Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

School of Health Sciences and INtegrated Engineering (SHINE), VIT

Bachelor of Technology in Health Sciences and Technology

Board of Studies: 04/03/2024

Bachelor of Technology in Health Sciences and Technology

Programme Specific Outcomes (PSOs)

PSO_01. To train graduates who can find innovative solutions for preventive methods that can make a positive difference in the development of the healthcare system.

PSO_02. To analyse and solve problems related to healthcare delivery and its industries by applying core and multidisciplinary principles.

PSO_03. To design and develop efficient health products considering economic, safety and environmental aspects.

The programme core has 44% Science subjects and 54% Technology based subjects. The programme electives have a 44, 48 and 8% split between Technology, Science and Management subjects.

Programme Credit Structure	
Foundation Core Courses	(53 credits)
Basic Sciences and Mathematics	24
Engineering Sciences	14
Humanities, Social Sciences and Management	15
Discipline-linked Engineering Science Courses	12
Programme Core Courses	47

Programme Elective Courses	15
Open Electives	15
Project and Internship	09
Credit	151
Non-graded Core Requirement (NGCR)	11
Total Credit	**162**

Course Code	Course Title	Course Type	L	T	P	C	PSO	Prerequisite
Bridge Courses								
	Introduction to Life Sciences		4	0	0	4	1	For students without biology at +2 level
	Introduction to Mathematics		4	0	0	4	1	For students without Mathametics at +2 level
Basic Sciences and Mathematics (24 credits)								
	Engineering Physics		3	0	0	3	1	
	Engineering Physics Lab		0	0	2	1	1	

	Engineering Chemistry		3	0	0	3	1	
	Engineering Chemistry Lab		0	0	2	1	1	
	Calculus		3	0	0	3	1	
	Calculus Lab		0	0	2	1	1	
	Differential Equations and Transforms		3	1	0	4	1	
	Complex Variables and Linear Algebra		3	1	0	4	1	
	Probability and Statistics		3	0	0	3	1	
	Probability and Statistics Lab		0	0	2	1	1	
Engineering Sciences (14 credits)								
	Basic Electrical and Electronics Engineering		3	0	0	3	1	
	Basic Electrical and Electronics Engineering Lab		0	0	2	1	1	
	Computer Programming: Python		1	0	4	3	1	
	Structured and Object-Oriented Programming		2	0	0	2	1	
	Structured and Object-Oriented Programming Lab		0	0	4	2	1	
	Computer Programming: Java		1	0	4	3	1	

Humanities, Social Sciences and Management (15 credits)								
	Effective English Communication (Non Graded Course)		0	0	4	2	1	
	Technical English Communication		2	0	0	2	1	
	Technical English Communication Lab		0	0	2	1	1	
	Technical Report Writing		0	0	2	1	1	
	Quantitative Skills Practice – I		0	0	3	1.5	1	
	Quantitative Skills Practice – II		0	0	3	1.5	1	
	Qualitative Skills Practice – I		0	0	3	1.5	1	
	Qualitative Skills Practice – II		0	0	3	1.5	1	
	Foreign language		2	0	0	2	1	
	HSM Elective		3	0	0	3	1	
Non-graded Core Requirement (11 credits)								
	Introduction to Engineering		0	0	2	1	1	
	Essence of Traditional Knowledge		2	0	0	2	1	
	Indian Constitution		2	0	0	2	1	
	Extracurricular activities		0	0	4	2	1	
	Environmental Sciences		2	0	0	2	1	

	Ethics and Values		2	0	0	2	1	
Project / Internship (9)								
	Clinical Science Internship				0	2	2	
	Industrial Internship				0	2	2	
	Capstone Project (6 months)				0	5	2	
Discipline-linked Engineering Sciences (12 credits)								
	Artificial Intelligence and Machine Learning in Healthcare		3	0	0	3	2	
	Signal Processing for Healthcare application		3	0	0	3	2	
	Fundamental principles of Biomechanics		3	0	0	3	1	
	Medical Electronics		3	0	0	3	1	
Programme Core courses (47 credits)								
	Applied Human Anatomy and Physiology		3	0	0	3	1	
	Fundamentals of Fluid Mechanics		3	0	0	3	1	
	Applied Human Anatomy and Physiology Lab		0	0	2	1	1	
	Cell and Molecular Biology		3	0	0	3	1	
	Cell and Molecular Biology Lab		0	0	2	1	1	

