Karpaga Vinayaga College of Engineering and Technology
Department of Biomedical Engineering
Course Outcomes (R-2017)

	HS8151-Communicative English
C101.1	Listen, understand and respond to others in different situations
C101.2	write with clarity in simple, apt and flawless language with coherence and cohesion
C101.3	Explain the basic grammar techniques and utilise it in enhancing language development.
C101.4	Read and comprehend a variety of texts adopting different reading skills
C101.5	Develop flair for any kind of writing with rich vocabulary and proper syntax
C101.6	Write technical articles and present papers on any topic of any genre.
	MA8151- Engineering Mathematics - I
C102.1	Explain mathematical techniques to problems in a wide range of practical engineering problems
C102.2	Constructs arguments to prove and justify results
C102.3	Manipulates algebraic expressions involving exponential functions
C102.4	Manipulates algebraic expressions involving logarithmic functions
C102.5	Apply techniques of integration to calculate areas and volumes
C102.6	Interpret and communicate mathematics in a variety of problem solving.
	PH8151 Engineering Physics
C103.1	Explain then basics of properties of matter and its applications,
C103.2	Explain concepts of waves and optical devices and their applications in fibre optics,
C103.3	Describe concepts of thermal properties of materials and their applications in expansion joints and heat exchangers
C103.4	Demonstrate advanced physics concepts of quantum theory and its applications in tunneling microscopes
C103.5	Explain basics of crystals, their structures and different crystal growth techniques.
C103.6	Explain applications of physics relevant to various streams of science and technology
	CY8151- Engineering chemistry
C104.1	Explain boiler feed water requirements, related problems and water treatment techniques.
C104.2	explain basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys
C104.3	Explain Preparation, properties and applications of engineering materials
C104.4	Describe types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
C104.5	Explain principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
C104.6	Describe concepts of absorption and catalysis
	GE8151- Problem Solving and Python Programming

C105.1	Develop algorithmic solutions to simple computational problems
C105.2	Read, write, execute by hand simple Python programs
C105.3	Structure simple Python programs for solving problems
C105.4	Decompose a Python program into functions
C105.5	Explain compound data using Python lists, tuples, dictionaries
C105.6	Read and write data from/to files in Python Programs
	GE8152- Engineering graphics
C106.1	Discuss about conics and orthographic views of engineering components
C106.2	Illustrate the projection of points, lines and planes
C106.3	Classify solids and projection of solids at different positions
C106.4	Explain sectioned view of solids and development of surface
C106.5	Illustrate isometric projection and perspective views of an object/solid
C106.6	Apply the concept of drawing in practical applications
	GE8161- Problem Solving and Python Programming Laboratory
C107.1	Write, test, and debug simple Python programs
C107.2	Implement Python programs with conditionals and loops
C107.3	Develop Python programs step-wise by defining functions and calling them
C107.4	Use Python lists, tuples, dictionaries for representing compound data.
C107.5	Read and write data from/to files in Python.
C107.6	Formulate problems and implement algorithms in python
	BS8161 - Physics and Chemistry Laboratory
C108.1	Determne Rigidity modulus, Young's modulus, wavelength of mercury spectrum
C108.2	Determine Young's modulus by non-uniform bending method
C108.3	Determine thickness of a thin wire – Air wedge method
C108.4	Acquire hands-on knowledge in the quantitative chemical analysis of water quality related parameters.
C108.5	Determine thermal conductivity of a bad conductor – Lee's Disc method
C108.6	Determine water quality parameters through volumetric and instrumental analysis of sound and compressibility of liquid – Ultrasonic interferometer
	HS8251-Technical English
C109.1	Breakdown the ideas in to its elementary constituents, analyze and act after a meaning full thought process
C109.2	Analyze the phrase and passage and explicitly pass on the ideas meaning fully
C109.3	Manage to interpret the given phrase or the graphical rendering and review the contents well individually or as a group
C109.4	Concentrate on the communication aspect of complicated ideas and respond positively

