VIT | Vidyalankar Institute of Technology
Accredited A+ by NAAC

Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Biomedical Engineering

Programme Structure (R-2025)

(As per NEP 2020, with effect from the Academic Year 2025-26)

VIDYALANKAR INSTITUTE OF TECHNOLOGY, WADALA, MUMBAI-37
VIT Vidyalankar Institute of Technology

Preamble

The National Education Policy (NEP) framework aims to break the mould from teacher centric to student centric educational practices. It empowers the students with flexibility in terms of choosing courses across different faculties and mode of learning.
This multidisciplinary approach will encourage learners to follow their passion and inherent interests. The learner is free to learn at a pace that he is comfortable with and this enables life long learning. It also enhances the scope for holistic personality development.
This premise is truly reflected in preamble of the NEP document, "The future of nation is decided in the classrooms of the schools and colleges today".

Details of implementation:

NEP curriculum framework enables us to accelerate change, redesign systems with equity in mind, respond to feedback, encourage collaboration, catch and pollinate ideas and create a culture of research and development. It will allow us to offer the required academic flexibility which will focus on improving competency level of students with diverse strengths.
The curriculum planned by VIT has vertical Program Courses consisting of core courses (PCC) of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. This vertical also includes Professional elective courses (PEC) which offer flexibility and diversity to learners to choose specialization from a basket of recent developments in their field of technology. The selection of unique professional elective courses based on industrial requirements and organizing them into tracks is a special feature of this curricula ensuring employability.
The vertical Multidisciplinary Courses consists of Open Elective (OE) courses and multidisciplinary minor (MD M) courses. Special vocational and skill development courses are included as a part of Skill courses vertical that make student capable to work in industrial environment.
The student is expected to demonstrate their ability through course in Experiential Learning Courses vertical like internships/On Job Training, Community Engagement Project, Real Industry Project/ research problem. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking. This will lead to creation of products and/ or patents through this program.
For holistic development of students, apart from technical courses, Ability Enhancement Courses, Entrepreneurship/Economics/Management Courses, Indian Knowledge System and Value Education courses from vertical Humanities and Social Science and Management develop the required soft-skills and attitude amongst learners.
In Liberal Learning vertical. courses like Various Dance Forms, Global citizenship Education, Facets of Astronomy etc. aims to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.
In addition to core courses, professional and open electives; our framework offers honour degree in each programme of engineering. It includes specialized courses along with field/ domain study that make student capable of working on industry relevant problems.

Chairman, Board of Studies
Department of Biomedical Engineering
Vidyalankar Institute of Technology

VIDYALANKAR INSTITUTE OF TECHNOLOGY, WADALA, MUMBAI-37. VIT Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

About Biomedical Engineering Department

Department of Biomedical Engineering at Vidyalankar Institute of Technology Accredited is by National Board of Accreditation, New Delhi for the UG program in Biomedical Engineering.

The Department has a clear vision to become a Centre of Excellence in the field of Biomedical engineering where learners are nurtured in a scholarly environment to evolve into competent professionals to benefit society.

The Department is rich in Human Resources with faculty having expertise in various domain. Emphasis is given on experiential learning and has modern lab facilities to involve students in more experimentation. The department has established Centre for Academic Excellence in collaboration with G.E. Healthcare. Also, we have an active MoU with Capgemini Engineering for students training, placements, and faculty enrichment. In past dept. has rendered cumulative efforts to enhance learning by conducting various workshops and FDPs.

Vision

To be a globally recognized centre of excellence in the field of biomedical engineering where learners are nurtured in a scholarly environment to evolve into competent professionals to benefit society

Mission

Evolve a curriculum which emphasizes on strong engineering fundamentals with the flexibility to choose advanced courses of interest and gain exposure to tools and techniques in Biomedical Engineering.

Encourage a teaching-learning process in which highly competent faculty share a symbiotic association with the institutes of repute.

Facilitate creation and dissemination of biomedical engineering knowledge through a digitally-enabled learning environment.

Develop academic and infrastructural facilities with modern equipment and other learning resources and encourage reciprocal sharing with other institutes through networking.

Establish a centre of excellence to enhance academia – biomedical industry partnership and work on collaborative projects.

Programme Educational Objectives

To enable the pursuit of knowledge in the field of Biomedical Engineering and contribute to the profession and employability of the students.

To engage in research, generate the employment through entrepreneurship and work effectively in multidisciplinary environment.

To understand the human, social, ethical and environmental context of their profession and contribute positively to the needs of individuals and society.

Programme Outcomes

PO1: Engineering Knowledge: Ability to apply knowledge of mathematics, science and engineering for the solution of biomedical engineering problems.

PO2: Problem Analysis: Ability to formulate and analyze complex biomedical engineering problems.

PO3: Design/development of Solutions: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, and public health.

PO4: Conduct Investigations of Complex Problems: Ability to design and conduct experiments, and to analyze and interpret data.

PO5: Modern Tool Usage: Ability to use the techniques, skills, and modern engineering tools necessary for biomedical engineering practice.

PO6: The engineer and society: Ability to include societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Ability to consider the impact of engineering solutions on environment and the need for sustainable development.

PO8: Ethics: Ability to incorporate professional ethics, responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Ability to work effectively as an individual, and as a member or leader in multidisciplinary environment.

PO10: Communication: Ability to communicate effectively on complex engineering activities.

PO11: Project Management and Finance: Knowledge and understanding of principles of management and finance in relation to biomedical engineering projects.

PO12: Life-long Learning: Appreciation of technological change and the need for independent life-long learning.

Programme Specific Outcomes

PSO1: Apply advanced science and engineering to solve the problems at the interface of engineering and healthcare.

PSO2: Demonstrate understanding of the principles and working of the hardware and software aspects of biomedical systems.

PSO3: Use professional and ethical practices, strategies and tactics for the development, operation and maintenance of biomedical technologies.

PSO4: Provide effective and efficient real time solutions using acquired knowledge in various domains.

Laboratory Infrastructure

The Department of Biomedical Engineering at Vidyalankar Institute of Technology, Mumbai, is equipped with modern and well-established laboratory facilities that promote experiential learning, innovation, and interdisciplinary research. These specialized labs support core areas such as biomedical instrumentation, medical imaging, artificial intelligence/machine learning, biomedical signal processing, and biomechanics, providing students with the skills needed to thrive in a technology-driven healthcare environment.

Outfitted with modern equipment and simulation tools, the laboratories offer a platform for students to explore, design, and develop smart healthcare solutions. The department emphasizes practical training aligned with current medical technology trends, ensuring students are well-prepared to address real-world healthcare challenges with confidence and technical proficiency.

Highlights of the Laboratories

1. **Human Anatomy, Prosthetics, and Instrumentation**
    - Equipped with anatomical models and charts
    - Hands-on exposure to prosthetic development
    - Notable project includes low-cost prosthetic arm
    - Biomedical sensors for ECG, EEG, EMG, etc.
    - Oscilloscope, soldering stations, and data analysis tools
    - Notable project: Insulin cooler using Peltier module for temperature-sensitive storage

2. **Biomedical Signal Processing and Simulation**
    - Facilities for signal processing, biological data acquisition, and simulation
    - Focus on diagnostics and treatment innovations through computational modeling
    - Brainstorming and tinkering space for ideation and prototyping

3. **Innovation and Industry Collaboration**

- **Externally Funded Projects**
    - Smart Robotic Wheelchair – Funded under TIH Chanakya Fellowship 2023 (DST)
- **Notable Student Projects & Achievements**
    - Syringe Infusion Pump – Presented at CiiA-3 Innovation Exhibition
    - Telegynaec App – 1st prize at Tantravihar 2024 and 2nd prize at IEEE Technovation 2024
    - GaitSynergy (Vision + EMG) – Presented at CiiA-3 Innovation Exhibition

Our Biomedical Engineering laboratories serve as centers of innovation, hands-on learning, and interdisciplinary collaboration, enabling students and faculty to explore real-world healthcare challenges through technology-driven solutions. These labs support advanced project development, research, and active industry engagement, fostering an environment that bridges academic knowledge with practical applications. The department has received CSR funding from Powerica Ltd., enhancing lab infrastructure and student project support. Additionally, a strategic collaboration with Wipro GE

Healthcare has led to the establishment of a Centre for Academic Excellence, aimed at equipping students with industry-aligned skills and exposure to cutting-edge biomedical technologies.

Industry Collaboration

In line with our vision to bridge the gap between academic learning and industry practices, our institution has forged strategic partnerships with leading organizations such as Jupiter Hospital, Pace Rover Medical Systems, Monitra Healthcare, ChembioSens, Capgemini, and NGOs including Asha Foundation, The Movement India, and My Green Society.

These collaborations underscore our commitment to creating a dynamic and immersive learning ecosystem that equips students to meet real-world challenges and seize emerging opportunities. Through these alliances, students gain exceptional access to internships, specialized training modules, value-added courses, and project-based learning—each offering practical insights into current industry practices and trends.

By closely engaging with our industry and NGO partners, we ensure that our curriculum stays current, innovative, and aligned with evolving technologies and methodologies. This approach not only enhances students' professional preparedness but also fosters a mindset of lifelong learning and adaptability—key to thriving in today's competitive global landscape.

Department Collaborations and MoUs

Placements

At Vidyalankar Institute of Technology, Mumbai, the Biomedical Engineering Department is committed to empowering students for successful careers at the intersection of healthcare and technology. Our placement initiatives are designed to bridge academic learning with industry expectations, connecting our graduates with opportunities in leading medical technology companies, healthcare startups, hospitals, and research organizations.

We focus on nurturing both technical expertise and essential soft skills, ensuring students are well-rounded professionals ready to meet real-world challenges. Through career counseling, technical training, aptitude preparation, and internships, students gain valuable exposure to the biomedical industry. The department's placement cell collaborates with recruiters to organize on-campus drives, seminars, and industry interactions in areas such as biomedical instrumentation, medical imaging, healthcare IT, and product development—paving the way for students to make impactful contributions in the healthcare technology space.