	Medical Imaging		3	0	0	3	2	
	Microbiology and Pathology		3	0	0	3	1	
	Microbiology and Pathology Lab		0	0	2	1	1	
	Genetics and Evolution		3	0	0	3	1	
	Image Processing and Data Analysis		3	0	0	3	2	
	Image Processing and Data Analysis Lab		0	0	2	1	2	
	Devices for Diagnostics and Therapeutics		3	0	0	3	3	
	Materials in Healthcare		3	0	0	3	3	
	Biotechnology for Healthcare		3	0	0	3	2	
	Engineering Design		2	0	0	2	3	
	Engineering Design Lab		0	0	4	2	3	
	Biomanufacturing		3	0	0	3	2	
	Biochemistry and Molecular Pharmacology		3	0	0	3	1	
	Biochemistry and Molecular Pharmacology Lab		0	0	2	1	1	
	Fundamentals of Clinical Trials		2	0	0	2	2	
Programme Elective courses (15 credits)								
	Medtech Entrepreneurship		3	0	0	3	2	
	Cell and Gene Therapy		3	0	0	3	2	

	Human Oncology		3	0	0	3	2	
	Regenerative Engineering		3	0	0	3	3	
	Drug Design and Discovery		3	0	0	3	3	
	Neurobiology		3	0	0	3	1	
	Evolutionary Medicine		3	0	0	3	1	
	Neutrigenomics		3	0	0	3	2	
	Microfluidics		3	0	0	3	1	
	Public Health and Epidemiology		3	0	0	3	1	
	Precision/Personalized Medicine		3	0	0	3	2	
	Healthcare Law and IPR		3	0	0	3	3	
	Advances in Healthcare Management		3	0	0	3	2	
	Advanced AI and ML in Healthcare		3	0	0	3	2	
	Medical Biophysics		3	0	0	3	1	
	Human Toxicology		3	0	0	3	1	
	Mechanobiology		3	0	0	3	1	
	Product Design and analysis		3	0	0	3	3	
	Data Visualization and Analytics		3	0	0	3	2	
	Regulatory affairs		3	0	0	3	3	

	Lasers in Medicine		3	0	0	3	1	
	Biosensors and Wearable devices		3	0	0	3	3	
	Tissue Biomechanics for Human Applications		3	0	0	3	2	
	Medical Immunology		3	0	0	3	1	
	Clinical Trials and Research		3	0	0	3	2	
	Bio-MEMS and Bio-NEMS		3	0	0	3	3	
Open elective courses (15 credits)								
	Psychology and Sociology		3	0	0	3	1	
	Biomimicry and Biomimmetics		3	0	0	3	3	
	Traditional Medicine		3	0	0	3	2	
	Medical Robotics		3	0	0	3	3	
	Evolutionary Biology of Humans		3	0	0	3	1	
	Behaviour and Cognitive Science		3	0	0	3	1	
	Data Analysis and Archiving		3	0	0	3	2	
	Mathematical Modelling		3	0	0	3	3	
	Medicinal Chemistry		3	0	0	3	3	

NON GRADIAL course is a course wherein a registered student has to be graded as **PASS/FAIL**. They are **mandatory credit courses** but should not be included in the CGPA calculation.

First Year

All students of Bachelor of Technology in Health Science will take up fundamental courses in basic sciences and mathematics along with basic engineering courses, which will bridge the gap for students from both non-biology and non-mathematics backgrounds.

In the first semester, the candidate will undertake introductory courses in mathematics and programming, together with a number of courses in chemistry and biology. In the second semester, the student will continue with basic engineering courses, develop skills in programming and learn soft skills from humanities.

Second Year

By the second year, the student needs to complete some of the remaining basic engineering and the compulsory courses in chemistry, physics, biology, statistics and mathematics. During the second year they will start with the programme cores and discipline-linked subjects which will provide foundation for the core skill. During the second year, the student needs to plan and finish his clinical internship.

Third Year

During the third year, the core subjects should be finished, following which they will have the opportunity to start choosing and undergoing elective courses. Industrial internships should be undertaken during this year.

Fourth Year

Undertake all the electives and devote time for capstone project in the final semester. The capstone project can be undertaken at Industries/Hospitals/R&D laboratories and even in-house at VIT, but it must demonstrate the ability to solve a clinical/ healthcare problem.