C109.5	Debate the issues and find the rudiments of the problem individually and as a group.
C109.6	Respond intelligently and seek clarification and understand completely.
	MA8251 Engineering Mathematics -II
C110.1	Apply Laplace transform technique to solve the given ordinary differential equation
C110.2	Explainconcepts of vector calculus, needed for problems in all engineering disciplines.
C110.3	Compute line, surface and volume integral using Gauss divergence, Green's and stoke's theorem.
C110.4	Find the singularities and its corresponding residues for the given function.
C110.5	Find double integral over general areas and triple integral over general volumes
C110.6	Apply Gauss Divergence theorem for evaluating the surface integral.
	PH8253-Physics for Electronics Engineering
C111.1	Explain the use of magnetic materials.
C111.2	Explain the use of semiconducting materials.
C111.3	Describe modern engineering materials and its appliications
C111.4	Explain dielectric materials and its applications
C111.5	Explain advance engineeing materials and its applications
C111.6	Explain various types of materials and their applications in engineering and technology
	BM8251 - Engineering Mechanics for Biomedical Engineers
C112.1	Explain fundamental principles of mechanics
C112.2	Explain effect of force on bodies
C112.3	Explain basics of fluid mechanics and relate it to bio-fluids
C112.4	Explain the action of friction and motion
C112.5	Describe basics of dynamics of particles
C112.6	Describe basics and statistics of particles
	BM8201 - Fundamentals of Bio Chemistry
C113.1	Describe different types of biological buffers and biomolecules with their significant functions.
C113.2	Explain the classification, properties and different biochemical pathways towards the energy generation processes of carbohydrates
C113.3	Explain the classification, properties and different biochemical pathways of lipids
C113.4	Explain the chemistry of nucelic acids and Metabolism and Disorder of purines and pyrimidines
C113.5	Describe the classification, structure, properties of proteins, amino acids and establish the relation between biochemical defects and metabolic disorders.
C113.6	Illustrate the mechanism of actions of enzymes and co-enzymes, clinical importance of enzymes and interpretation of their activities.
	EC8251 - Circuit Analysis

C114.1	Explain basic electric circuits and its analysis
C114.2	Solve circuits using network theorems
C114.3	Describe phenomenon of resonance in coupled circuits.
C114.4	Explain transient response of circuits
C114.5	Analyze transisent circuits
C114.6	Apply Phasor diagrams and analysis of three phase circuits
	GE8261 - Engineering Practices Laboratory
C115.1	Identify Tools and Techniques used for Sheet Metal Fabrication
C115.2	Use welding equipment to join the structures.
C115.3	Measure various electrical quantities
C115.4	Explain the working of electronic components and its utilization
C115.5	Apply electronic principles to develop circuits for primitive application
C115.6	Demonstrate Plumbing requirements of domestic buildings
	BM8211 - Bio Chemistry Laboratory
C116.1	Describe safe laboratory practice and handle the equipment safely
C116.2	Demonstrate Preparation of buffers and measurement of pH
C116.3	Perform Qualitative tests of carbohydrates, proteins & Amino Acids,
C116.4	Demonstrate analysis of biochemical parameters and their interpretation in Blood sample
C116.5	Identify blood collection tubes and phlebotomy equipments
C116.6	Acquire knowledge of separation technology of proteins and aminoacids.
	MA8352 - Linear Algebra and Partial Differential Equations
C201.1	Compute basic objects associated with vector spaces and linear transformation
C201.2	Explain Concepts on eigenvalues and eigenvectors of a matrix and inner product spaces
C201.3	Explain fundamental concepts of partial differential equations and the various solution procedures for solving the first order non-linear partial differential equations.
C201.4	Demonstrate analytical methods for solving higher order partial differential equations.
C201.5	Solve initial boundary value problems in one dimensional wave and heat equations
C201.6	Find boundary value problems in elliptic equations
	EC8352 -Signals and System
C202.1	Define various properties and operation of signals & system.
C202.2	Explain about various types of signals and systems, classify them.
C202.3	Determine the idea of different types of signals and how a system produces an output(basically what happens inside a system).
C202.4	Analyze discrete & continous time signals and system in the Fourier,LTI and Z transform domain.