Top Companies Recruiting

Our graduates have been placed in some of the most sought-after companies, including but not limited to:

- **Tech Giants:** Google, Microsoft, Amazon. Mathworks
- **Consulting Firms:** Accenture, Deloitte, Capgemini
- **IT Services and Solutions:** TCS, Infosys, Pred Healthcare, Citius Tech
- **Specialized Companies:** Tata Elxsi, Medtronic, Philips Healthcare, GE Healthcare, Siemens
- **Government Organizations:** Indian Patent Office, BIS, CDSCO

These firms actively recruit for specialized roles and provide exciting career paths in emerging technologies and domains.

Specialization Tracks in Autonomy Curriculum

The Biomedical Engineering Department at Vidyalankar Institute of Technology offers specialized tracks such as **Artificial Intelligence & Machine Learning (AIML)**, **Internet of Things (IoT)**, and **Biomedical Technology and Innovation**, along with the option to pursue **Advanced Honors** in **AI in Healthcare, Next-Gen Internet of Things, and Medical Imaging Technology.** Students also have freedom to opt for Minor degree in **Blockchain**, and **User Interface and User Experience (UI/ UX).** These tracks align

with cutting-edge industry trends, enabling students to build domain expertise and gain a competitive edge in the job market.

Possible Job Opportunities

1. **Biomedical Instrumentation & Medical Devices**
    - **Designations:** Biomedical Engineer, Field Service Engineer, Clinical Engineer, Product Support Engineer.
    - **Career Paths:** Installation and maintenance of medical equipment, device calibration, technical support in hospitals, R&D in device innovation.
    - **Estimated Salaries:** ₹3.5 LPA – ₹8 LPA, with senior roles in MNCs and hospitals reaching ₹12–15 LPA.

2. **Medical Imaging & Diagnostics Technology**
    - **Designations:** Imaging Systems Engineer, Application Specialist (MRI/CT/Ultrasound), Radiology Equipment Engineer.
    - **Career Paths:** Development and support of diagnostic imaging technologies, hospital imaging departments, medical imaging startups.
    - **Estimated Salaries:** ₹4 LPA – ₹10 LPA, with experienced professionals earning ₹15 LPA+ in specialized roles.

3. **Healthcare IT & Bioinformatics**
    - **Designations:** Healthcare Data Analyst, Clinical Informatics Specialist, Health IT Consultant.
    - **Career Paths:** Integration of IT in healthcare delivery, EMR/EHR system development, medical data analysis, digital health platforms.
    - **Estimated Salaries:** ₹5 LPA – ₹12 LPA, with senior-level roles and niche skills reaching ₹18–20 LPA.

4. **Government & Public Sector Opportunities**
    - **Designations:** Biomedical Engineer (Public Hospitals), Medical Equipment Officer, Regulatory Affairs Officer, Research Scientist.
    - **Career Paths:** Roles in government hospitals (AIIMS, ESIC), defense medical research (DRDO, INMAS), public health technology deployment (NHM), regulatory compliance (CDSCO)**.**
    - **Estimated Salaries:** ₹4 LPA – ₹10 LPA (Pay Matrix Level 6 to 10), with additional benefits and career progression through UPSC, SSC, or state-level exams

Comprehensive Placement Training

To support students in achieving these milestones, the department offers:

- Rigorous placement training sessions on aptitude, coding, and soft skills

- Industry expert-led workshops and boot camps
- Opportunities for internships and real-world project collaborations

The Biomedical Engineering Department of Vidyalankar Institute of Technology takes pride in nurturing well-rounded professionals, ensuring graduates are well-equipped to embark on a successful career trajectory.

Internships

At Vidyalankar Institute of Technology, Mumbai, we recognize the immense value of practical experience in shaping the career paths of our students. Our internship program plays a pivotal role in bridging the gap between academic learning and real-world application. By offering students the opportunity to work with industry professionals and engage in hands-on projects, we ensure they gain invaluable insights into the latest technological advancements and industry practices.

Through internships, students not only apply their theoretical knowledge but also develop critical soft skills such as teamwork, communication, and problem-solving, which are essential for professional success. Our robust industry ties and strong placement network enable students to secure internships with leading organizations across various sectors, ranging from hospitals, medical device manufacturers, education sector, government organizations and healthcare IT.

The internship experience empowers students to explore their interests, build their professional portfolios, and enhance their employability. By providing real-world exposure, our internship program equips students with the confidence and expertise needed to excel in the ever-evolving job market.

Professional Bodies and Student Chapters

Biomedical Engineering Department has two technical student chapter committees for organizing technical activities, seminars and workshops to hone the skillset of students trying to excel in their specific domain of interest. Students have the liberty to take part as well as hold the office for these committees in college.

1. Biomedical Engineers Society of India (BMESI)
2. Biomedical Students Association (BMSA)

Biomedical Engineering Department students are also members and hold positions in other professional bodies that are managed by other departments which includes.

1. Institute of Electrical and Electronics Engineers (IEEE)
2. Institution of Electronics and Telecommunication Engineers (IETE)
3. Indian Society for Technical Education (ISTE)
4. FINTEC

Various technical activities at VIT Biomedical Engineering Department include Events, Workshops, Seminars, Guest Lectures, Internship Opportunities, Industry Exposure and Industrial/Hospital visits for the students as well as faculty members. Such holistic approach along with academics help students nourish their soft skills and have a demand over their oratory, management and technical skills.

Research

The Department of Biomedical Engineering at Vidyalankar Institute of Technology, Mumbai, actively drives impactful research through publications in reputed journals and conferences, fostering innovation and technological advancements. With a focus on Intellectual Property Rights (IPR), the department has achieved several Indian patents and copyrights while collaborating on consultancy projects with industries and institutes.

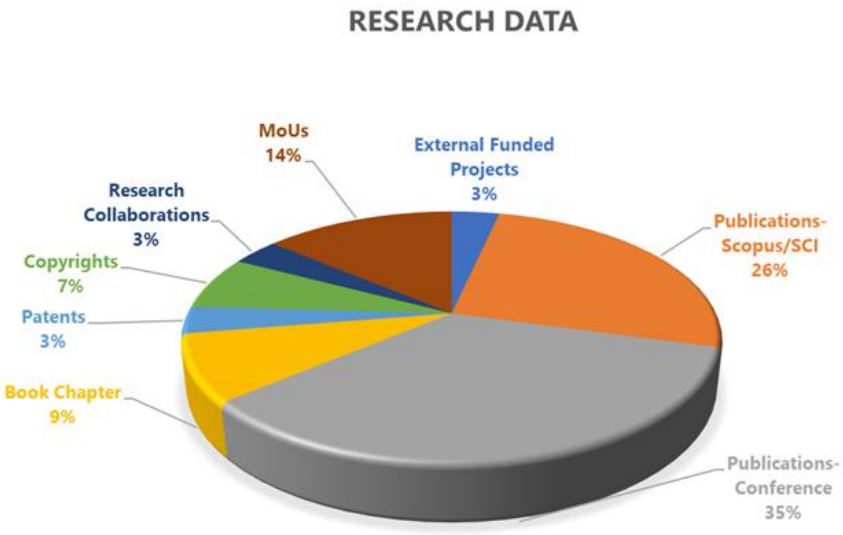
Revenue generation through testing, consultancy, training programs, and workshops contributes significantly to the department's growth. Participation in STTPs, FDPs, and professional workshops ensures continuous development of faculty and students. These initiatives underscore the department's commitment to excellence in research, innovation, and industry collaboration.

To promote the research environment, we have IEEE library subscription, and Turnitin for plagiarism checks. Many of our department faculties have presented in renowned National and International Conference and published papers in Scopus/SCI/UGC care indexed journals. Many of our faculties also serve as reviewer in Scopus indexed journals. The combination of Faculty Experience and the student's synergy has set the momentum and will enable us to cross the milestones.

Our department has made significant achievements and impactful contributions:

1. **Funding from external agencies:**
    - **Funding Agencies:** TIH IIT Bombay and Powerica Ltd
    - **Total grants:** Around Rs.10 lakhs.
2. **Publications and Intellectual Property:**
    - **Patents (Granted/Published/Filed):** Two patents have been filed in the last semester.
    - **Publications:** Over 20 research papers in reputed journals and conferences.
3. **Research Collaborations:**
   The department has established partnerships with renowned institutions, including:
    - UNSW, Australia
    - IIT Bombay
4. **Industry Engagement:**
    - **Memoranda of Understanding (MoUs):** Over 8 collaborations with leading industries to foster innovation, internships, and skill development.

Through its robust research ecosystem, the department continues to make meaningful advancements, contributing to academia, industry, and society while preparing students and faculty for global leadership in technology.



Student Projects

The Department of Biomedical Engineering at Vidyalankar Institute of Technology, Mumbai, places a strong emphasis on project-based learning, enabling students to transform theoretical knowledge into practical solutions. Our student projects reflect creativity, innovation, and technical expertise, and are

often developed in collaboration with industry experts who provide valuable feedback and guidance. This interaction ensures that the projects meet real-world industry standards and address current technological challenges.

Students actively participate in various national and international competitions, where they showcase their skills and earn recognition for their problem-solving abilities. Additionally, many of our students engage in research projects, contributing to academic advancements with research papers presented at reputed conferences and published in journals. Several projects have also led to patents and copyrights, demonstrating our students' ability to innovate and create valuable intellectual property.

The success of these projects is rooted in the rigorous teamwork and collaborative approach fostered within the department. Working together, students develop not only technical skills but also essential soft skills like communication, leadership, and project management, preparing them for successful careers in the tech industry. Through their projects, our students continue to set new benchmarks of excellence and contribute significantly to the field of Biomedical engineering. Few highlights are seen below:

Team Smart Robotic Wheelchair won the Second Prize in Hardware Category at
Team members: - Abhinav Paniketti,Shruti Jha, Saniya Ayire, Calix Jangul
Guide:- Prof. Arunkumar Ram

Megh Mhatre (BE Biomedical)'Best Student Paper' award at the International Conference titled IEEE 2024 Intelligent Signal Processing and Effective Communication Technologies (INSPECT 2024).

