Biomedical systems and Informatics Engineering Department
Hijjawi Faculty for Engineering Technology
Yarmouk University

Curriculum-Bachelor's Degree in

(Biomedical Informatics Engineering)

2013

بسم الله الرحمن الرحيم

Yarmouk University
Hijjawi faculty for Engineering Technology
Bachelor degree in Biomedical systems and Informatics Engineering
Study Plan

Study Plan that leads to obtain a bachelor's degree at Hijjawi Faculty for Engineering Technology at the University of Yarmouk and issued in accordance with the instructions to obtain a bachelor's degree at Yarmouk University No. (2) for the year 1998, issued under the system of granting degrees and diplomas at Yarmouk University No. (76) for the year 1976.

1 - Hijjawi Faculty of Engineering Technology offers a study plan that leads to a bachelor's degree in the following disciplines:

A – Electronics Engineering.

B- Telecommunications Engineering.

C - Computer Engineering.

D - Electrical Power Engineering.

E - Biomedical Systems and Informatics Engineering.

F - Civil Engineering - Construction Management.

G - Industrial Engineering.

H – Building Technology Engineering.

I - Architectural Engineering.

2 - Minimum of credit hours required to award a bachelor's degree in any department at Hijjawi Faulty for Engineering Technology is (167) credit hours.

3- The provisions contained in the instructions to award a bachelor's degree No. (2) for the year 1998 in the Yarmouk University is valid at department at Hijjawi Faulty for Engineering Technology.

4- Admission to the college is according to the admission policy at the university in each academic year, as illustrated in the instructions for accepting students at the university.

5 - A bachelor's degree in disciplines described in part (1) of Hijjawi Faculty for Engineering Technology is awarded after the completion of the requirements illustrated in section (5) of the Instructions No. (2) for the year 1998 as follows: -

Study Plan - Bachelor Degree
Hijjawi Faculty for Engineering Technology

Requirements	Hours	Mandatory	Elective
University Requirements	27	12	15
Faculty Requirements	27	27	-
Department Requirements	113	104	9
Total	167		

Faculty mandatory requirements (27 credit hours):

Course Number	Course name	Hours			Pre
		C.H	P	T	
Math 101	Calculus 1	3	-	3	-
Math 102	Calculus 2	3	-	3	Math 101
Phys 101	General Physics 1	3	-	3	-
Phys 105	General Physics Lab 1	1	3	-	Phys 101*
Phys 102	General Physics 2	3	-	3	Phys 101
Phys 106	General Physics Lab 2	1	3	-	Phys 102 *
Chem 101E	General Chemistry (for engineering students)	3	-	3	-
Chem 105	General Chemistry Lab	1	3	-	Chem 101E
Math 203 E	Ordinary Differential Equations (fir engineering students)	3	-	3	Math 102
CPE 150	Introduction to Programming	4	-	3	
CPE 150L	Introduction to Programming Lab	0	3	-	
BME 152	Introduction to Engineering	2		2	-

*** Can be combined**

Biomedical Informatics Engineering Curriculum

A. Compulsory Requirements (104 Cr.)

Course No.	Course Title	No. of Hours			Prerequisites
		Theory	Practical	Credit	
Bio 108	Human Biology	3	-	3	-
BME 102	PathoPhisology I	3	-	3	Bio 108
BME 105	PathoPhisology Lab.	-	3	1	BME 102*
BME 200A	Medical Informatics Engineering	3	-	3	CPE 150
BME 202A	Cybernetics	3	-	3	Math 203
STAT 203	Biostatistics	3	-	3	Bio. 102 or Geo 102 or BME 102
BME 204A	Biomedical Systems Engineering	3	-	3	BME 202A
ELE 205	Communication Skills	3	-	3	BME 152 Or EPE 203
EPE 220	Electrical Circuits I	3	-	3	PHY 102
EPE 223	Electrical Circuits Lab.	-	3	1	EPE 220
ELE 250	Electronics I	3	-	3	EPE 220
ELE 251	Electronics I Lab.	-	3	1	ELE 250
CME 312B	Signals & Systems	3	-	3	EPE 222
BME 350	Applied Programming	1	3	2	BME 200A
ELE 350 A	Electronics (2)	3	-	3	ELE 250
CpE 354C	Data Structures & Algorithms	3	-	3	CpE 150
CpE 366	Programmable Circuits & Microcontrollers	3	-	3	CpE 150
BME 367	Programmable Circuits & Microcontrollers Lab.	-	3	1	CpE 366
BME 380	Medical Transducers	3	-	3	ELE 350A
BME 388	Health Informatics Project Management	2	-	2	CpE 150
BME 390A	Analysis and Processing of Biomedical Signals	3	-	3	CME 312B and BME 204A
BME 402	Electronic Patient Records	3	-	3	BME 200A
BME 420	Medical Instrumentation	3	-	3	BME 380
BME 422	Concepts of Medical Imaging	3	-	3	BME 380
BME 430	BioInformatics I	3	-	3	BME 102
BME 431	BioInformatics Lab.	-	3	1	BME 430