C202.5	Evaluate the time and frequency response of Continuous and Discrete time systems which are useful to understand the behaviour of electronic circuits and communication system
C202.6	Compute the output of an LTI system in the time and frequency domains
	BM8351 - Anatomy and Human Physiology
C203.1	Define the general terminology, cell structure and function, histology, gross anatomy, and physiology related to the various human systems
C203.2	Draw and label of various anatomical parts of the human systems
C203.3	Explain about interconnect of various anatomy and physiological systems
C203.4	Explain of how these human organ systems are interrelated to apply a holistic approach to human health.
C203.5	Apply concept and knowledge of human systems to novel technical and/or clinical scenarios
C203.6	Apply the theoretical knowledge of anatomy and physiological parameters to identify human systems
	BM8301 - Sensors and Measurements
C204.1	Measure various electrical parameters with accuracy, precision, resolution.
C204.2	Select appropriate passive or active transducers for measurement of physical phenomenon.
C204.3	Select appropriate light sensors for measurement of physical phenomenon.
C204.4	Use AC and DC bridges for relevant parameter measurement.
C204.5	Employ Multimeter, CRO and different types of recorders for appropriate measurement.
C204.6	Determine the different sensing devices
	EC8353 - Electron Devices and Circuits
C205.1	Define the structure and working operation of basic electronic devices.
C205.2	Explain the current voltage characteristics of semiconductor device
C205.3	Apply and adapt the required components to construct on amplifier circuits & oscillators
C205.4	Analyze the characteristics of different electronic devices such as diodes and transistors
C205.5	Evaluate frequency response to understand behaviour of electronic circuits
C205.6	Demonstrate the design and build sensor based project.
	BM8302 -Pathology and Microbiology
C206.1	Describe the cellular responses to stress . Cell degeneration, cellular repair and concepts of tumour
C206.2	Describe the causes and pathophysiology of different fluid and haemodynamic disorders
C206.3	Apply the knowledge to operate the different types of microscope and prepare specimens for observation
C206.4	Apply the knowledge to identify cause and prevention method to control various infectious disease due to bacteria and viruses
C206.5	Explain the concept of cell mediated immunity and hypersensitivity
C206.6	Apply the knowledge in Diagnose the infectious diseases using immunological techniques like immunofluroscence, ELISA, RIA and immunoelectrophoresis

	BM8311 -Pathology and Microbiology Laboratory
C207.1	Examine phyical and chemical parameter of urine samples
C207.2	Demonstrate proper usage, identify the parts/functions of the following microscopes
C207.3	Examine the morphology of bacteria using various staining techniques (Gram staining, acid fast, capsule,spore)
C207.4	Perform practical experiments on tissue processing, cryoprocessing and staining techniques
C207.5	Identify haematology slides of anemica and leukemia and slides of malarial parasites, micro filaria and leishmania donovani
C207.6	Explain bone marrow charts
	BM8312 - Devices and Circuits Laboratory
C208.1	Analyze the characteristics of basic electronic devices
C208.2	Design RL and RC circuits
C208.3	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems
C208.4	Investigate different configurations of FET and SCR
C208.5	Design microelecronic circuits using common base and common emitter
C208.6	Aquire knowledge Configuration of diode
	BM8313 - Human Physiology Laboratory
C209.1	Demonstrate the techniques related to haematological analysis
C209.2	Identification and enumeration of blood cells
C209.3	Perform, analyse and report on haematological experiments in human physiology
C209.4	Utilize scientific laboratory equipment in order to gather and analyze data on human anatomy and physiology
C209.5	Interpretation of the experimental results related to the pathological conditions
C209.6	Analysis of special sensory organs test
	MA8391 Probability and Statistics
C210.1	Explain the concepts of probability
C210.2	Apply standard distributions in real life phenomenon.
C210.3	Apply random process techniques in management problems.
C210.4	Solve management problems using sampling distributions
C210.5	Explain various distribution functions involving more than one variable
C210.6	Analyse the response of Random inputs to linear time invariant system
	BM8401 Medical Physics
C211.1	Explain the effects of non ionizing radiation and its effects in medical field.
C211.2	Define and list the intensities of sensory stimuli.
C211.3	Summarize how ionizing radiation interacts with the human body, how to quantify it and its levels seen in environment and healthcare.