Student Achievements

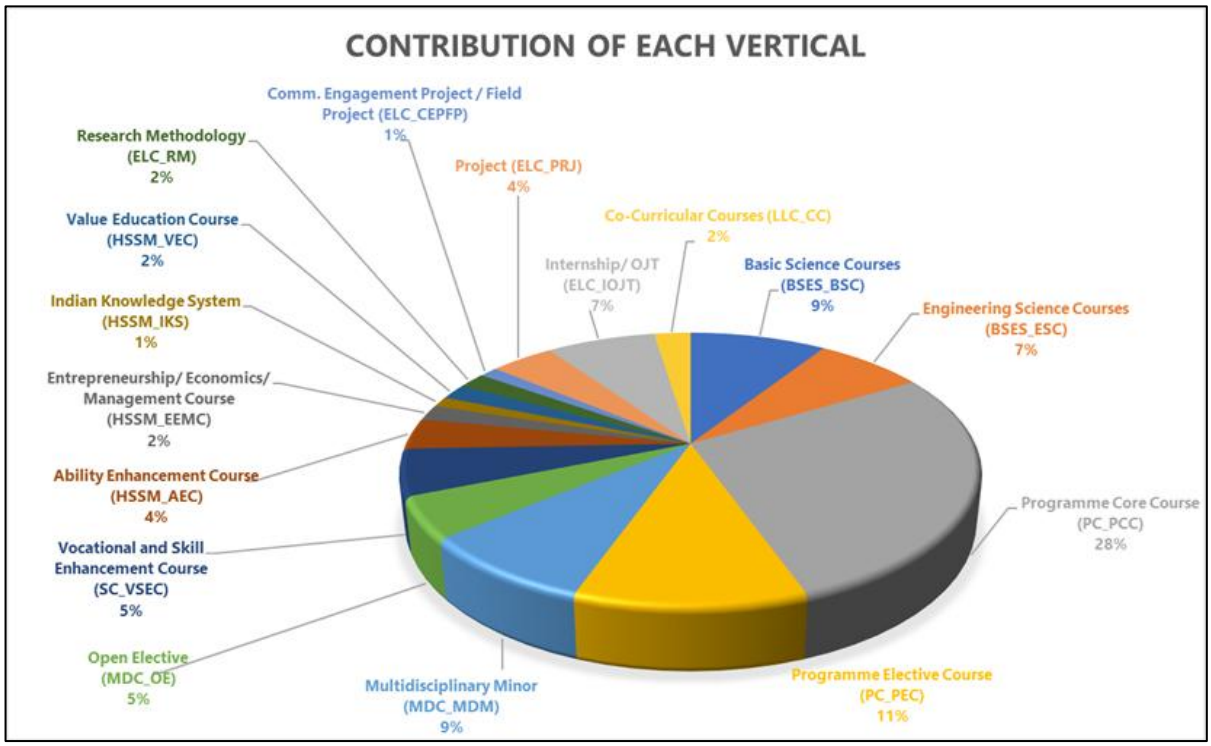
The Department of Biomedical Engineering at Vidyalankar Institute of Technology, Mumbai, is dedicated to the holistic development of its students. Our students excel academically, securing top ranks in university exams and contributing to research and innovation through technical projects and papers presented at conferences.

In addition to academics, our students actively participate in co-curricular activities, such as workshops, hackathons, coding competitions, and seminars, where they apply their knowledge and stay updated on emerging technologies. They also engage in a wide range of extra-curricular activities, winning accolades in sports, cultural events, and leadership roles.

Moreover, many of our students gain admission to prestigious universities worldwide, including the University of California and IITs, for higher studies. The consistent achievements of our students reflect the department's commitment to nurturing well-rounded individuals who are poised to make significant contributions to the tech industry and beyond. Few of them are mentioned below:

CREDIT ALLOTMENT

Sr. No.	Verticals		Sub-Verticals	Minimum Credits Required	Offered Credits
1	Basic Science and Engineering Science Courses (BSES)	1.a	Basic Science Courses (BSES_BSC)	15	15
		1.b	Engineering Science Courses (BSES_ESC)	12	12
2	Program Courses (PC)	2.a	Programme Core Course (PC_PCC)	46	46
		2.b	Programme Elective Course (PC_PEC)	18	54
3	Multidisciplinary Courses (MDC)	3.a	Multidisciplinary Minor (MDC_MDM)	14	56
		3.b	Open Elective (MDC_OE)	8	16
4	Skill Courses (SC)		Vocational and Skill Enhancement Course (SC_VSEC)	9	09
5	Humanities Social Science and Management (HSSM)	5.a	Ability Enhancement Course (HSSM_AEC)	6	6
		5.b	Entrepreneurship/ Economics/ Management Course (HSSM_EEMC)	3	6
		5.c	Indian Knowledge System (HSSM_IKS)	2	06
		5.d	Value Education Course (HSSM_VEC)	3	11
6	Experiential Learning Courses (ELC)	6.a	Research Methodology (ELC_RM)	3	03
		6.b	Comm. Engagement Project / Field Project (ELC_CEPFP)	2	02
		6.c	Project (ELC_PRJ)	7	07
		6.d	Internship/ OJT (ELC_IOJT)	12	12
7	Liberal Learning Courses (LLC)		Co-Curricular Courses (LLC_CC)	4	24
Total				**164**	**285**



Award of Degree

Learner is expected to successfully complete requirement of 161 credits (with minimum credits under each vertical and/or sub-vertical as mentioned above) for award of degree "B.Tech. in Biomedical Engineering".

Definition of Credit

Duration	Credit
1 Hr. Lecture (L) per week or 15 hours in a semester	1
1 Hr. Tutorial (T) per week or 15 hours in a semester	1
1 Hr. Practical (P) per week or 15 hours in a semester	0.5
30 hours of Internship/ OJT/ CEP/ FP in a semester	1

To empower Biomedical Engineering students with greater academic depth and interdisciplinary breadth, the undergraduate program offers Honours and Minor specializations. These additional academic credentials extend beyond standard coursework—embodying a commitment to intellectual curiosity, personal growth, and professional distinction.

Pursuing an Honours track enables in-depth expertise within Biomedical Engineering, while selecting a Minor fosters a broader perspective through complementary disciplines. Both pathways provide flexibility, formal recognition, and a competitive edge in advanced studies, impactful research, and diverse career trajectories across healthcare and biomedical innovation.

These options are available subject to eligibility criteria and offer a chance to craft a richer, more versatile academic profile—reflecting individual ambition and preparing graduates for a future of limitless possibilities.

Learners can choose to avail

i) "B.Tech. in Biomedical Engineering – Honors and Multidisciplinary Minor" degree or
ii) "B.Tech. in Biomedical Engineering - Honours with Research and Multidisciplinary Minor" degree or
iii) "B.Tech. in Biomedical Engineering with Double Minors (Multidisciplinary and Specialization Minor)" degree

by completing requirements of additional 18 credits, which will be over and above the 164 credits required for "B.Tech. with Multidisciplinary Minor" degree. Details of additional 20 credits are stated in Honours/ Minor Document.

Courses Under Various Verticals/ Sub-Verticals

1. Basic and Engineering Science Courses (BSES)

1.a. Basic and Engineering Science Courses>Basic Science Courses (BSES_BSC)

Minimum Credits Required = 15

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	BSC02	Engineering Mathematics-I	√	-	-	-	NIL	BSC 04	5	K	3	-	1	3	1
2	BSC11T	Engineering Chemistry	-	√	-	-	NIL	PCBM 03T&P	5	K	2	-	-	2	2
3	BSC11P	Engineering Chemistry Lab	-	√	-	-	NIL	PCBM 03T&P	5	S	-	2	-	1	2
4	BSC04	Engineering Mathematics-II	-	√	-	-	BSC 02	BSC 06	5	K	3	-	-	3	2
5	BSC06	Engineering Mathematics - III	√	-	-	-	BSC 04	BSC 08	6	K	3	-	-	3	3
6	BSC08	Engineering Mathematics - IV	-	√	-	-	BSC 06	PCBM 11T&P	6	K	3	-	-	3	4
Total Offered Credits														**15**	

1.b. Basic and Engineering Science Courses>Engineering Science Courses (BESC_ESC)

Minimum Credits Required = 12

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	ESC02T	Engineering Mechanics	√	-	-	-	NIL	ESC01 T&P	5	K	2	-	-	2	1
2	ESC02P	Engineering Mechanics Lab	√	-	-	-	NIL	ESC01 T&P	5	S	-	2	-	1	1
3	ESC06T	Basic Electrical & Electronics Engineering	√	-	-	-	NIL	ESC 10T&P	5	K	2	-	-	2	1
4	ESC06P	Basic Electrical & Electronics Engineering Lab	√	-	-	-	NIL	ESC 10T&P	5	S	-	2	-	1	1
5	ESC01T	Engineering Graphics	-	√	-	-	ESC02 T&P	PEBM 06 PCBM05	5	K	2	-	-	2	2

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
6	ESC01P	Engineering Graphics Lab	-	√	-	-	NIL	PEBM 06 PCBM05	5	S	-	2	-	1	2
7	ESC10T	Electronic Devices and Circuits	√	-	-	-	ESC06, PCBM 01	PCBM 02,	6	K	3	-	-	3	3
	ESC10P	Electronic Devices and Circuits Lab	√	-	-	-	ESC06, PCBM 01	PCBM 02,	6	S	-	2	-	1	3
Total Offered Credits														**12**	

2. Programme Courses (PC)

2.a. Programme Courses>Programme Core Courses (PC_PCC)

Minimum Credits Required = 46

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	PCBM01T*	Physics for Biomedical Engineering	√	-	-	-	NIL	PCBM 02T&P	5	K	2	-	-	2	1
2	PCBM01P*	Physics for Biomedical Engineering Lab	√	-	-	-	NIL	PCBM 02T&P	5	S	-	2	-	1	1
3	PCBM02T	Biomedical Transducers and Control Systems	√	-	-	-	ESC01 T&P PCBM 01T&P	PCB M06 T&P	6	K	2	-	-	2	3
4	PCBM02P	Biomedical Transducers and Control Systems Lab	√	-	-	-	ESC01 T&P PCBM 01T&P	PCBM 06 T&P	6	S	-	2	-	1	3
5	PCBM03T	Human Anatomy & Physiology	√	-	-	-	BSC11 T&p	PCBM 05T&P	6	K	2	-	-	2	3
6	PCBM03P	Human Anatomy & Physiology Lab	√	-	-	-	BSC11 T&p	PCBM 05T&P	6	S	-	2	-	1	3