BME446	Pattern Recognition & Decision Making	3	-	3	BME390A
CpE 454	Database Systems Design	3	-	3	CpE 360 or BME 350
CpE 452	Software Engineering	3	-	3	CpE 150 or BME 350
BME 460	Medical Instruments	3	-	3	BME 420
BME 498C	Graduation Project 1	-	-	1	Department Decision
BME 500D	Field Training	Six Months	3	Department Decision	120 CrH
BME 500E	Field Training		6		
BME 536	Electronic Health Systems	3	-	3	BME 350
BME532A	Management and Design of Health Care systems	3	-	3	BME 350
BME 537	Vista Lab (Kernel and FileMan)	-	3	1	BME 536
BME540	Networks in health care systems	3	-	3	BME 532A
BME542	Safety & Security of health Information system	2	-	2	BME536*
BME564	Telemedicine	3	-	3	BME460
BME572 A	BioSafety, BioSecurity, and Bioethics	2	-	2	BME460
BME 598C	Graduation Project 2	-	-	3	BME 498B

***Co requisite course, i.e., can be taken together**

B. Biomedical Informatics Engineering Optional Requirements (9 Cr.)

Course No.	Course Title	No. of Hours			Prerequisites
		Theory	Practical	Credit	
BME 104	PathoPhisology II	3	-	3	BME102
BME464A	Modelling and Analysis of Biomedical Signals	3	-	3	BME420
BME 466	Coding theory and Cryptography	3	-	3	BME 204 A
CIS 467	Data Mining	3	-	3	BME 430 or CIS 260
CpE 496**	Specialized Trainning Course in IT	3	-	3	Department Decision

CpE 458	Programming and administration of operating Systems	3	-	3	CpE 360
CME 462	Data Transmission	3	-	3	CME 456
BME530	BioInformatics II	3	-	3	BME430
BME534	Computational Biology	3	-	3	BME430
BME544	Medical Image Processing.	3	-	3	BME390
BME 550	Medical Documentation	3	-	3	BME 532 A*
BME596B	Special Topics	3	-	3	Department Decision

***Co requisite course, i.e., can be taken together**

**A student may synchronize with the course (BME 500E- field training 1) with a max of 3 credit hours if he joined a training course approved by the Department of Biomedical Systems and Informatics Engineering in the summer semester only.

** The student will be exempted from the study of this course if he passes one of the software and networking training sessions held by the University of Yarmouk which are (MCSA, OCA, CCNA) under Deans Council decision No. (29/2008) dated 21/1/2008.

Note: It is not permissible in any way registering course (AAA 496- specialized training course) if the student received a training course for the purposes of exemption from the course (BME 500 E - Field Training)

Meaning of the tenths in the Biomedical Informatics Engineering Curriculum:

(0) field training, pathology and physiology, introduction to both medical and systems Engineering.

(2) concepts and Bio-measurements.

(3) Biomedical Informatics Technology and Management

(4) Analysis tools and medical diagnostics.

(5) Software and Medical Applications

(6) Medical devices and equipment

(7) Networking, security and safety of biomedical applications

(8) Medical sensors and medical project management.

(9) Graduation project, selected topics.

Course Descriptions:

BME 152 Introduction to engineering (2 Cr. Hrs.)

A comprehensive overview of the engineering process, profession, career opportunities and practice. Engineering specializations, theoretical and practical engineering aspects. Basic units (SI) and dimensions, engineering tools (Spreadsheets, MATLAB,…), critical or logical way of thinking and the use of

engineering sense when solving problems, engineering design process and considerations, intellectual property, engineering ethics.

