- **Course Description (Medical IT Convergence Engineering)**

Introduction to Biomedical Engineering			
Yr. : 1	Sem. : 2	Course Code:	BE0004
Study introductory biomedical engineering about the science, engineering and medicine and learn how to utilize engineering techniques in the fields of the current medicines. Introduce recent trends of the bio-signal, medical imaging, robotic surgery, medical information, etc.			
Creative Design Introduction			
Yr. : 1	Sem. : 2	Course Code:	BE0003
Learn solution techniques for engineering problems by learning fundamental engineering knowledge.			
Biomedical Circuit Theory 1			
Yr. : 2	Sem. : 1	Course Code:	BE0002
This subject introduces R, L, C circuits, Laplace transforms, operational amplifier, and excellent analytical tools of circuit.			
Basic Biomedical Electronic Circuit Laboratory			
Yr. : 2	Sem. : 1	Course Code:	BE0010
Learn measurement methods of power supply, multi-meter, bread board and oscilloscope. Introduce measurement techniques of the physical quantities of the currents, voltages, and power utilized in electronic engineering. Verify the knowledge by performing the experiments which were introduced from the courses of circuit theory.			
Electromagnetics			
Yr. : 2	Sem. : 1	Course Code:	BE0011
Understand fundamental electromagnetic theories using vector calculation, differential and integral calculus and three-dimensional coordinate systems, and also learn electric and magnetic field, potential difference and energy including the fundamental theory of the bio electromagnetics			
C++ Language Programming			
Yr. : 2	Sem. : 1	Course Code:	BE0070
Learning C ++ language syntax and efficient programming techniques, and learning basic elements such as variables, functions, classes, and objects in programming languages, and developing object-oriented programming skills using C ++.			
Logic Circuits			
Yr. : 2	Sem. : 1	Course Code:	BE0008
Analyze operation of logic gates and flip-flop from the logic circuit course. Design and perform the experiments of the operations of the combinational logic circuits, sequential logic circuits and counters.			
Biomedical Statistics			

Yr. : 2	Sem. : 1	Course Code:	BE0065
Learn various statistical methods used for objectively verifying the effect of new therapy and drugs in medicine, apply them to real medical data, and improve practical ability.			
Electronic Circuits 1			
Yr. : 2	Sem. : 2	Course Code:	BE0005
Study operating mechanisms and characteristics of the basic electronic components such as diode, transistors, and operational amplifiers. Learn basic circuits using these electronic components.			
Human Physiology 1			
Yr. : 2	Sem. : 2	Course Code:	BE0007
Understand life phenomenon and interaction of physical and chemical causes among physiological apparatus which is related to the function of organs. Cardiovascular, respiratory, skeletal systems will be covered.			
Visual Programming and Design			
Yr. : 2	Sem. : 2	Course Code:	BE0057
Learn basic language structure using the programming language about the solution technique of engineering problem and learn the ability to code the program effectively using the technique.			
Matlab Application and Design			
Yr. : 2	Sem. : 2	Course Code:	BE0073
Matlab is widely used in engineering and scientific fields. It integrates numerical analysis, matrix operation, signal processing, and easy graphical functions to provide high-performance numerical calculation and visualization of results. The basic knowledge of Matlab and the design application in biomedical field will be studied.			
Circuit Theory 2			
Yr. : 2	Sem. : 2	Course Code:	BE0006
In the second part of circuit theory, this subject introduces sinusoidal analysis, frequency domain with complex numbers, magnetic coupling, and Fourier series.			
Electronic Circuit Laboratory			
Yr. : 3	Sem. : 1	Course Code:	BE0012
Learn various electronic circuits using diodes, transistors and operational amplifiers and analyze the operations through the experiments. Design the electronic circuits according to design requirements and verify the operations of them.			
Electronic Circuits 2			
Yr. : 3	Sem. : 1	Course Code:	BE0013
Learn techniques of the amplifications, filtering and attenuations using active circuits which composed of diode, transistor, FET, OP-amp. Learn design and analysis capabilities of the electronic circuits			

Control Engineering			
Yr. : 3	Sem. : 1	Course Code:	BE0017
Design linear control systems in the introduction course of the control engineering. Lean the mathematical modeling, characteristics, performances, stability and root-locus analysis of the linear systems in order to study the fundamental methods of the control engineering.			
signal and System			
Yr. : 3	Sem. : 1	Course Code:	BE0020
Learn the theories about the linear system, convolution and Fourier transform to understand the analysis of a variety of signals and systems.			
Java Programming			
Yr. : 3	Sem. : 1	Course Code:	BE0064
Understand the principle of Java highlighted as a next-generation Internet programming language, learn how to make Java programs, and improve practical ability of making JAVA application programs, such as applet/servlet, database, network, and data mining programs in distributed environments.			
Biomedical Computer-Aided-Design and Design			
Yr. : 3	Sem. : 1	Course Code:	BE0059
By using commercialized CAD software, we reconstruct medical images into three-dimensional geometrical files and generate linear meshes for computational simulation and 3D printing. Visualization technique will be also introduced.			
Basic Biomedical Engineering Laboratory			
Yr. : 3	Sem. : 2	Course Code:	BE0016
Learn how to develop and maintain medical devices through theory and practice of the concept and principle of biomedical engineering based on basic electrical theory. Learn how to validate and apply the theoretical knowledge of human physiology by measuring the physiological phenomenon by using bio-instruments.			
Biomedical Electronic Measurements Engineering			
Yr. : 3	Sem. : 2	Course Code:	BE0018
Objectives of this subject are to explain the operation, performance, and applications of the most important measuring instruments normally encountered in medical laboratory, and to discuss electronics measuring techniques.			
Control System			
Yr. : 3	Sem. : 2	Course Code:	BE0025
Learn how to design practical compensation and control systems and understand the root-locus, Nyquist diagram, bode plot, Nichols diagram in order to study the design and analysis of the closed-loop systems.			
Microprocessor Experiment			