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
7	PCBM04T	Digital logic design and analysis	-	√	-	-	PCBM 07T& P	PCBM 10T& P	6	K	2	-	-	2	4
8	PCBM04P	Digital logic design and analysis Lab	-	√	-	-	PCBM 07T& P	PCBM 10T& P	6	S	-	2	-	1	4
9	PCBM05	Biomechanics Prosthetics and Orthotics	-	√	-	-	PCBM 03T& P	PCBM 08T& P	6	K	2	-	1	3	4
10	PCBM06T	Analytical and Clinical Equipment	-	√	-	-	PCBM 02T& P	PCBM 09T& P	6	K	2	-	-	2	4
11	PCBM06P	Analytical and Clinical Equipment Lab	-	√	-	-	PCBM 02T& P	PCBM 09T& P	6	S	-	2	-	1	4
12	PCBM07T	Linear Integrated Circuits	-	√	-	-	ESC10 T&P	PCBM 04T& P	6	K	2	-	-	2	4
13	PCBM07P	Linear Integrated Circuits Lab	-	√	-	-	ESC10 T&P	PCBM 04T& P	6	S	-	2	-	1	4
14	PCBM08T	Biological Modelling and Simulation	-	√	-	-	PCBM 05	NIL	6	K	2	-	-	2	4
15	PCBM08P	Biological Modelling and Simulation Lab	-	√	-	-	PCBM 05	NIL	6	S	-	2	-	1	4
16	PCBM09T	Diagnostic and Monitoring Equipment	√	-	-	-	PCBM 06T& P	PCBM 13T& P	7	K	2	-	-	2	5
17	PCBM09P	Diagnostic and Monitoring Equipment Lab	√	-	-	-	PCBM 06T& P	PCBM 13T& P	7	S	-	2	-	1	5
18	PCBM10T	Microprocessors and Microcontrollers	√	-	-	-	PCBM 04T& P	PEBM 05T& P	7	K	2	-	-	2	5
19	PCBM10P	Microprocessors and Microcontrollers Lab	√	-	-	-	PCBM 04T& P	PEBM 05T& P	7	S	-	2	-	1	5
20	PCBM11T	Biomedical Digital Signal Processing	√	-	-	-	BSC08	PCBM 14T& P	7	K	2	-	-	2	5
21	PCBM11P	Biomedical Digital Signal Processing Lab	√	-	-	-	BSC08	PCBM 14T& P	7	S	-	2	-	1	5
22	PCBM12T	Medical Imaging Equipment	√	-	-	-	NIL	NIL	7	K	2	-	-	2	5
23	PCBM12P	Medical Imaging Equipment Lab	√	-	-	-	NIL	NIL	7	S	-	2	-	1	5

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
24	PCBM13T	Critical Care Equipment	-	√	-	-	PCBM 09T&P	PCBM 16	7	K	2	-	-	2	6
25	PCBM13P	Critical Care Equipment Lab	-	√	-	-	PCBM 09T&P	PCBM 16	7	S	-	2	-	1	6
26	PCBM14T	Digital Image Processing	-	√	-	-	PCBM 11T&P	NIL	7	K	2	-	-	2	6
27	PCBM14P	Digital Image Processing Lab	-	√	-	-	PCBM 11T&P	NIL	7	S	-	2	-	1	6
28	PCBM15	Biomedical Microsystems	-	√	-	-	NIL	NIL	7	K	2	-	-	2	6
29	PCBM16	Hospital Management	-	√	-	-	PCBM 13T&P	NIL	7	K	2	-	-	2	6
Total Offered Credits														**46**	

2.b. Programme Courses > Programme Elective Courses (PC_PEC)
Minimum Credits Required = 18

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	PEBM01T	Integrated Data Management	-	√	-	-	NIL	PEBM 04T&P	7	K	2	-	-	2	5
2	PEBM01P	Integrated Data Management Lab	-	√	-	-	NIL	PEBM 04T&P	7	S	-	2	-	1	5
3	PEBM02T	Modern Sensors for Internet of Things (IoT)	√	-	-	-	NIL	PEBM 05T&P	7	K	2	-	-	2	5
4	PEBM02P	Modern Sensors for Internet of Things (IoT) Lab	√	-	-	-	NIL	PEBM 05T&P	7	S	-	2	-	1	5
5	PEBM03T	Bio-Photonics	√	-	-	-	NIL	NIL	7	K	2	-	-	2	5
6	PEBM03P	Bio-Photonics Lab	√	-	-	-	NIL	NIL	7	S	-	2	-	1	5
7	PEBM04T	Artificial Intelligence	√	-	-	-	PEBM 01T &P	PEBM 07T&P	7	K	2	-	-	2	6

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
8	PEBM04P	Artificial Intelligence Lab	√	-	-	-	PEBM 01T &P	PEBM 07T&P	7	S	-	2	-	1	6
9	PEBM05T	Principles of Internet of Things (IoT)	-	√	-	-	PEBM 02T&P	PEBM 08T&p	7	K	2	-	-	2	6
10	PEBM05P	Principles of Internet of Things (IoT) Lab	-	√	-	-	PEBM 02T&P	PEBM 08T&p	7	S	-	2	-	1	6
11	PEBM06T	Robotics in Medicine	-	√	-	-	BSC 08	NIL	7	K	2	-	-	2	6
12	PEBM06P	Robotics in Medicine Lab	-	√	-	-	BSC 08	NIL	7	S	-	2	-	1	6
13	PEBM07T	Machine Learning	-	√	-	-	PEBM 04T&P	PEBM 10T&P	7	K	2	-	-	2	6
14	PEBM07P	Machine Learning Lab	-	√	-	-	PEBM 04T&P	PEBM 10T&P	7	S	-	2	-	1	6
15	PEBM08T	Embedded System Design with Tiny Operating System (OS)	-	√	-	-	PEBM 05T&P	PEBM 11T&P	7	K	2	-	-	2	6
16	PEBM08P	Embedded System Design with Tiny Operating System (OS) Lab	√	-	-	-	PEBM 05T&P	PEBM 11T&P	7	S	-	2	-	1	6
17	PEBM09T	Point of Care Technology	√	-	-	-	PCBM 13T&P	PEBM 12T&P	7	K	2	-	-	2	6
18	PEBM09P	Point of Care Technology Lab	√	-	-	-	PCBM 13T&P	PEBM 12T&P	7	S	-	2	-	1	6
19	PEBM10T	Deep learning	√	-	-	-	PEBM 07T&P	PEBM 13T&P	8	K	2	-	-	2	7
20	PEBM10P	Deep learning Lab	√	-	-	-	PEBM 07T&P	PEBM 13T&P	8	S	-	2	-	1	7
21	PEBM11T	Internet of Things (IoT) and Edge Computing	√	-	-	-	PEBM 08T&P	PEBM 14T&P	8	K	2	-	-	2	7
22	PEBM11P	Internet of Things (IoT) and Edge Computing Lab	√	-	-	-	PEBM 08T&P	PEBM 14T&P	8	S	-	2	-	1	7
23	PEBM12T	Biomedical Equipment Safety	-	√	-	-	PEBM 09T&P	PEBM 15T&P	8	K	2	-	-	2	7
24	PEBM12P	Biomedical Equipment Safety Lab	-	√	-	-	PEBM 09T&P	PEBM 15T&P	8	S	-	2	-	1	7

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
25	PEBM13T	Data Analytics	-	√	-	-	PEBM 10T&P	PEBM 16T&P	8	K	2	-	-	2	7
26	PEBM13P	Data Analytics Lab	-	√	-	-	PEBM 10T&P	PEBM 16T&P	8	S	-	2	-	1	7
27	PEBM14T	Internet of Things (IoT) Security and Trust	√	-	-	-	PEBM 11T&P	PEBM 17T&P	8	K	2	-	-	2	7
28	PEBM14P	Internet of Things (IoT) Security and Trust Lab	-	√	-	-	PEBM 11T&P	PEBM 17T&P	8	S	-	2	-	1	7
29	PEBM15T	Medical Device Regulation	√	-	-	-	PEBM 12T&P	PEBM 18T&P	8	K	2	-	-	2	7
30	PEBM15P	Medical Device Regulation Lab					PEBM 12T&P	PEBM 18T&P	8	S	-	2	-	1	7
31	PEBM16T	Basics of Natural Language Processing					PEBM 13T&P	NIL	8	K	2	-	-	2	7
32	PEBM16P	Basics of Natural Language Processing Lab					PEBM 13T&P	NIL	7	S	-	2	-	1	7
33	PEBM17T	Industrial Internet of Things (IIoT)					PEBM 14T&P	NIL	7	K	2	-	-	2	7
34	PEBM17P	Industrial Internet of Things (IIoT) Lab					PEBM 14T&P	NIL		S	-	2	-	1	7
35	PEBM18T	Installation & Maintenance of Medical Equipment					PEBM 15T&P	NIL		K	2	-	-	2	7
36	PEBM18P	Installation & Maintenance of Medical Equipment Lab					PEBM 15T&P	NIL		S	-	2	-	1	7
Total Offered Credits														**54**	

3.Multidisciplinary Courses

a. Open Elective Courses

Minimum Credits Required = 08

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	OEC01	Collaborative Inter-Institute Studies[$]	-	-	√	-	CEP01 AEC03	OJT 01	-	S	4	-		4	8
2	OEC02	Cyber Law	-	√	-	-	NIL	NIL	2	K	-	2	8	2	8
3	OEC03	Project Management	-	√	-	-	NIL	NIL	2	K	-	2	8	2	8
4	OEC04	Product Lifecycle Management	√	-	-	-	NIL	NIL	2	K	-	2	8	2	8
5	OEC05	Sustainability Management	√	-	-	-	NIL	NIL	2	K	-	2	8	2	8
6	OEC06	Renewable Energy Management	√	-	-	-	NIL	NIL	2	K	-	2	8	2	8
Total Offered Credits														**16**	

b. Multidisciplinary Minor (MDM)