BME 102 PathoPhysiology I, Prerequisite: Bio 108 (3 cr. Hrs)

Covers the physiology and basic mechanisms of diseases and selected common disorders of the following systems: cardiovascular, cardiac diseases, Hypertension, Coagulation disorders, Atherosclerosis, Aneurysms and Dissections of blood vessels, Heart Failure, Ischemic Heart diseases, Valvular Heart diseases; respiratory, Bronchial asthma, Chronic obstructive pulmonary disease**,** Bronchitis and bronchiactasis, Respiratory failure; hematopoeitic, Red blood cell disorders, White blood cell disorders, Platelet disorders; renal system, reneal diseases, renal failure.

BME 105 PathoPhisology Lab. Prerequisite: BME 102 (1 cr. Hr)

The lab will cover the fundamental concepts of human physiology and its pathology. It includes experiments that covers the following topics: Cells and tissues, Diffusion, osmosis, and tonicity, Enzymes, Nervous System, Special Senses, Endocrine glands, Skeletal muscle, Blood, The Heart, Blood Flow, Blood Pressure, and ECGs, Respiration, Digestion, and Renal (Urinary) System. Furthermore, clinical workflows and the related information processes will be studied.

BME 200 A Medical Informatics Prerequisite : CPE 150 and BME 102 (3 cr. Hrs)

Introduction to health care Information systems and its applications. Locating, manipulating, and displaying information in health care settings. Medical records and hospital and patient information handling. Both conventional and proposed patient and hospital information systems will be discussed as well as the impact of governmental, state and local regulations on the security and transfer of medical information. Experiences with information and workflow in a hospital as well as with organizational aspects are necessary for teaching this course.

BME 204A Biomedical Systems Engineering, Prerequisite: BME 102 and BME 200 (3 Cr. Hrs)

Introduces the interdisciplinary nature of the Biomedical Engineering Technology program through engineering and medical terminology. Presents hospital and industrial policies, procedures and codes with an emphasis on safety. Introduces biomedical instrumentation, control systems and the man-machine interface. Introduces techniques for analysis and modeling of biomedical systems. Application of mathematics (including Differential Equations, Laplace Transforms and Statistics) and computer-aided methods to

study problems at the interface of engineering and biology. Elements of physiological modeling and the solution of the transient and forced response for a variety of biomechanical, biomaterial, bioelectrical and biochemical systems.

BME 350 Applied Programming , Prerequisite: BME 200A (2 Cr. Hrs.)

This course provides an overview of the MUMPS programming language, its syntax, commands, and features. Topics Covered: Elements and syntax, Data storage, Details of the MUMPS programming environment, Common MUMPS programming patterns, globals. Expieremnts on all theoretical aspects of MUMPS are applied in the practical lab.

BME 367 Programmable Circuits & Microcontrollers Lab, Prerequisite: BME 366, (1 Cr. Hrs.)

Experiments that handle different applications of digital electronic circuits and microcontrollers: application of logical gates, ADC, LCD, interrupts, serial interface and pulse width modulation using PIC as a controller. 8051 delay application on stepper motor, DC motor and traffic light modules, ADC and DAC using serial PC communication and keyboard mode.

BME 380 Medical Transducers, Prerequisite: BME 356, (3 Cr. Hrs.)

Principles of Transducers and sensors design and application in medicine and biology. Properties of transducers (sensitivity, accuracy, dynamics, linearity, hysteresis, and frequency response). Classification of Transducers. Displacement and human motion measurements: resistive sensors, bridge circuits, strain gage, inductive, capacitive and piezoelectric sensors. Pressure measurement. Transducers for body Temperature measurements: Thermocouples, Thermistors, Radiation Thermometry, Fiber-optic temperature sensors. Optical measurements, Fiber Optics, optical Filters. Radiation sensors. Sensor Calibration, Origin of Biopotentials: Electrical activity of cells in Electroneurograph, Electromyograph, Electrocardiograph, Electroretinograph, Electroencephalograph. Biopotential Electrodes: Polarization, Interface, Behavior, Microelectrodes. Chemical Biosensors. Electrode Arrays.

BME 388 Health Informatics Project Management, Prerequisite: BME 200A, (2 Cr. Hrs.)