Yr. : 3	Sem. : 2	Course Code:	BE0058
This class aims to demystify the Arduino microcontroller through hands-on work in the lab creating simple machines with embodied behaviors. The Arduino is a versatile resource for physical projects for students in all disciplines. This course brings students over the beginner's threshold to a basic understanding of the use, terminology, and potential of the Arduino. The skills and concepts taught in this course are presented from an interdisciplinary approach which merges practices in arts and technology. The first portion will teach the essential skills for creating a simple sensor-driven physical computing system, and the second portion will reinforce those skills by making a simple interactive project. The course has no technical prerequisites, although uses a little bit of algebra-level math.			
Biomedical Signal Processing and Design			
Yr. : 3	Sem. : 2	Course Code:	BE0026
Learn signal processing techniques to extract the various bio signal information and digital filter design to process the signal data conversion using Z-transform and FFT.			
Mobile Programming			
Yr. : 3	Sem. : 2	Course Code:	BE0066
Learn techniques of the android programming used for the mobile device application development. For this, we study the basic structural components and concept of the android platform and learn the tool and technique to implement the mobile programs.			
Creative Design Project1(Capstone Design)			
Yr. : 4	Sem. : 1	Course Code:	BE0053
In the first part of creative design project, the students also select the subjects in the fields of the electronic engineering based on the knowledge obtained from the major coursework during four years and prepare the dissertation. Learn the capabilities as one of the members in the electronic engineering related industries.			
Medical Image Processing and Design			
Yr. : 4	Sem. : 1	Course Code:	BE0034
This course is to implement all information inside the body by utilizing the basic digital imaging, analysis of the histogram, smoothness, acumination, analytical image segmentation in the frequency domain for medical imaging processing with the basic theory and practices.			
Radiology Engineering			
Yr. : 4	Sem. : 1	Course Code:	BE0041
Study the background about the knowledge, category, operational mechanism and characteristics of the electronic radiology engineering and learn how to utilize the applications of the X-ray. Learn the basic theory of the medical diagnosis about the X-ray tube, X-ray generation system, digital X-ray sensor, etc.			

Brain/Neural Engineering			
Yr. : 4	Sem. : 1	Course Code:	BE0068
Understand the neurophysiology and study analysis techniques about various brain/neural signals. Based on this knowledge, we perform the practices which analyze the brain/neural signal data, and learn the practical capability needed for medical applications using brain neural signal.			
Artificial Intelligence			
Yr. : 4	Sem. : 1	Course Code:	BE0071
The artificial intelligence, which plays a central role in the fourth industrial revolution, changes the technology and industry of biomedical engineering. In this course, the Deep Learning on the artificial intelligence field will be studied with Python programming.			
Imaging Medical Instrumentation			
Yr. : 4	Sem. : 1	Course Code:	BE0072
In imaging medical instrumentation course, we learn medical hardware devices used for diagnosing and treating diseases through constructing the images of the targets. In this course, we learn general structure and operation principle of X-ray, CT, MRI, US, PET and other medical hardware devices.			
Biosensor Engineering			
Yr. : 4	Sem. : 2	Course Code:	BE0027
This course introduces enzyme sensor, DNA sensor, pH sensor, and basic concept of biosensor, and to discuss electrochemical method, charge detection method, and fluorescence method for detecting biomaterials.			
Creative Design Project2 (Capstone Design)			
Yr. : 4	Sem. : 2	Course Code:	BE0037
In the second part of creative design project, the students also select the subjects in the fields of the electronic engineering based on the knowledge obtained from the major coursework during four years and prepare the dissertation. Learn the capabilities as one of the members in the electronic engineering related industries.			
Bio-Simulation			
Yr. : 4	Sem. : 2	Course Code:	BE0069
Learn how to formulate bio-system by using system engineering methodology, and predict biological phenomenon which is impossible to be measured by experiment using the instrument devices.			
Medical Imaging Laboratory			
Yr. : 4	Sem. : 2	Course Code:	BE0062
Learn how to develop and implement medical imaging devices through the biomedical engineering principle			

based on basic electronics hardware.			
Analog Integrated Circuit			
Yr. : 4	Sem. : 2	Course Code:	BE0074
Learn advanced techniques and theories of analog integrated amplifiers, filters and power amplifiers using active CMOS device components. Learn design and analysis capabilities of the analog integrated circuits.			
Biomedical Special Topics			
Yr. : 4	Sem. : 2	Course Code:	BE0075
In this special topic course, learn and discuss the technology trends of the latest research and current industrial trends of biomedical engineering.			