C211.4	Explain the fundamentals of radioactivity and radioactive isotopes.
C211.5	Illustrate the methods of detecting and recording the ionizing radiation and its interaction with matter
C211.6	Outline the various ways to generate radioisotopes.
	EE8452 Basics of Electrical Engineering
C212.1	Identify right choice on motors for different applications
C212.2	Explain the operation of DC & Machines.
C212.3	Explain DC Generators and Motors.
C212.4	Explain synchronous Machines and Alternators.
C212.5	Explain power distribution to apply safety principles to biomedical equipments
C212.6	Analyze electromagnetic fields and its effects on different media
	EC8453 Linear Integrated Circuits
C213.1	Define fundamentals and areas of applications for the integrated circuits.
C213.2	Explain differences between theoretical, practical & simulated results in integrated circuits.
C213.3	Use the concepts of waveform generation and introduce some special function ICs
C213.4	Analyze special function Ics,ADC & DAC using OP-AMP and its application,PLL
C213.5	Evaluate appropriate integrated circuit modules to build a given application.
C213.6	Demonstrate the ability to design practical circuits that perform the desired operation.
	EC8393 Fundamentals of Data Structures In C
C214.1	Acquire knowledge in C program
C214.2	Describe the concept of structres,pointers
C214.3	Implement linear data structure operations using C
C214.4	Suggest appropriate linear / non-linear data structure for any given data set.
C214.5	Apply hashing concepts for a given problem and Appropriately choose the sorting algorithm for an application
C214.6	Describe the searching algorithems
	EC8392 Digital Electronics
C215.1	Define Digital fundamentals, Boolean algebra and its applications in digital systems
C215.2	Describe various semiconductor memories and related technology
C215.3	Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal.
C215.4	Analysis and design procedures for synchronous and asynchronous sequential circuits
C215.5	Evaluate various combinational digital circuits using logic gates
C215.6	Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraints
	EC8381 Fundamentals of Data Structures In C Laboratory

C216.1	Develop a C program for small applications using basic concepts
C216.2	Explain use of struture and union concepts
C216.3	Implement linear and non linear data strutures for problem solving
C216.4	Slove the problems using binary tree and binary seach tree
C216.5	implemnt the basic progams for searching
C216.6	Develop the algorithem for various sorting methods
	BM8411 Integrated Circuits Laboratory
C217.1	Define basics of linear integrated circuits and available ICs
C217.2	Describe characteristics of operational amplifier and Ics
C217.3	Apply knowledge in SPICE, it is board level design to check the integrity of circuit designs
C217.4	Analyse the working of PLL and use PLL as frequency multiplier.
C217.5	Evaluate various combinational digital circuits using logic gates
C217.6	Build the projects of 555 timers. 8051, op-amps, voltage regulator, and ICs
	EC8394 Analog and Digital Communication
C301.1	Apply analog and digital communication techniques
C301.2	Explain data and pulse communication techniques.
C301.3	Analyze Source and Error control coding
C301.4	Explain multi-user radio communication technology
C301.5	Describe the principle of pulse modulation techniques & determine number of bits per symbol required to represent the source
C301.6	Classify different analog and digital modulation schemes
	BM8501 Biocontrol Systems
C302.1	Explain the need for mathematical modelling of various systems, representation of systems in block diagrams and signal flow graphs and will translate it to biological systems
C302.2	Analyze the time response of various systems and test for system stability
C302.3	Analyze the frequency response characteristics of various systems using different charts.
C302.4	Describe the concept of modelling physiological systems
C302.5	Demonstrate the application aspects of time and frequency domain analysis in physiological control system
C302.6	Analyze simple simulation models of physiological contrrol systems
	BM8502 Biomedical Instrumentation
C303.1	Explain concept of biomedical equipments
C303.2	Explain the biomedical instrumentation ideas and training to inculcat in healthcare
C303.3	Explain the function and working of bioelectronic circuits.
C303.4	Explain non electrical physiological parameters and its necssaity in modern healthcare

