



Vel Tech Rangarajan & Dr.Sagunthala R&D Institute of Technology
Department of Bio Medical Engineering (VTUR21 Curriculum)

Foundation Courses of VTUR21						
Sl. No.	Course Code	Course Name	Class distribution per week			C
			L	T	P	
1	10210PH102	Physics of Materials	3	0	0	3
2	10210CH102	Bio Chemistry	3	0	0	3
3	10210CS101	Problem Solving using C	3	0	0	3
4	10210ME101	Design thinking	2	0	0	2
5	10210MA201	Matrices & Calculus	2	0	2	3
6	10210EN201	Professional Communication - I	1	0	2	2
7	10210ME201	Engineering Graphics	1	0	4	3
8	10210CH301	Engineering Chemistry Lab	0	0	2	1
9	10210EE301	Engineering Products Lab	0	0	2	1
10	10210CS301	Problem Solving using C Lab	0	0	2	1
11	10210PH103	Applied Physics	2	0	0	2
12	10210BM101	Biology for Engineers	2	0	0	2
13	10210MA203	Vector Calculus & Complex variable	2	0	2	3
14	10210EN202	Professional Communication - II	1	0	2	2
15	10210EE202	Basic Electrical & Instrumentation Engineering	2	0	2	3
16	10210EE204	Introduction to Engineering	1	0	4	3
17	10210CS201	Python Programming	1	0	2	2
18	10210PH302	Applied Physics Laboratory	0	0	2	1
19	10210CS303	IT Workshop	0	0	2	1
20	10210MA104	Fourier Series & Transform techniques	3	0	0	3
21	10210CH103	Environmental Studies	2	0	0	2
22	10210ME102	Universal Human Values	3	0	0	3
23	10210ME103	Innovation & Entrepreneurship	2	0	0	2
24	10210ME104	Project Management & Finance	2	0	0	2
25	10210MA106	Probability & Random Process	3	0	0	3
			Total			56
26		Induction Cum Acquaintance Program	0	0	2	M
27	10210BL101	Constitution of India	1	0	0	M
28	10210ME105	Engineer and Society	1	0	0	M



S.No	Course Code	Program Core	Class distribution per week			C
			L	T	P	
1	10211BM101	Anatomy and Human Physiology	3	0	0	3
2	10211BM102	Analog and Digital Integrated Circuits	2	2	0	3
3	10211BM103	Electric Circuit Theory	2	2	0	3
4	10211BM104	Engineering Mechanics	2	2	0	3
5	10211BM105	Bio Sensors and Transducers	3	0	0	3
6	10211BM106	Control systems	3	2	0	4
7	10211BM107	Microcontroller and Digital Signal Processor	2	2	0	3
8	10211BM108	Digital Signal Processing	2	2	0	3
9	10211BM109	Biomaterials	3	0	0	3
10	10211BM110	Bio Medical Instrumentation	3	0	0	3
11	10211BM111	Diagnostic and Therapeutic Equipments	3	0	0	3
12	10211BM112	Radiological Equipments	3	0	0	3
			Total			37
Program Core Integrated Courses						
13	10211BM201	Pathology and Microbiology	2	0	2	3
14	10211BM202	Artificial Neural Networks	3	0	2	4
15	10211BM203	Biomechanics	2	0	2	3
16	10211BM204	Image Processing	3	0	2	4
			Total			14
Laboratory Courses						
17	10211BM301	Biochemistry and Physiology Laboratory	0	0	2	1
18	10211BM302	Analog and Digital Circuits Laboratory	0	0	2	1
19	10211BM303	Sensors and Transducers Laboratory	0	0	2	1
20	10211BM304	Microcontrollers and DSP Processor Laboratory	0	0	2	1
21	10211BM305	Digital Signal Processing Laboratory	0	0	2	1
22	10211BM306	Biomedical Instrumentation Laboratory	0	0	2	1
23	10211BM307	Diagnostic and Therapeutic Equipments Laboratory	0	0	2	1
			Total			7
Total Credits						58