Minimum Credits Required = 14

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	MDM01	Seminar					MDM XX01, 02,03	NIL	7	K	2	-	-	2	8
2	MDMBI01	Introduction to Bioinformatics	-	√	-	-	NIL	MDM BI02	6	K	2	-	-	2	8
3	MDMBI02	Algorithms and Data Structures in Bioinformatics	-	√	-	-	MDM BI01	MDM BI03	6	S	3	-	1	4	5
4	MDMBI03	Machine Learning Applications in Bioinformatics	√	-	-	-	MDM BI02	NIL	6	K	3	-	1	4	6
5	MDMIE01	Foundations of Innovation and Entrepreneurship	√	-	-	-	NIL	MDM IE02	5	S	3	-	1	4	7

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
6	MDMIE02	Startup Planning and Development	√	-	-	-	MDM IE01	MDM IE03	5	K	3	-	1	4	5
7	MDMIE03	Innovation Management and Scaling Startups	√	-	-	-	MDM IE02	NIL	6	S	3	-	1	4	6
8	MDMBD01	Introduction to Business Development and Marketing Principles	√	-	-	-	NIL	MDM BD02	5	K	3	-	1	4	7
9	MDMBD02	Financial Basics for Engineers and Technopreneurs	√	-	-	-	MDM BD01	MDM BD03	5	S	3	-	1	4	5
10	MDMBD03	Strategic Marketing and Business Planning	-	√	-	-	MDM BD02	NIL	6	K	3	-	1	4	6
11	MDMCS01	Computational Logic and Data Structures	-	√	-	-	NIL	MDM CS02	5	S	3	-	1	4	7
12	MDMCS02	Operating Systems and Computer Networks	-	√	-	-	MDM CS01	MDM CS03	5	K	3	2	-	4	5
13	MDMCS03	Database Systems and Introduction to Data Mining	-	√	-	-	MDM CS02	NIL	6	S	3	2	-	4	6
Total Offered Credits														**56**	

4. Vocational and Skill Enhancement Courses (VSEC)
Skill Courses

Minimum Credits Required = 09

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	VSEC01T	Structured Programming	√	-	-	-	NIL	VSEC02 T&P	5	S	2	-	-	2	1
2	VSEC01P	Structured Programming Lab	√	-	-	-	NIL	VSEC02 P&T	5	S	-	2	-	1	1
3	VSEC02T	Object Oriented Programming	-	√	-	-	VSEC01 T&P	VSEC04T	5	S	2	-	-	2	2

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
4	VSEC02P	Object Oriented Programming Lab	-	√	-	-	VSE C01 T&P	VSEC 04P	5	S	-	2	-	1	2
5	VSEC04T	Python Programming	√	-	-	-	VSE C02 T&P	PEBM XX	6	S	2	-	-	2	3
6	VSEC04P	Python Programming Lab	√	-	-	-	VSE C02 P&T	PEBM XX	6	S	-	2	-	1	3
Total Offered Credits														**09**	

5. Humanities, Social Sciences and Management Courses (HSSM)

a. Ability Enhancement Courses (AEC)

Minimum Credits Required = 06

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	AEC01T	Effective Communication	√	-	-	-	NIL	VEC 01T&p	5	A	2-	-	-	2	1
2	AEC01P	Effective Communication Lab	√	-	-	-	NIL	VEC 01T&p	5	A		2	-	1	1
3	AEC02	Technical and Business Writing	√	-	-	-	VEC 01T&p	AEC03	6	A	2	-	-	2	3
4	AEC03	Presentations Skills	-	√	-	-	AEC02	OJT-1 PRJ BM01	6	A	-	2-	1	1	4
Total Offered Credits														**06**	

b. Entrepreneurship/Economics/ Management Courses

Minimum Credits Required = 03

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	EEMC01	Design Thinking		√			NIL	NIL	6	K	2	2	-	3	4

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
2	EEMC02	Principles of Economics and Management		√			NIL	NIL	6	K	3	-	-	3	4
Total Offered Credits														**06**	

c. Indian Knowledge System (IKS)
Minimum Credits Required = 02

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	IKS01	Indian Traditional Knowledge System		√			NIL	NIL	5	A	2	-	-	2	2
2	IKS02	Indian Constitution		√			NIL	NIL	5	A	2	-	-	2	2
3	IKS03	Exploring Indian Art		√			NIL	NIL	5	A	2	-	-	2	2
Total Offered Credits														**06**	

d. Value Education Courses (VEC)

Minimum Credits Required = 03

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	VEC01T	Professional skills	-	√	-	-	AEC 01T&P	AEC 02T&P	5	A	2	-	-	2	2
2	VEC01P	Professional skills Lab	-	√	-	-	AEC 01T&P	AEC 02T&P	5	A	-	2	-	1	2
3	VEC02	E Waste and Environmental Management	-	√	-	-	NIL	NIL	5	A	-2	-	-	2	2
4	VEC03	Universal Human Values	-	√	-	-	NIL	NIL	5	A	2	-	-	2	2

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
5	VEC04	Responsibility towards sustainable environment	-	√	-	-	NIL	NIL	5	A	2	-	-	2	2
6	VEC05	Four Pillars of Democratic Nation	-	√	-	-	NIL	NIL	5	A	2	-	-	2	2
Total Offered Credits														**11**	

6. Experiential Learning Courses

a. Research Methodology (RM)

Minimum Credits Required = 03

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	RM01	Research Methodology	-	√	-	-	NIL-	NIL	8	K	3	-	-	3	8
Total Offered Credits														**03**	

b. Community Engagement Project /Field Project (CEP/FP)

Minimum Credits Required = 02

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	CEP01	Social Service Internship/ Project	-	-	-	√	CCXX	OJT01 PRJB M01	6	-	-	4	-	2	3/ Break of Sem III&IV
Total Offered Credits														**02**	

c. Project

Minimum Credits Required = 07

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	PRJBM01	Mini Project	√	-	-	-	CEP01 AEC03	PRJB M03	7	S		4		2	5
2	PRJBM02	Project Synopsis	-	√	-	-	PRJB M01	PRJB M03	7	S		4		2	6
3	PRJBM03	Project	√	-	-	-	PRJB M02	OJT02	8	S	1	4	-	3	7
Total Offered Credits														**07**	

d. Internship/On Job Training

Minimum Credits Required = 12

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	OJT01	Industry Internship-1	-	-	√	-	CEP01 AEC03	OJT02	7	S				5	Break of Sem VI&VII
2	OJT02	Industry Internship-2	-	√	-	-	OJT01	NIL	8	S				7	8
Total Offered Credits														**12**	

7. Liberal Learning Courses

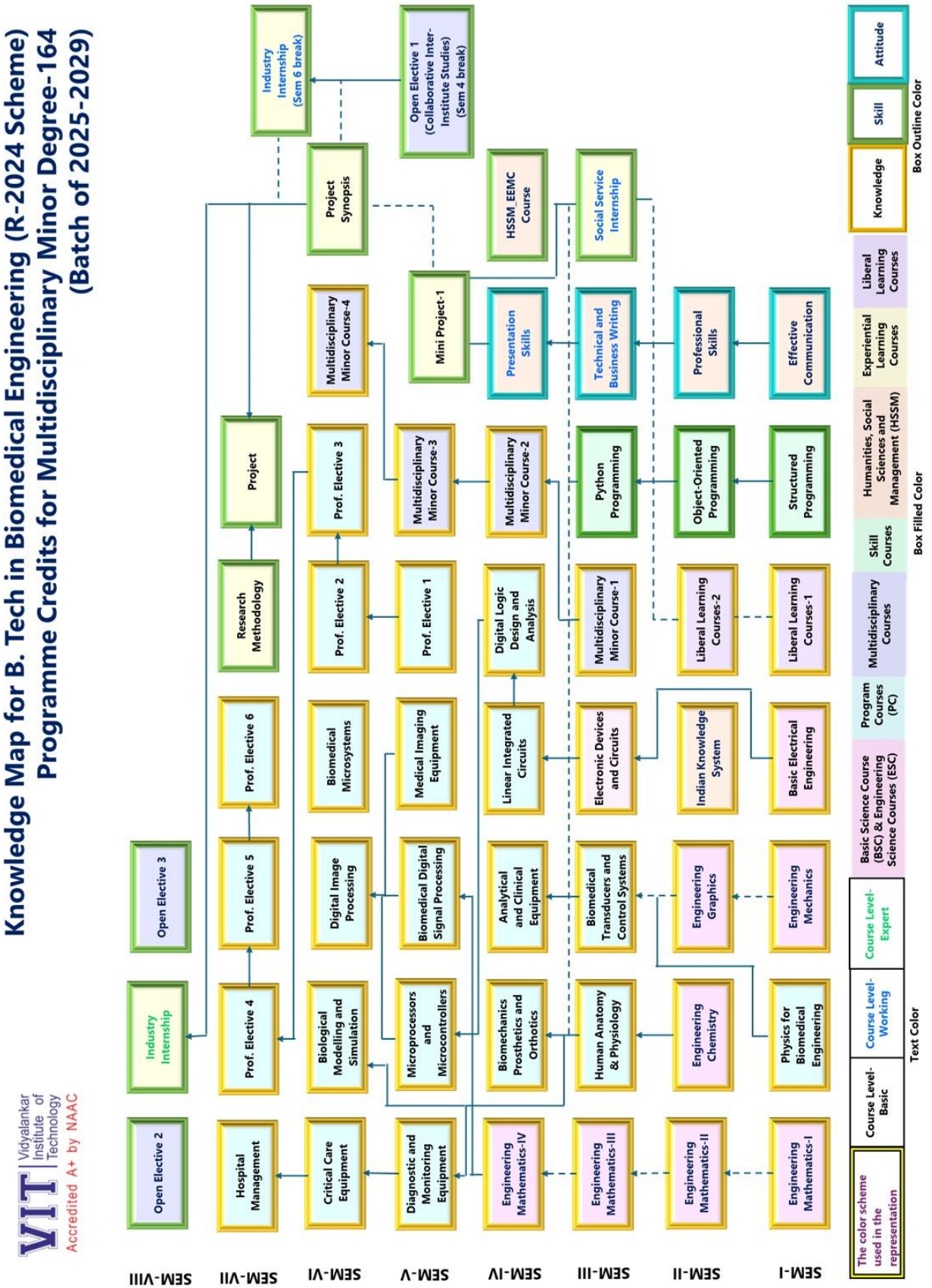
Co-curricular Courses (LLC-CC)