Project management techniques. Projects and the need for a management process. Project planning. Project control. Strengths and limitations of PRINCE2. Challenges to traditional approaches. Why health informatics projects fundamentally different from other business IT projects? Differences - the health context; historical context; funding; budgets and management issues; clinical complexity; organizational and national politics; issues of scale; who benefits; the role of the patient; integration of patient records. Similarities. Failures: project management; clinical; goal conflicts; mismanaged expectations; killing

innovation; technical, social and organizational; the cascade of failure; the impact of change and intervention; strategic failure. Ensuring success. Value proposals to stakeholders; Stakeholder Analysis; Risk Management; mitigating risk; budgeting and scheduling contingency; role of the project manager and project champion; effective communication and escalation. Case studies of successful health care projects. Evaluation of projects and project proposals.

BME 390A Analysis and Processing of Biomedical Signals, Prerequisite CME 312 (2 Cr. Hrs)

Origin, description and characteristics of biomedical signals. Reduction of interferences. Digital Filters (FIR filters, IIR filters, integer filters). Temporal analysis. Spectral analysis. Processing of both Biomedical deterministic and random signals (ECG, EEG, EMG, Speech, etc.); Probability Density Functions and signal estimation; Principles of Biomedical signal modeling. Compression of biomedical signals.

BME 402 Electronic Patient Records, Prerequisite: BME 200A, (3 Cr. Hrs.)

Challenges of designing, implementing and using and EPR. Implementation strategies. Socio-technical integration. Standardisation of technology, routines and practices. Classification systems. Collaboration between different practices. Innovations related to EPRs. Infrastructural challenges in developing countries.

BME 420 Medical Instrumentation, Prerequisite: EE 350A, (3 Cr. Hrs.)

Sources in medical systems and noise reduction techniques, grounding and shielding techniques. Medical Diagnostic systems devices: Biopotential recorders (PCG, ECG, EEG, EMG, EOG); Patient Care monitoring systems (bedside Monitors, central Monitors, photoplethysmography, blood pressure measurement, respiratory rate, catheterization and bed side monitor), Ear noise throat (ENT). Arrhytmia and Ambulatory Monitoring Instruments. Fetal Monitoring Instruments, Oximeters (oximetry, ear oximeter, pulse oximeter, skin reflectance oximeter). Cardiac Output Measurement (Indicator dilution methods, aortic pressure waveform, impedance technique, ultrasound method). Pulmonary Function Analyzers (pulmonary function, spirometry, pneumotachometers, respiratory gas analyzers). Audiometers and Hearing Aids.

BME 422 Concepts of Medical Imaging, Prerequisite: BME 200A, (3 Cr. Hrs.)

Diagnostic Ultrasound Imaging, Magnetic Resonance Imaging (MRI), Radiographic Imaging Systems, Emission Imaging systems, Comparison of Imaging modes.

BME 430 Bioinformatics I, Prerequisite: BME 102, (3 Cr. Hrs.)

Introduction to Bioinformatics, principles and computational methods for organizing and maintaining large volume of genomic data. Genome sequencing projects, proteomics and gene expression studies. Fundamentals theories will be

presented to define the modeling philosophy and principles as well as simulation methodologies for the integration of genomic and physiological data in the analysis of complex biological processes and for diagnostic matters.

BME 431 Bioinformatics Lab, Prerequisite: BME 430, (1 Cr. Hrs.)

This Lab emphasizes the hands-on application of bioinformatics methods to biological problems. Students will gain experience in the application of existing software, as well as in combining approaches to answer specific biological questions. Sequence alignment, fast database search, profiles and motifs, comparative genomics, gene finding, phylogenetic trees, protein structure, functional characterization of proteins, expression anaylysis, and computational proteomics.

BME 446 Pattern Recognition & Decision Making, Prerequisite: BME390 A, (3 Cr. Hrs.)

Overview of issues related to medical decision making. Introduction to concept of evidence-based medicine and decision processes related to process of care and outcomes. Basic probability and statistics to understand research results and evaluations, and algorithmic methods for decision-making processes (Bayes theorem, decision trees, neural networks, and fuzzy methods). Study design, hypothesis testing, and estimation. Technical advances in medical decision support systems and expert systems, review of classic and current research. Introduction to common statistical and decision-making software packages to familiarize students with current tools.

BME 460 Medical Instruments, prerequisite: BME 420, (3 CR. Hrs.)

Medical therapeutic systems including the following: Cardiac Pacemakers (external, implantable, pacing system analyzer); Cardiac Defibrillator ; Instruments for Surgery and Electro-surgical Units, Laser Applications in Biomedical Fields (Pulsed Ruby Laser, Nd-YAG Laser, Helium-Neon Laser, Argon Laser, CO2 Laser, Semiconductor Lasers); Physiotherapy and Electrotherapy Equipment; Haemodialysis Machines and Artificial Kidney. Lithotriptors; Anaesthesia Machine; Ventilators; Automated Drug Delivery Systems.