C303.5	Construct different instrumentation methods and measurements.
C303.6	Apply biomedical instrumentation performance of electrical along with non electrical physiological measurements
	EC8553 Discrete-Time Signal Processing
C304.1	Explain discrete fourier transform, properties of DFT and its application to linear filtering
C304.2	Explain characteristics of digital filters, design digital IIR and FIR filters and apply these filters to filter undesirable signals in various frequency bands
C304.3	Apply knowledge in SPICE, it is board level design to check the integrity of circuit designs
C304.4	Explain design & analysis of DSP systems like FIR and IIR Filter etc.
C304.5	Examine spectral analysis of the signals
C304.6	Constrct different filter structure and also to develop algorithm for signal processing.
	OBT552 BASICS OF BIOINFORMATICS
C305.1	Explain the concepts of retriving protein sequence, nucleotide sequence from databases
C305.2	Demonstrate the importance of biological databases and their significance
C305.3	Explain concepts of file formats, submission of sequence data in databases and data retrivals tools.
C305.4	Explain about the concept of pairwise sequence alignment and multiple sequence alignment , algorithms and tools for pairwise and multiple seqeunce alignment
C305.5	Construct phylogenetic tree based on the biological information
C305.6	Explain various applications of bioinformatics (gene finding, gene annotation, comparative genomics)
	BM8001 Medical Optics
C306.1	Demostrate the knowledge of optical properties of tissue (L2)
C306.2	Desctibe the components of instrumentation in medical photonics and configurations (L2)
C306.3	Explain the properties of laser to applications in surgery (L2)
C306.4	Explain the various non-thermal diagnostic applications of light source. (L2)
C306.5	Illustrate the emerging techniques in using photonics to biomedical imaging (L2)
C306.6	Explain the optical properties of biological tissues and translate it to vaarious diagnostic and therapeutic applications (L2)
	EC8562 Digital Signal Processing Laboratory
C307.1	Definethe concept of generation of signals and signal processsing
C307.2	Describe their abilities towards DSP processor based implementation of DSP systems
C307.3	Implement Linear and Circular Convolution
C307.4	Analyse the applications of Fast Fourier Transform in DSP
C307.5	Evaluate Signal Generation and Manipulation
C307.6	Propose low pass,band pass,band stop and high pass FIR filters using the window functions
	BM8511 Biomedical Instrumentation Laboratory

C308.1	Explain basic concepts of biological amplifiers and circuits
C308.2	Demonstrate signal acqusition of various biosignals
C308.3	Illustrate the knowledge acquired from basic integrated circuits lab to design preamplifiers for various bio signal acquisition.
C308.4	Design and analyze the characteristics of amplifier and recording instruments of modern healthcare
C308.5	Identify non-electrical and biochemical measurement techniques
C308.6	Analyze biomedical instrumentation performance of electrical along with non electrical physiological measurements
	HS8381 Interpersonal Skills/Listening & Speaking
C309.1	Demonstrate active listening skills
C309.2	Read fluently and comprehend the given texts
C309.3	Involve actively in group discussion, interviews and presentation.
C309.4	Develop public speaking skills.
C309.5	Participate actively in role play, and debate.
C309.6	Make power point presentations and perform effectively in interviews and group discussions
	EC8691 Microprocessors and Microcontrollers
C310.1	Explain the instruction set of 8086 microprocessor
C310.2	Describe ALP for fixed and Floating Point and Arithmetic operations using 8086
C310.3	Analyze the internal architecture of 8085 and write assembly language program in 8085μp.
C310.4	Analyze internal architecture of 8086μp, addressing modes, instruction sets and write assembly language program using 8086μp.
C310.5	Apply the concepts of different coprocessors – numeric and I/O processor
C310.6	Explain the interface ROM, RAM, temperature controller and stepper motor.
	BM8601 Diagnostic and Therapeutic Equipment - I
C311.1	Describe the working and recording setup of all basic cardiac equipment.
C311.2	Understand the working and recording of all basic neurological equipment's.
C311.3	Discuss the recording of diagnostic and therapeutic equipment's related to EMG.
C311.4	Explain about measurements of parameters related to respiratory system.
C311.5	Describe the measurement techniques of sensory responses.
C311.6	Measure the total respiratory volume using spirometer and use of ventilator
	BM8651 Biomechanics
C312.1	Explain the principles of mechanics
C312.2	Explain computational mathematical modelling applied in biomechanics.
C312.3	Explain the principles of biofluid dynamics
C312.4	Explain the fundamentals of bio-solid mechanics
C312.5	Apply the knowledge of joint mechanics.

