nanodevices will be covered.

Code	**BENG439**
Name	**Metabolic Engineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Spring
Type	Elective
Prerequisites	
Description	This course includes the engineering concepts for analysis, design, and modification of metabolic pathways to convert raw materials to food, pharmaceuticals, fuels and chemicals. It provides fundamental knowledge of cellular metabolic pathways, the basic principles and applications of metabolic engineering, metabolic flux analysis, the regulation of metabolic pathways, and the biosynthesis of primary/secondary metabolites.

Code	**BENG440**
Name	**Bioinformatics**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course is designed to introduce students to bioinformatics tools and analysis methods and therefore is a hands-on type. Most weeks will include both classroom lecture and computer lab time. The topics include databases, sequence alignment, homology search, phylogenetic trees, and structure prediction.

Code	**BENG441**
Name	**Scientific Writing and Understanding**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall
Type	Elective
Prerequisites	-
Description	This course aims to demystify the writing process and teach the fundamentals of effective scientific writing. Instruction will focus primarily on the process of writing and publishing scientific manuscripts. The course will be presented in two segments: Part (1) teaches students how to write effectively, concisely, and clearly and part (2) takes them through the preparation of an actual scientific manuscript. Students taking the class for 2 units will be asked to attend a weekly lecture and to complete some short writing and editing exercises. Students will receive regular, relevant feedback on their writing and presentation skills and will be expected to provide constructive feedback to their colleagues in the course.

Code	**BENG442**
Name	**Entrepreneurship in Bioengineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall or Spring
Type	Elective
Prerequisites	-
Description	This course focuses on the process involved in both pursuing a venture within a bioengineering company and the creating and managing processes. This course covers the unique aspects of entrepreneurship in the bioengineering field contrasted with other industries, and then discusses the biotechnology entrepreneur's background and characteristics, and the forces that impact their decisions.

Code	**BENG443**
Name	**Regulations and IP Rights in Bioengineering**
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall or Spring
Type	Elective
Prerequisites	-
Description	This course focuses on basic principles of intellectual property rights (IPR) in Bioengineering. This class covers the types of IPR, search patents data bases, read and understand a patent application, prepare claim drafting.

Code	**BENG491**
Name	**Capstone Project I**
Hour per week	2 (0 + 2)
Credit	1
ECTS	8
Level/Year	Undergraduate
Semester	Fall
Type	Compulsory
Prerequisites	1st and 2nd year courses should be passed
Description	This course aims to apply the theoretical knowledge and skills gained during undergraduate education to the practice. The capstone project can be an independent or a team-based project. It introduces students to the design of new biological technologies with the aim of addressing societal needs. Students design the concept followed by implementation and testing. The project, mentored by an advisor from faculty, have to be reported with methods, results, data evaluation, discussion and conclusion.

Code	**BENG492**
Name	**Capstone Project II**
Hour per week	2 (0 + 2)
Credit	1
ECTS	8
Level/Year	Undergraduate
Semester	Spring
Type	Compulsory
Prerequisites	BENG491
Description	This course aims to apply the theoretical knowledge and skills gained during undergraduate education to the practice. The capstone project can be an independent or a team-based project. It introduces students to the design of new biological technologies with the aim of addressing societal needs. Students design the concept followed by implementation and testing. The project, mentored by an advisor from faculty, have to be reported with methods, results, data evaluation, discussion and conclusion.

Code	**BENG493**
Name	Summer Internship
Hour per week	2 (0 + 2)
Credit	1
ECTS	6
Level/Year	Undergraduate /4
Semester	Fall
Type	Compulsory
Prerequisites	4 semester must be completed.
Description	This course intends to teach the students to get to know the working area prior to their graduation and therefore to accumulate a certain level of experience before they are employed as graduates. This course focuses on learning and choosing bioengineering areas that are compatible with their own skills and interests and seizing the opportunity to observe the real-life applications of the discipline of Bioengineering.

Code	**XBEN445**
Name	Technical Transfer Elective
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring the disciplinary based courses taken at national or international exchange to the program and information system.

Code	**XBEN446**
Name	Technical Transfer Elective
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring the disciplinary based courses taken at national or international exchange to the program and information system.

Code	**XBEN 447**
Name	General Transfer Elective
Hour per week	3 (3 + 0)
Credit	3
ECTS	5
Level/Year	Undergraduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring the disciplinary based courses taken at national or international exchange to the program and information system.

Code	**BENX131**
Name	**Digital Learning Platform Transfer Elective 1**
Hour per week	1 (1+0)
Credit	1
ECTS	3
Level/Year	Undergraduate / 2-3
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring non-technical or elementary level technical courses taken from digital learning platforms.

Code	**BENX132**
Name	**Digital Learning Platform Transfer Elective 2**
Hour per week	1 (1+0)
Credit	1
ECTS	3
Level/Year	Undergraduate / 2-3
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring non-technical or elementary level technical courses taken from digital learning platforms.

Code	**BENX141**
Name	**Digital Learning Platform Basic Level Transfer Elective 1**
Hour per week	1 (1+0)
Credit	1
ECTS	4
Level/Year	Undergraduate / 2-3
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring elementary level disciplinary or interdisciplinary courses taken from digital learning platforms.

Code	**BENX142**
Name	**Digital Learning Platform Basic Level Transfer Elective 2**
Hour per week	1 (1+0)
Credit	1
ECTS	4
Level/Year	Undergraduate / 2-3
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring elementary level disciplinary or interdisciplinary courses taken from digital learning platforms.

Code	**BENX151**
Name	**Digital Learning Platform Advanced Transfer Elective 1**
Hour per week	1 (1+0)
Credit	1
ECTS	5
Level/Year	Undergraduate / 3-4
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring the disciplinary and interdisciplinary based courses taken from digital learning platforms.

Code	**BENX152**
Name	**Digital Learning Platform Advanced Transfer Elective 2**
Hour per week	1 (1+0)
Credit	1
ECTS	5
Level/Year	Undergraduate / 3-4
Semester	Fall, Spring
Type	Elective
Prerequisites	-
Description	This course is constituted for the recognition of credit mobility and transferring the disciplinary and interdisciplinary based courses taken from digital learning platforms.