Minimum Credits Required = 04

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
1	CC01	Various Dance Forms	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
2	CC02	Corporate and Social Etiquettes	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
3	CC03	Global Citizenship Education	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2

Sr. No.	Course Code	Course Name	Offered in				Required Prerequisite	Prerequisite for	Course Level (as per NCrF)	KSA Mapping	Hours Per Week			Credits	Preferred Semester
			Fall	Spring	Summer	Winter					Theory	Practical	Tutorial		
4	CC04	Wellness – Body, Mind & Spirit	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
5	CC05	IQ vs EQ	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
6	CC06	Nutrition and Physical Wellness	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
7	CC07	Facets of Astronomy	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
8	CC08	Railways - Wonders of Infrastructure	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
9	CC09	Financial Literacy for Engineers	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
10	CC10	Mastering Advanced Excel	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
11	CC11	Personal Grooming Essentials	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
12	CC12	Various Music Forms	√	√	-	-	NIL	CEP01	5	A	2	-	-	2	1&2
Total Offered Credits														**24**	

Knowledge Map of VIT_BIOM_R-2025 Curriculum


Knowledge Map for B. Tech in Biomedical Engineering (R-2024 Scheme)
Programme Credits for Multidisciplinary Minor Degree-164
(Batch of 2025-2029)
Vidyalankar Institute of Technology
Accredited A+ by NAAC
SEM-I
SEM-II
SEM-III
SEM-IV
SEM-V
SEM-VI
SEM-VII
SEM-VIII
Engineering Mathematics-I
Engineering Mathematics-II
Engineering Mathematics-III
Engineering Mathematics-IV
Diagnostic and Monitoring Equipment
Critical Care Equipment
Hospital Management
Open Elective 2
Physics for Biomedical Engineering
Engineering Chemistry
Human Anatomy & Physiology
Biomechanics Prosthetics and Orthotics
Microprocessors and Microcontrollers
Biological Modelling and Simulation
Prof. Elective 4
Industry Internship
Engineering Mechanics
Engineering Graphics
Biomedical Transducers and Control Systems
Analytical and Clinical Equipment
Biomedical Digital Signal Processing
Digital Image Processing
Prof. Elective 5
Open Elective 3
Basic Electrical Engineering
Indian Knowledge System
Electronic Devices and Circuits
Linear Integrated Circuits
Medical Imaging Equipment
Biomedical Microsystems
Prof. Elective 6
Liberal Learning Courses-1
Liberal Learning Courses-2
Multidisciplinary Minor Course-1
Digital Logic Design and Analysis
Prof. Elective 1
Prof. Elective 2
Research Methodology
Structured Programming
Object-Oriented Programming
Python Programming
Multidisciplinary Minor Course-2
Multidisciplinary Minor Course-3
Prof. Elective 3
Project
Effective Communication
Professional Skills
Technical and Business Writing
Presentation Skills
Mini Project-1
Multidisciplinary Minor Course-4
Project Synopsis
Industry Internship (Sem 6 break)
HSSM_EEMC Course
Social Service Internship
Open Elective 1 (Collaborative Inter-Institute Studies) (Sem 4 break)
Basic Science Course (BSC) & Engineering Science Courses (ESC)
Program Courses (PC)
Multidisciplinary Courses
Skill Courses
Humanities, Social Sciences and Management (HSSM)
Experiential Learning Courses
Liberal Learning Courses
Box Filled Color
Course Level-Basic
Course Level-Working
Course Level-Expert
Text Color
Knowledge
Skill
Attitude
Box Outline Color
The color scheme used in the representation

Illustrative Semester wise

Credit Distribution Structure and Assessment Guidelines

(Based on NEP 2020 Guidelines)

for

Bachelor of Technology

in

Biomedical Engineering

Sr. No.	Verticals	Sub Verticals	Sem I		SemII		SemIII		SemIV		SemV		SemVI		SemVII		SemVIII		TOTAL
			Credits	Certification	Credits	Certification	Credits	Certification	Credits	Certification	Credits	Certification	Credits	Certification	Credits	Certification	Credits	Certification	
I	**BSC/ESC**	Basic Science Course(BSC)	3		6		3		3										15
		Engineering Science Courses(ESC)	6		3		3												12
II	**Program Courses**	Program Core Courses (PCC)	3				6		12		12		11		2				46
		Program Elective Courses (PEC)									3	1	6	2	9	3			18
III	**Multidisciplinary Courses**	Multidisciplinary Minor (MDM)					4		4		4		2						14
		Open Elective (OE) Other than a particular Program							4								4		8
IV	**Skill Courses**	Vocational and Skill Enhancement course	3	1	3	1	3	1											9
V	**Humanities, Social Sciences and Management (HSSM)**	Ability Enhancement Course (AEC -01, AEC-02)	3				2												6
		Entrepreneurship/Economics/Management Courses																	3
		Indian Knowledge System (IKS)			2														2
		Value Education Course (VEC)			3														3
VI	**Experiential Learning Courses**	Research Methodology																	3
		Comm. Engagement. Project (CEP)/Field Project (FP)					2												2
		Project																	7
		Internship/ OJT																	12
VII	**Liberal Learning Courses**	Co-curricular Courses (CC)	2		2														4
Total			20	1	19	1	23	1	27		21	1	26	2	17	3	11		**164**

First Year B. Tech. Biomedical Engineering **Preferred Semester: I**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
BESC_BSC	BSC02	Engineering Mathematics-I	NIL	BSC 04	K	3	-	-	3	20	30	50	100	
BESC _ESC	ESC02T	Engineering Mechanics	NIL	ESC 01T&P	K	2	-	-	2	15	20	40	075	
BESC _ESC	ESC02P	Engineering Mechanics Lab	NIL	ESC 01T&P	S	-	2	-	1	25	-	25	050	
BESC _ESC	ESC06T	Basic Electrical Engineering	NIL	ESC10 T&P	K	2	-	-	2	15	20	40	075	
BESC _ESC	ESC06P	Basic Electrical Engineering Lab	NIL	ESC10 T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM01T	Physics for Biomedical Engineering	NIL	PCBM 02T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM01P	Physics for Biomedical Engineering Lab	NIL	PCBM 02T&P	S	-	2	-	1	25	-	25	050	
HSSM_AEC	AEC01T	Effective Communication	NIL	VEC01	A	2	-	-	2	15	20	40	075	
HSSM_AEC	AEC01P	Effective Communication Lab	NIL	VEC01	A	-	2	-	1	25	-	25	050	
SC_VSEC	VSEC01T	Structured Programming	NIL	VSEC 02T&P	S	2	-	-	2	15	20	40	075	Y
SC_VSEC	VSEC01P	Structured Programming Lab	NIL	VSEC 02T&P	S	-	2	-	1	25	-	25	050	Y
LLC_CC	CCXX*	Any LLC_CC course from the list	NIL	CEP01	A	2	-	-	2	25		50	075	
Total									**20**					

ISA=In Semester Assessment: This will involve evaluation based on thought provoking assignments/ experiments/ class tests/ take home tests/ open book tests/ quizzes/ certification course etc… activities which will be assigned on weekly basis during the semester.

MSE= Mid Semester Examination: This will be a proctored examination conducted in the semester. Syllabus will be based on the percentage of syllabus completed till the exam.

ESE= End Semester Examination: This examination will be conducted after the end of academic session covering 100% syllabus of the course.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

First Year B. Tech. Biomedical Engineering **Preferred Semester: II**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
BESC_BSC	BSC04	Engineering Mathematics-II	BSC 02	BSC 06	K	3	-	-	3	20	30	50	100	
BESC_BSC	BSC11T	Engineering Chemistry	NIL	PCBM 03T&P	K	2	-	-	2	15	20	40	075	
BESC_BSC	BSC11P	Engineering Chemistry Lab	NIL	PCBM 03T&P	S	-	2	-	1	25	-	25	050	
BESC_ESC	ESC01T	Engineering Graphics	ESC 02T&P	PEBM 06T&p	K	2	-	-	2	15	20	40	075	
BESC_ESC	ESC01P	Engineering Graphics Lab	ESC 02T&P	PEBM 06T&p	S	-	2	-	1	25	-	25	050	
HSSM_VEC	VEC01T	Professional Skills	AEC01	AEC02	A	2	-	-	2	15	20	40	075	
HSSM_VEC	VEC01P	Professional Skills Lab	AEC01	AEC02	A	-	2	-	1	25	-	25	050	
HSSM_IKS	IKSXX	Any HSSM_IKS course from Basket	NIL	NIL	A	2	-	-	2	25	-	50	075	
SC_VSEC	VSEC02T	Object-Oriented Programming	VSEC 01T&P	VSEC 04T&P	S	2	-	-	2	15	20	40	075	Y
SC_VSEC	VSEC02P	Object-Oriented Programming Lab	VSEC 01T&P	VSEC 04T&P	S	-	2	-	1	25	-	25	050	Y
LLC_CC	CCXX*	Any LLC_CC course from the list	NIL	CEP01	A	2	-	-	2	15	20	40	075	
Total									**19**					

ISA=In Semester Assessment: This will involve evaluation based on thought provoking assignments/ experiments/ class tests/ take home tests/ open book tests/ quizzes/ certification course etc... activities which will be assigned on weekly basis during the semester.

MSE= Mid Semester Examination: This will be a proctored examination conducted in the semester. Syllabus will be based on the percentage of syllabus completed till the exam.