C312.6	Explain applications of computational mathematical modelling applied in biomechanics.
	GE8291 Environmental Science and Engineering
C313.1	Explain the values, threats, conservation of biodiversity and ecosystems
C313.2	Discuss various pollution control methods and waste management
C313.3	Explain the effects of Natural resource exploitation on environment
C313.4	Distinguish various environmental laws & regulation for environmental sustainability
C313.5	Explain the effect of Human population and role of IT on environment
C313.6	Discuss scientific, technological, economic and social solutions to environmental problems
	BM8002 Artificial organs and Implants
C314.1	Explain about the principles, construction and control of artificial organs.
C314.2	Explain different types of soft tissue and hard tissue replacements
C314.3	Interpretation of main features of biomaterials and the biocompatibility phenomena.
C314.4	Basic knowledge of transplantology connected with the immunological problems caused artificial organs application.
C314.5	Apply the concepts in function and relationship between the structure and functionality of chosen artificial organ.
C314.6	Beside of technical problems, Student is sensitive to ethical, economical, environmental and legal.
	MD8091 Hospital Management
C315.1	Explain the principles of Hospital administration
C315.2	Identify the importance of Human resource management
C315.3	Explain various marketing research techniques.
C315.4	Identify Information management systems and its uses
C315.5	Expalin safety procedures followed in hospitals
C315.6	Explain various accrediation procedure for hospitals
	EC8681 Microprocessors and Microcontrollers Laboratory
C316.1	Explain the instruction set of 8086 microprocessor
C316.2	Describe ALP for fixed and Floating Point and Arithmetic operations using 8086
C316.3	Construct different waveforms using 8086 microprocessor & controller
C316.4	Analyze assembly language programs for various applications using 8051 microcontroller
C316.5	Apply the specific tasks of embedded systems in displaying microwave's information, receiving remote signals, etc.
C316.6	Develop programs for arithmetic operations, code conversion using 8085 Microprocessor.
	BM8611 Diagnostics and Therapeutic Lab
C317.1	Measure different bioelectrical signals using various methods
C317.2	Assess different non-electrical parameters using various methodologies
C317.3	Illustrate various diagnostic and therapeutic techniques

C317.4	Examine the electrical safety measurements
C317.5	Analyze the different bio signals using suitable tools.
C317.6	Outline the importance of patient safety against electrical hazard
	BM8612 Mini Project
C318.1	Formulate a real world problem, identify the requirement and develop the design solutions.
C318.2	Demonstrate a through and systematic understanding of project contents.
C318.3	Understand methodologies and professional way of documentation and communication.
C318.4	Know the key stages in development of the project.
C318.5	Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
C318.6	Extend or use the idea in mini project for major project.
	BM8701 Diagnostic and Therapeutic Equipment - II
C401.1	Describe the patient monitoring system and biotelemetry using physiological signal
C401.2	Explain ultrasound and pulse echo techniques in A, B and M mode
C401.3	Compare various Diathermy equipments
C401.4	Explain the special diagnostic equipment like endoscopy and thermography
C401.5	Identify electric shock hazards using biomedical equipment
C401.6	Demonstrate testing and measurements of various sensory responses
	EC8093 Digital Image Processing
C402.1	Explain fundamental concepts of a digital image processing system.
C402.2	Describe the basics of segmentation, features extraction, compression and recognition methods for color models.
C402.3	Apply the concept of rapid advances in Machine vision and develop any image processing application
C402.4	Analyze images in the frequency domain using various transforms.
C402.5	Apply the techniques for image enhancement and image restoration.
C402.6	Explain the proposed artificial intelligence algorithm
	BM8702 Radiological Equipments
C403.1	Describe the working principle of X-ray machine and its application
C403.2	Demonstrate the various generations of computed tomography and will illustrate the working principle of it and its applications
C403.3	Explain the concepts of Magetic resonance imaging and relate it with functional applications
C403.4	Demostrate the advances of radionuclides and interpret the techniques used for visualizing various functional sections of the body
C403.5	Explain the different radiation therapy methodologies
C403.6	Describe the methods of Radiation safety and radiation protection priciples
	BM8703 Rehabilitation Engineering
C404.1	Explain the fundamentals of rehabilitation and rehabilitation team members.