BME 498D Graduation Project 1 , Prerequisite: Directed by the Department, (1 Cr. Hr.)

Theoretical investigation and problem identification of a special project in Biomedical engineering under the supervision of an academic faculty member, detailed report as well as an oral examination are required.

BME 500 F Field Training, Prerequisite: directed by the department, (3 Cr. Hrs.)

A training period of two months to be spent in the medical informatics or bioinformatics industry or research centers (inside or outside Jordan),under the

follow up of an academic faculty member from the department, periodic reports and a final report must be submitted for evaluation, an oral examination is required.

BME 500 G Field Training, Prerequisite: directed by the department, (6 Cr. Hrs.)

A training period of four months to be spent in the medical informatics or bioinformatics industry or research centers (inside or outside Jordan), under the follow up of an academic faculty member from the department, periodic reports and a final report must be submitted for evaluation, an oral examination is required.

BME 532 A Management and Design of Health Care Systems, Prerequisite: BME 350, (3 Cr. Hrs.)

Principles of health information management. admitting procedures, analysis of the medical records, organizing health information systems, statistics and legal aspects of medical records services. Acquisition and maintenance of health care data. Develop knowledge in the areas of numbering, filing, indices, registers, record retention, storage and retrieval systems, microfilming and optical disk storage. Billing office procedures and basic computerization in the health information management department, including the keyless data entry techniques for bar coding, smart cards, voice recognition, magnetic strip, touch screens, electronic data interchange, and optical character recognition.

BME 536 Electronic Health Systems, Prerequisite: BME 350, (3 Cr. Hrs.)

Instruction in installation and maintenance of health IT VISTA system. Principles underlying system configuration. Topics Covered: System elements, VISTA Kernel, FileMan, TaskMan, MailMan, DB security, VistA Security, VistA maintenance, VistA users management, HL7, RPC and KIDS.

BME 537 VistA System (Kernel and FileMan) Lab, Prerequisite: BME 530, (1 Cr. Hrs.)

This course is focused on VistA CPRS (Veterans Health Information Systems and Technology Architecture Computerized Patient Record System) software. Specialties: PIMS (Registration, Primary Care Management Module (PCMM), ADT, Services, Wards and Clinics), Pharmacy (IP, OP, PDM, IMO, Controlled Substances and BCMA setup),Laboratory (General, Micro, Anatomic Pathology and BloodBank), Radiology/Nuclear Medicine(Registration, Workload, examination and reporting), Surgery(Scheduling, Anesthesia, OR Rooms and reports), Service Providers(CPRS, Flowsheets, BCMA, CP, ICD9 and CPT), and introduces students advanced features of MUMPS language and its effective use in creating real applications in the VistA setting. Topics Covered: Using VistA libraries, Review of best practices in ViSTA application development, Software development Lifecycle, FileMan APIs, Kernel APIs, VA programming standards and RPC programming.

BME 540 Networks in Health Care Systems, Prerequisite: BME 532, (3 Cr. Hrs.)

Telecommunication concepts necessary for understanding network design and operation both within and between health care organizations. Topics include network designs (topology), client-server and mainframe environments, the operation of various network hardware devices (servers, routers, gateways, modems, cable types, etc.), network operating systems (NT, W2000, Unix, etc.), network protocols in health care (HL7, DICOM) and other network applications. Investigate processes, procedures and considerations for creating reliable computer networks. The understanding of telecommunications concepts is essential for teaming with technical professionals.

BME 542 Safety & Security of Health Information System, Prerequisite: BME 440, (2 Cr. Hrs.)

Extensive study of established safety standards, insuring proper patient, personal, and environmental safety. Inclusive are requirements for testing, monitoring, and recording safety procedures subsequent to governmental and industry medical standards. Comprehensive overview of the security, privacy and intrusion detection of health care networks. Health care network Defense and Countermeasures. Health care network encryption crypto-graphical methods, electronic signature, and authentication tools. Recent trends in safety and security of Health information system.

BME 564 Telemedicine, Prerequisite: BME 460, (3 Cr. Hrs.)