ESE= End Semester Examination: This examination will be conducted after the end of academic session covering 100% syllabus of the course.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

List of Indian Knowledge System Courses

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
HSSM_IKS	IKS01	Indian Traditional Knowledge System	NIL	NIL	A	2	-	-	2	25	-	50	075	
HSSM_IKS	IKS02	Indian Constitution	NIL	NIL	A	2	-	-	2	25	-	50	075	
HSSM_IKS	IKS03	Exploring Indian Art	NIL	NIL	A	2	-	-	2	25	-	50	075	

List of Liberal Learning_ Cocurricular Courses

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
LLC_CC	CC01	Various Dance Forms	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC02	Corporate and Social Etiquettes	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC03	Global Citizenship Education	NIL	CEP01	A	2	-	-	2	75	-	-	075	
LLC_CC	CC04	Wellness – Body, Mind & Spirit	NIL	CEP01	A	2	-	-	2	25	-	25	050	
LLC_CC	CC05	IQ vs EQ	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC06	Nutrition and Physical Wellness	NIL	CEP01	A	2	-	-	2	25	-	25	050	
LLC_CC	CC07	Facets of Astronomy	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC08	Railways - Wonders of Infrastructure	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC09	Financial Literacy for Engineers	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC10	Mastering Advanced Excel	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC11	Personal Grooming Essentials	NIL	CEP01	A	2	-	-	2	25	-	50	075	
LLC_CC	CC12	Various Music Forms	NIL	CEP01	A	2	-	-	2	25	-	50	075	

Second Year B. Tech. Biomedical Engineering **Preferred Semester: III**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
BESC_BSC	BSC06	Engineering Mathematics - III	BSC04	BSC08		3	-	-	3	20	30	50	100	
BESC_ESC	ESC10T	Electronic Devices and Circuits	ESC06 PCBM 01T&P	PCBM 02T&P		2	-	-	2	15	20	40	075	
BESC_ESC	ESC10P	Electronic Devices and Circuits Lab	ESC06 PCBM 01T&P	PCBM 02T&P		-	2	-	1	25	-	25	050	
PC_PCC	PCBM03T	Human Anatomy & Physiology	BSC 11T&P	PCBM 05T&P		2	-	-	2	15	20	40	075	
PC_PCC	PCBM03P	Human Anatomy & Physiology Lab	BSC 11T&P	PCBM 05T&P		-	2	-	1	25	-	25	050	
PC_PCC	PCBM02T	Biomedical Transducers and Control Systems	ESC 01T&P PCBM 01T&P	PCBM 06T&P		2	-	-	2	15	20	40	075	
PC_PCC	PCBM02P	Biomedical Transducers and Control Systems Lab	ESC 01T&P PCBM 01T&P	PCBM 06T&P		-	2	-	1	25	-	25	050	
MDC_MDM	MDMXX	Multidisciplinary Minor Course-1	NIL	MDM XX		4	-	-	4	45	30	50	125	
SC_VSEC	VSEC04T	Python Programming	VESC 02T&P	PEBM XX		2	-	-	2	15	20	40	075	Y
SC_VSEC	VSEC04P	Python Programming Lab	VESC 02T&P	PEBM XX		-	2	-	1	25	-	25	050	Y
HSSM_AEC	AEC02	Technical and Business Writing	VEC 01T&P	AEC 03T&P		2	-	-	2	75	-	-	075	
CEP/FP	CEP01	Social Service Internship/ Project	CCXX	OJT 01 PRJBM 01		-	4	-	2	-	-	75	075	
Total									**23**					

ISA=In Semester Assessment: This will involve evaluation based on thought provoking assignments/ experiments/ class tests/ take home tests/ open book tests/ quizzes/ certification course etc… activities which will be assigned on weekly basis during the semester.

MSE= Mid Semester Examination: This will be a proctored examination conducted in the semester. Syllabus will be based on the percentage of syllabus completed till the exam.

ESE= End Semester Examination: This examination will be conducted after the end of academic session covering 100% syllabus of the course.

#For CEP01- Social Service Internship/ Project: 2 hours / week slot will be provided during the semester (in regular timetable). Additional work of 60 hours needs to be completed during the semester (besides regular timetable) or after the semester (during inter-semester break).

NOTE: As per Institute guidelines, the results of courses completed in inter-semester break will appear in the marksheet of the next semester.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Guidelines for Multidisciplinary Elective Courses and Minor Degree – Refer Appendix-B

Learners are required to go through the Appendix-B carefully before selecting the Multidisciplinary Elective courses. Detailed guidelines regarding Multidisciplinary Elective courses, Minor Degree Titles and courses relevant to each MDM Title are given in Appendix-B.

Multidisciplinary Elective Course-1 (MDMXX)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
MDC_MDM	MDMBI01	Introduction to Bioinformatics	NIL	MDM BI02		3	-	2	4	45	30	50	125	
MDC_MDM	MDMIE01	Foundations of Innovation and Entrepreneurship	NIL	MDM IE02		3	-	2	4	45	30	50	125	
MDC_MDM	MDMBD01	Introduction to Business Development and Marketing Principles	NIL	MDM BD02		3	-	2	4	45	30	50	125	
MDC_MDM	MDMCS01	Computational Logic and Data Structures	NIL	MDM CS02		3	2	-	4	45	30	50	125	

Second Year B. Tech. Biomedical Engineering **Preferred Semester: IV**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
BESC_BSC	BSC08	Engineering Mathematics-IV	BSC 06	PCBM 11T&P		3	-	-	3	20	30	50	100	
PC_PCC	PCBM04T	Digital logic design and analysis	PCBM 07 T&P	PCBM 10T&P		2	-	-	2	15	20	40	075	
PC_PCC	PCBM04P	Digital logic design and analysis Lab	PCBM 07 T&P	PCBM 10T&P		-	2	-	1	25	-	25	050	
PC_PCC	PCBM05	Biomechanics Prosthetics and Orthotics	PCBM 03T&P	PCBM 08T&P		2	-	2	3	40	20	40	100	
PC_PCC	PCBM06T	Analytical and Clinical Equipment	PCBM 02T&P	PCBM 09T&P		2	-	-	2	15	20	40	075	
PC_PCC	PCBM06P	Analytical and Clinical Equipment Lab	PCBM 02T&P	PCBM 09T&P		-	2	-	1	25	-	25	050	
PC_PCC	PCBM07T	Linear Integrated Circuits	ESC 10T&P	PCBM 04T&P		2	-	-	2	15	20	40	075	
PC_PCC	PCBM07P	Linear Integrated Circuits Lab	ESC 10T&P	PCBM 04T&P		-	2	-	1	25	-	25	050	
MDC_MDM	MDMXX	Multidisciplinary Minor Course-2	MDM XX	MDM XX					4	45	30	50	125	
HSSM_AEC	AEC03	Presentation Skills	AEC02 T&P	OJT01 PRJ BM01		-	2	-	1	50	-	-	050	
HSSM_EEMC	EEMC01	Design thinking	NIL	NIL		2	2	-	3			125	125	
Total									**23**					
Course credits completed during the previous inter-semester break will appear in this semester marksheet														
CEP/FP	CEP01	Social Service Internship/ Project	CCXX	OJT 01 PRJBM 01		**-**	**2**	**-**	**2**	**-**	**-**	**75**	**75**	

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Multidisciplinary Elective Course-2 (MDMXX)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
MDC_MDM	MDMBI02	Algorithms and Data Structures in Bioinformatics	MDM BI01	MDM BI03	K	3	2	-	4	45	30	50	125	
MDC_MDM	MDMIE02	Startup Planning and Development	MDM IE01	MDM IE03	K	3	-	1	4	45	30	50	125	
MDC_MDM	MDMBD02	Financial Basics for Engineers and Technopreneurs	MDM BD01	MDM BD03	K	3	-	1	4	45	30	50	125	
MDC_MDM	MDMCS02	Operating Systems and Computer Networks	MDM CS01	MDM CS03	K	3	2	-	4	45	30	50	125	

Second Year B. Tech. Biomedical Engineering - Summer Break

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
MDC_OE	OEC01[$]	Collaborative Inter-Institute Studies	CEP01 AEC03	OJT 01	S	-	8	-	4	125	-	-	125	

[$] **For Collaborative Inter-Institute Studies:** Collaboration with other reputed institutes equivalent to 4 credits is recommended to be done by learner during second year inter semester break (i.e. summer break between semester 4 and semester 5).

NOTE: As per Institute guidelines, the result of courses completed in inter-semester break will appear in the marksheet of the next semester.

Third Year B. Tech. Biomedical Engineering **Preferred Semester: V**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PCC	PCBM09T	Diagnostic and Monitoring Equipment	PCBM 06T&P	PCBM 13T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM09P	Diagnostic and Monitoring Equipment Lab	PCBM 06T&P	PCBM 13T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM10T	Microprocessors and Microcontrollers	PCBM 04T&P	PEBM 04T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM10P	Microprocessors and Microcontrollers Lab	PCBM 04T&P	PEBM 04T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM11T	Biomedical Digital Signal Processing	BSC 08	PCBM 14T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM11P	Biomedical Digital Signal Processing Lab	BSC 08	PCBM 14T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM12T	Medical Imaging Equipment	NIL	NIL	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM12P	Medical Imaging Equipment Lab	NIL	NIL	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBMXXT	Prof. Elective 1	PEBM XX	PEBM XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 1 Lab	PEBM XX	PEBM XX	S	-	2	-	1	25	-	25	050	
MDC_MDM	MDMXX	Multidisciplinary Minor Course-3	MDM XX	MDM XX	K	4	-	-	4	45	30	50	125	
ELC_PRJ	PRJBM01	Mini Project	CEP 01 AEC 03	PRJ BM03	S	-	4	-	2	25	-	50	075	
Total									**21**					
Course credits completed during the previous inter-semester break will appear in this semester marksheet														
MDC-OE	OEC01	Collaborative Inter-Institute Studies (Credit Transfer)	CEP01 AEC03	OJT 01	**S**	**-**	8	**-**	4	-	-	125	125	

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Guidelines for Professional Elective Courses and Specialization Certificate – Refer Appendix-A

Learners are required to go through the Appendix-A carefully before selecting the Professional Elective courses. Detailed guidelines regarding Professional Elective courses, specialization tracks and courses relevant to each track are given in Appendix-A.

Professional Elective Courses-1 (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM01T	Integrated Data Management	NIL	PEBM 04T&P	K	2	-	-	2	15	20	40	075	Y
PC_PEC	PEBM01P	Integrated Data Management Lab	NIL	PEBM 04T&P	S	-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM02T	Modern Sensors for Internet of Things (IoT)	NIL	PEBM 05T&P	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBM02P	Modern Sensors for Internet of Things (IoT) Lab	NIL	PEBM 05T&P	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBM03T	Bio-Photonics	NIL	NIL	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBM03P	Bio-Photonics Lab	NIL	NIL	S	-	2	-	1	25	-	25	050	

#For details of Specialization Certificate, refer Appendix-A

Guidelines for Multidisciplinary Elective Courses and Minor Degree – Refer Appendix-B

Learners are required to go through the Appendix-B carefully before selecting the Multidisciplinary Elective courses. Detailed guidelines regarding Multidisciplinary Elective courses, Minor Degree Titles and courses relevant to each MDM Title are given in Appendix-B.