C404.2	Descirbe the key engineering principles of rehabilitation and assitive technology.
C404.3	Apply the types of therapeutic exercises to benefit the society
C404.4	Design and apply different types Hearing aids, visual aids and their application in biomedical field and hence the benefit of the society.
C404.5	Explain engineering concepts in Virtual reality based rehabilitation devices
C404.6	Identify prosthetic and orthotic devices for restoration of limb function
	BM8002 Robotics in medicine
C405.1	Explain the basics of a robotic system
C405.2	Explain the basics of Kinematics and task planning of a robotic manipulator
C405.3	Construct inverse kinematic motion planning solutions for vaarious robotic configurations
C405.4	Demonstrate the applications of the robotic systems in medical field.
C405.5	Solve the kinematics problems of a basic robotic system
C405.6	Describe the vision system used in Robotics and the various techniques used for processing the images
	BM8702 Radiological Equipments
C406.1	Describe the working principle of X-ray machine and its application
C406.2	Demonstrate the various generations of computed tomography and will illustrate the working principle of it and its applications
C406.3	Explain the concepts of Magetic resonance imaging and relate it with functional applications
C406.4	Demostrate the advances of radionuclides and interpret the techniques used for visualizing various functional sections of the body
C406.5	Explain the different radiation therapy methodologies
C406.6	Describe the methods of Radiation safety and radiation protection priciples
	EC8762 Digital Image Processing Laboratory
C407.1	Describe enhancing operations on the image using spatial filters and frequency domain filters.
C407.2	Explain the concepts of image restoration and segmentation.
C407.3	Apply image processing technique to solve real health care problems.
C407.4	Use transforms and analyse the characteristics of the image.
C407.5	Apply the compression technique on the images.
C407.6	Apply various techniques on medical images for obtaining important clinical information and to solve real healthcare problems
	MD8751 Hospital Training
C408.1	Explain principles and working of all the medical equipment present in hospital, evaluate the equipment and machinery on the basis of cost.
C408.2	Communicate effectively and develop their leadership and teambuilding abilities
C408.3	Apply modern change management and build innovation management concepts to optimise hospital structures
C408.4	Demonstrate the function and working of hospital safety hazards, bioelectronic circuits.

C408.5	Analyse existing hospital service policies and enhance the activities of the hospital.
C408.6	Demonstrate resources and management of equipments and administration
	BM8073 Biometric systems
C409.1	Explain the technologies of fingerprint,iris,face and speech recognition
C409.2	Discuss the general principles of design of biometric systems and the underlying trade-offs
C409.3	Identify the personal privacy and security implications of biometrics based identification technology
C409.4	Explain the different strategies of scan and multimodal biometrics
C409.5	Discuss the issues in the realistic evaluation of biometric based systems
C409.6	Demonstrate the design of basic biometric system
	BM8076 Electrical Safety and Quality Assurance
C410.1	Explain basics of electrical concepts and electrical hazards
C410.2	Explain standards and requirements for electrical safety
C410.3	Explain protection methods for electrical requirements from hazards
C410.4	Describe procedures used in quality control and assurance activities as well as safety measures used in hospital
C410.5	Explain regulatory requirement for healthcare
C410.6	Explain electrical protection and maintenance in working environment and ensure electrical safety
	BM8811 Project Work
C411.1	Explain the basic concepts & broad principles of Biomedical engineering projects
C411.2	Apply concepts of Project and Production Management
C411.3	Organise effectively to achieve perfection in project implementation & completion.
C411.4	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach
C411.5	Implement project planning in their Industrial In-Plant training work
C411.6	Demonstrate professionalism with ethics; present effective communication skills and relate engineering issues to broader societal context