Overview of telemedicine in the context of the general health care system, application of telemedicine in various medical specialties and settings, e.g., countryside, military/aerospace and corrections; variety of issues in implementing operating a telemedicine program including business plan development, technology, economics, legal/ethical, training, protocol development, and evaluation.

BME 572A Biosafety, Biosecurity, and Bioethics. Prerequiste: BME 460, (2 Cr. Hr.)

Extensive study of established safety standards, insuring proper patient, personal, and environmental safety. Inclusive are requirements for testing, monitoring, and recording safety procedures subsequent to governmental and industry standards. Provide applications of safety, calibration and troubleshooting techniques to practical situations. Mutual visits to hospital environment to gain onsite practical safety experience and help the students understand ethics and legal issues they face in their work and defining the students on the processes used in ethical decision-making and legal matters related to human health and biomedical research. Provide students with the necessary resources, help, and guidance to achieve an additional analysis, realization, and practice in their field of profession.

BME 598D Graduation Project 2 , Prerequisite: BME 498B (3 Cr. Hrs.)

Theoretical investigation and practical implementation of special projects in the fields of Biomedical Engineering will be supervised by an academic member of the faculty. The project is a continuation of BME 498A. Periodic reports and a final report must be submitted for evaluation, an oral examination is required.

**** Optional Courses:**

BME 104 pathophysiology II, Prerequisite: BME102, (3 Cr. Hrs.)

It includes the physiology and basic mechanisms of diseases and selected common disorders of the following systems: gastrointestinal and hepatobiliary, genital, endocrine, musculoskeletal, and nervous systems.

BME 464 A Modeling and Analysis of Biomedical Signals, Prerequisite: BME 420, (3 Cr. Hrs.)

Parametric modeling, modern spectral estimation, multivariate analysis, adaptive signal processing, decimation/interpolation, wavelets, and two-dimensional signal analysis. Principal component analysis, Independent component analysis (ICA), Nonlinear methods. There will be several computer projects, which apply these modern techniques to physiologic data.

BME 466 Coding theory and Cryptography, Prerequisite: BME 532A, (3 Cr. Hrs.)

Mathematical foundations of Coding Theory, polynomial classes, codes , linear systematic codes, cyclical codes, BCH-Codes, error-detection and correction; introduction to Cryptography, symmetric and asymmetric encryption, cryptographic algorithms: MD5, IDEA, Public key Encryption: RSA; digital signatures and encrypted EMAIL with PGP

BME 530 Bioinformatics II, Prerequisite: BME 430, (3 Cr. Hrs.)

Apply fundamental bioinformatics methods to analyze protein sequence and structure data, genomic DNA sequence, and gene expression data. Interpret and evaluate results of key bioinformatics analyses; System biology focusing on the development of models on molecular and tissue level. . Design effective strategies for application of bioinformatics methods, including appropriate controls and/or significance tests. Combine fundamental methods into multi-part strategies for addressing complex problems.

BME 534 Computational Biology, Prerequisite: BME 430, (3 Cr. Hrs.)

Computational modeling focuses on modeling and analysis of biological systems. The multiscale modelling of biological systems, using mathematical models and computer tools. Modelling strategies. Compartmental models of physiologic systems. Cellular models, organ models, systems models. Methods and tools for identification. Analysis of molecular biology databases, sequence analysis, modeling of regulatory networks and metabolic pathways. Examples will be discussed from systems biology and biomedical applications.

BME 544 Medical Image Processing, Prerequisite: BME 422, (3 Cr. Hrs.)

Fundamental concepts of low and high level image processing algorithms used in medical image analysis (such as those that occur in MRI, CT, PET or SPECT imaging). A basic review of image acquisition, through low level processing to high level object extraction and recognition: Image enhancement, restoration, filtering, segmentation, morphology, texture, presentation & description, compression, recognition & interpretation, and registration. These topics will be demonstrated throughout projects.

BME 550 Medical Documentation, Prerequisite: BME 532A, (3 Cr. Hrs.)

Basic principles of medical documentation systems, classifications and nomenclatures. Use and benefit of medical documentation systems. Important medical classification systems (ICD, SNOMED, ICPM, TNM). Typical examples of medical documentation. Classification and nomenclatures in medicine. Planning and maintenance of medical documentation systems. Analysis and evaluation of medical information systems.

BME 596B Special Topics, Prerequisite: department's directions, (3 CR. Hrs.)

The contents of the special topic course will be in the field of biomedical systems and different from the contents of the offered courses. It will be determined by the department.