Multidisciplinary Elective Course-3 (MDMXX)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
MDC_MDM	MDMBI03	Machine Learning Applications in Bioinformatics	MDM BI02	NIL	K	3	2	-	4	45	30	50	125	
MDC_MDM	MDMIE03	Innovation Management and Scaling Startups	MDM IE02	NIL	K	3	-	1	4	45	30	50	125	
MDC_MDM	MDMBD03	Strategic Marketing and Business Planning	MDM BD02	NIL	K	3	-	1	4	45	30	50	125	
MDC_MDM	MDMCS03	Database Systems and Introduction to Data Mining	MDM CS02	NIL	K	3	2	-	4	45	30	50	125	Y

Guidelines for Award of Honours/ Honours by Research / Double Minor (Multidisciplinary and Specialization) Degree

Before the end of Semester 5, learners are required to go through the Honours/ Honours by Research/ Specialization Minor Degree Programme document carefully to opt for Honours/ Honours by Research/ Double Minor Degree. Learners willing to opt for Honours/ Honours by Research/ Specialization Minor degree programme are required to satisfy the eligibility criteria stated in the document.

Third Year B. Tech. Biomedical Engineering **Preferred Semester: VI**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PCC	PCBM08T	Biological Modelling and Simulation	PCBM 05T&P	NIL	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM08P	Biological Modelling and Simulation Lab	PCBM 05T&P	NIL	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM13T	Critical Care Equipment	PCBM 09T&P	PCBM 16T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM13P	Critical Care Equipment Lab	PCBM 09T&P	PCBM 16T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM14T	Digital Image Processing	BSC 08	PCBM 14T&P	K	2	-	-	2	15	20	40	075	
PC_PCC	PCBM14P	Digital Image Processing Lab	BSC 08	PCBM 14T&P	S	-	2	-	1	25	-	25	050	
PC_PCC	PCBM15	Biomedical Microsystems	NIL	NIL	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXT	Prof. Elective 2	PEB XX	PEB XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 2 Lab	PEB XX	PEB XX	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBMXXT	Prof. Elective 3	PEB XX	PEB XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 3 Lab	PEB XX	PEB XX	S	-	2	-	1	25	-	25	050	
MDC_MDM	MDM01	Seminar	MDM XX 01,02,03	NIL	S	2	-	-	2	25		50	075	
ELC_PRJ	PRJBM02	Project Synopsis	PRJ BM01	PRJ BM03	S	2	-	-	2	25	-	50	075	
Total									**21**					

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination

*Selection based on the subset of courses made available by the Institute for the semester.

#Selection based on the MD M Title chosen by the student.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Professional Elective-2 Courses (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM04T	Artificial Intelligence	PEBM 01T&P	PEBM 07T&P		2	-	-	2	15	20	40	075	Y
PC_PEC	PEBM04P	Artificial Intelligence Lab	PEBM 01T&P	PEBM 07T&P		-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM05T	Principles of Internet of Things (IoT)	PEBM 02T&P	PEBM 08T&P		2	-	-	2	15	20	40	075	
PC_PEC	PEBM05P	Principles of Internet of Things (IoT) Lab	PEBM 02T&P	PEBM 08T&P		-	2	-	1	25	-	25	050	
PC_PEC	PEBM06T	Robotics in Medicine	BSC08	NIL		2	-	-	2	15	20	40	075	
PC_PEC	PEBM06P	Robotics in Medicine Lab	BSC08	NIL		-	2	-	1	25	-	25	050	

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-3 Courses (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM07T	Machine Learning	PEBM 04T&P	PEBM 10T&P	K	2	-	-	2	15	20	40	075	Y
PC_PEC	PEBM07P	Machine Learning Lab	PEBM 04T&P	PEBM 10T&P	S	-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM08T	Embedded System Design with Tiny Operating System	PEBM 05T&P	PEBM 11T&P	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBM08P	Embedded System Design with Tiny Operating System Lab	PEBM 05T&P	PEBM 11T&P	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBM09T	Point of Care Technology	PCBM 13T&P	PEBM 12T&P	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBM09P	Point of Care Technology Lab	PCBM 13T&P	PEBM 12T&P	S	-	2	-	1	25	-	25	050	

#For details of Specialization Certificate, refer Appendix-A

Third Year B. Tech. Biomedical Engineering - Summer Break

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
OJT	OJT01	Industry Internship-1	CEP 01 AEC 03	OJT 02	S	-	-	-	5	75	-	75	150	

*150+ hours of industry internship to be done during inter semester break between semester 6 and semester 7.

NOTE: As per Institute guidelines, the results of courses completed in inter-semester break will appear in the marksheet of the next semester.

Final Year B. Tech. Biomedical Engineering **Preferred Semester: VII**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PCC	PCBM16	Hospital Management	PCBM 13T&P	NIL	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXT	Prof. Elective 4	PEBM XX	PEBM XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 4 Lab	PEBM XX	PEBM XX	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBMXXT	Prof. Elective 5	PEBM XX	PEBM XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 5 Lab	PEBM XX	PEBM XX	S	-	2	-	1	25	-	25	050	
PC_PEC	PEBMXXT	Prof. Elective 6	PEBM XX	PEBM XX	K	2	-	-	2	15	20	40	075	
PC_PEC	PEBMXXP	Prof. Elective 6 Lab	PEBM XX	PEBM XX	S	-	2	-	1	25	-	25	050	
ELC_RM	RM01	Research Methodology	NIL	NIL	K	3	-	-	3	20	30	50	100	
ELC_PRJ	PRJBM03	Project	PRJ M02	OJT 02	S	1	2	-	3	50	-	50	100	
Total									**17**					

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination

*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Professional Elective-4 Courses (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM10T	Deep learning	PEBM 07T	PEBM 13T		2	-	-	2	15	20	40	075	Y
PC_PEC	PEBM10P	Deep learning Lab	PEBM 07T	PEBM 13T		-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM11T	Internet of Things (IoT)	PEBM 08T	PEBM 14T		2	-	-	2	15	20	40	075	

		and Edge Computing												
PC_PEC	PEBM11P	Internet of Things (IoT) and Edge Computing Lab	PEBM 08T	PEBM 14T		-	2	-	1	25	-	25	050	
PC_PEC	PEBM12T	Biomedical Equipment Safety	PEBM 09T	PEBM 15T		2	-	-	2	15	20	40	075	
PC_PEC	PEBM12P	Biomedical Equipment Safety Lab	PEBM 09T	PEBM 15T		-	2	-	1	25	-	25	050	

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-5 Courses (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM13T	Data Analytics	PEBM 10T&P	PEBM 16T&P		2	-	-	2	15	20	40	075	Y
PC_PEC	PEBM13P	Data Analytics Lab	PEBM 10T&P	PEBM 16T&P		-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM14T	Internet of Things (IoT) Security and Trust	PEBM 11T&P	PEBM 17T&P		2	-	-	2	15	20	40	075	
PC_PEC	PEBM14P	Internet of Things (IoT) Security and Trust Lab	PEBM 11T&P	PEBM 17T&P		-	2	-	1	25	-	25	050	
PC_PEC	PEBM15T	Medical Device Regulation	PEBM 12T&P	PEBM 18T&P		2	-	-	2	15	20	40	075	
PC_PEC	PEBM15P	Medical Device Regulation Lab	PEBM 10T&P	PEBM 16T&P		-	2	-	1	25	-	25	050	

Professional Elective-6 Courses (PEBMXXT and PEBMXXP)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM16T	Basics of Natural Language Processing	PEBM 13T&P	NIL		2	-	-	2	15	20	40	075	Y

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
PC_PEC	PEBM16P	Basics of Natural Language Processing Lab	PEBM 13T&P	NIL		-	2	-	1	25	-	25	050	Y
PC_PEC	PEBM17T	Industrial Internet of Things (IIoT)	PEBM 14T&P	NIL		2	-	-	2	15	20	40	075	
PC_PEC	PEBM17P	Industrial Internet of Things (IIoT) Lab	PEBM 14T&P	NIL		-	2	-	1	25	-	25	050	
PC_PEC	PEBM18T	Installation & Maintenance of Medical Equipment	PEBM 15T&P	NIL		2	-	-	2	15	20	40	075	
PC_PEC	PEBM18P	Installation & Maintenance of Medical Equipment Lab	PEBM 15T&P	NIL		-	2	-	1	25	-	25	050	

#For details of Specialization Certificate, refer Appendix-A

Final Year B. Tech. Biomedical Engineering **Preferred Semester: VIII**

Course Structure and Assessment Guidelines

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
MDC_OE	OECXX*	Any 2 Open Elective courses from the list offered.	NIL	NIL	K	2	-	-	2	15	20	40	075	
MDC_OE	OECXX*		NIL	NIL	K	2	-	-	2	15	20	40	075	
INT/OJT	OJT02	Industry Internship-2	OJT 01	NIL	S	-	14	-	7	100		100	200	
Total									**11**					

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination

*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

List of Open Elective Courses (OECXX)

Vertical_Sub-Vertical	Course Code	Course Name	Required Prerequisite	Prerequisite for	KSA Mapping	Hours Per Week			Credits	Assessment Guidelines (Marks)				Recommended Certification
						Theory	Practical	Tutorial		Total ISA	Total MSE	Total ESE	Total Marks (Passing @40%)	
	OEC02	Cyber Law	NIL	NIL	K	2	-	-	2	15	20	40	075	
	OEC03	Project Management	NIL	NIL	K	2	-	-	2	15	20	40	075	
	OEC04	Product Lifecycle Management	NIL	NIL	K	2	-	-	2	15	20	40	075	
	OEC05	Sustainability Management	NIL	NIL	K	2	-	-	2	15	20	40	075	
	OEC06	Renewable Energy Management	NIL	NIL	K	2	-	-	2	15	20	40	075	