S.No	Course Code	Program Electives	Class distribution per week			C
			L	T	P	
1	10212BM101	Hospital Management	3	0	0	3
2	10212BM102	Telehealth Technology	3	0	0	3
3	10212BM103	Medical Ethics	3	0	0	3
4	10212BM104	Body Area Networks	3	0	0	3
5	10212BM105	Introduction to Nanotechnology	3	0	0	3
6	10212BM106	Rehabilitation Engineering	3	0	0	3
7	10212BM107	Robotics in Medicine	3	0	0	3
8	10212BM108	Biomedical Informatics	3	0	0	3
9	10212BM119	Medical optics	3	0	0	3
10	10212BM120	Medical Device Regulatory Affairs	3	0	0	3
11	10212BM121	Tissue Engineering	3	0	0	3
Program Elective Integrated Courses						
12	10212BM201	Digital Imaging and Communication in Medicine	1	0	4	3
13	10212BM202	Brain-Computer Interface	1	0	4	3
14	10212BM203	Biomedical Computational Modelling	1	0	4	3

S. No	Course Code	Specialization	Class distribution per week			C
			L	T	P	
Major (AI in Healthcare)*						
1	10212BM109	Introduction to Machine Learning	2	2	0	4
2	10212BM204	Introduction to Deep Learning	3	0	2	4
3	10212BM110	Natural Language Processing	3	0	0	3
4	10212BM304	Essential Python Modules for Machine Learning Laboratory	0	0	2	1
5	10212BM122	High-Performance Computing	3	0	0	3
6	10212BM123	Computer Vision*	3	0	0	3
*yet to be framed					Total	18
Honors (Precision Healthcare Technology)						
1	10212BM205	Foundations of Data Science and R	3	0	2	4
2	10212BM111	Inferential Analysis and Machine Learning	3	0	0	3
3	10212BM112	Precision Medicine in Chronic Diseases	3	0	0	3
4	10212BM301	Inferential Medical Data Analytics Using R	0	0	4	2
5	10212BM113	Predictive Analysis of Medical Data	3	0	0	3
6	10212BM114	Healthcare Operations Research	3	0	0	3
					Total	18



Minor (Brain-Computer Interface)						
1	10213BM110	Neurophysiology	2	0	0	2
2	10213BM111	Introduction to BCI and Signal Acquisition Methods	3	0	0	3
3	10213BM112	Digital Signal Processing	3	2	0	4
4	10213BM203	BCI Feature Extraction & Translation	3	0	2	4
5	10213BM302	BCI Data Analysis with MNE	0	0	2	1
6	10213BM113	BCI-Applications and Ethics	3	0	0	3
7	10213BM303	EEG Recording & Analysis Laboratory	0	0	2	1
			Total			18

S.No	Course Code	Open Electives	Class distribution per week			C
			L	T	P	
1	10213BM201	Bio Signal Processing Instrumentation	2	0	2	3
2	10213BM202	Brain Computer Interface	2	0	2	3
3	10213BM101	Body Area Networks	3	0	0	3
4	10213BM102	Environmental Conservation	3	0	0	3
5	10213BM103	Telehealth Technology	3	0	0	3
6	10213BM104	Medical Instrumentation	3	0	0	3
7	10213BM105	Drone in Healthcare	3	0	0	3
8	10213BM301	Biomedical Lab	0	0	2	1
MOOC COURSE						
9	10213BM106	Data Management for clinical research				
10	10213BM107	Biophotonics				
11	10213BM108	BioMEMS and Microfluidics				
12	10213BM109	Organ printing				



Program Educational Objectives

Our Graduates will be

1. Employed in Biomedical Engineering related fields or in other career fields in industry, government organizations or academe (Career accomplishment)
2. Able to continue to enhance their professional skills in their chosen profession by participating in professional organizations, completing additional college courses, or completing industry-sponsored short courses. (Professional accomplishment)
3. Active members to serve the society (Professional)
4. Solve critical problems in the domain of biomedical engineering (Professional)

Program Outcomes

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.



7. **Environment and sustainability:** Understand the impact of the professional engineering solution in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage

Program specific outcomes

1. Apply critical reasoning to identify, solve, design solution for problems in BCI biomedical engineering;
2. Design an effective interface between living and non living things