School of Bioengineering

B.Tech in Bioengineering

Curriculum & Syllabus

(2018 - 19 Batch onwards)

Category	Core Credits	Elective Credits	Total Credits
Natural Sciences	28	6	**34**
Engineering and Technology	97	21	**118**
Humanities and Management	13	9	**22**
Open Electives	0	6	**6**
Total Credits			**180**

VIT BHOPAL / B. Tech. Bio Engineering (4 years - 180 Credits)														
	Natural Sciences	:	34 Cr.		*Bioengineering and Technology*	:	118 Cr.		*Humanities and Management Courses*	:	22 Cr.		*Open Electives*		6 Cr.
	Core courses	Type	28		Program - Core courses	Type	97		Core courses	Type	13				
PHY1001	Engineering Physics	LTP	4	CSE1001	Introduction to problem solving and programming	LTP	4	ENG1001	Communication for Technical Professionals	LT	3		Any courses of 6 credits		
MAT1002	Calculus for Bio Engineers	LT	4	EEE1001	Electric Circuits and Systems	LTP	4	HUM1007	Ethics and Values	LT	2		CSE3011 Python Programming	LT	3
CHY2002	Environmental Science	LT	3	BIO1001	Introduction to Bioengineering	LT	3	ENG2001	Technical Writing & Composition	LT	2		ECE4006 Sensors and IoT	LP	3
PHY2011	Biophysics	LT	3	BIO2001	Human Physiology	LT	3	HUM1008	Swachh Bharat	PJ	2		PLA1003 Placement Training – II	LT	4
MAT2101	Applications of Differential Equations	LT	3	BIO1101	Physiology of Cells and Tissues	LT	3	EXC1001	Extracurricular Activity	PJ	2		**Coursera course**		
MAT3015	Biostatistics	LT	4	BIO1102	Cell and tissue culture techniques	LP	3	STS1001	Soft Skills for Engineers - I	P	1		Leadership and Emotional Intelligence	LT	2
MAT3011	Transform Techniques	LT	3	BIO3012	Global Health Challenges	LT	2	STS2001	Soft Skills for Engineers - II	P	1				
CHY1003	Biochemistry	LTP	4	BIO2002	Molecular Biology and genetic engineering	LTP	4								
				ECE2101	Analog Circuits	LTP	4								
				EEE3100	Bio signals and Image Processing	LTP	4								
				ECE2003	Signals and	LT	3								

					Systems						
				EEE3101	Biosystems and Control	LP	3				
				BIO3001	Computational Biology and Analytics	LP	3				
				BIO3002	Immune engineering	LTP	4				
	Natural Science Elective Courses	**:**	**6**	BIO3022	Stem Cells and Regenerative Medicine	LTP	3		**Humanities and Management - Elective Courses**	**:**	**9**
				BIO2003	Biomaterials	LT	3	HUM1014	Course – I Indian Constitution	LT	3
PHY3001	Bio-optics	LT	3	BIO3003	Tissue Engineering	LTP	4	PLA1001	Course – II Placement Training – I	LT	4
CHY2001	Biophysical Chemistry	LP	3	BIO3010	Biosafety, bioethics and IPR	LT	2	MGT1006/MGT2003	Course – III International Business Or Technology Enterprenership	LT	3
CHY2005	Analytical Chemistry	LT	3	BIO4011	Bio-fluid Mechanics	LT	3	**VTOL courses**			
CHY2007	Modeling and simulation of Biological systems	LP	3	BIOXXX	Bio Mechanics	LTP	4	BHPV004	Marketing Management	LT	4
BIOXXXX	Bio Sustainability	LT	3	DSN2096	Engineering Design	LT	2	BHPV014	Logistics and supply chain management	LT	4
BIOXXXX	Forensic Biology	LT	3	DSN2098	Project Exhibition – I	PJ	1	BHPV015	Accounting & Financial Management	LT	4

Code	Course	Type	Credit	Code	Course	Type	Credit	Code	Course	Type	Credit		
BIOXXXX	Microbiology	LP	3	DSN2099	Project Exhibition – II	PJ	1	BHPV008	Functional French	LT	2		
				DSN3099	Engineering Project in Community Service	PJ	2						
				BIO2097	Clinical Rotation	PJ	2						
				BIO4098	Comprehensive Exam	PJ	2						
				BIO4099	Capstone Project	PJ	20						
				BIO3011	Biomedical Instrumentation	LT	3						

Program Elective courses		:	21
BIO3016	Design of Medical Devices & Implants	LT	3
BIO3011	Biomedical Instrumentation	LT	3
BIO3015	Biosensors and MEMS	LT	3
BIO3013	Drug Design and Delivery	LT	3
BIO1501	Bio-inspired Design	LT	3
BIO3020	Personalized Medicines	LT	3
BIO3017	Advanced Biomaterials and Manufacturing Process	LP	3
BIO3014	Cancer Biology	LT	3
BIO3019	Epigenetics	LT	3

Semester 1				Semester 2				Semester 3			
Code	Course Title	Type	Cr.	Code	Course Title	Type	Cr.	Code	Course Title	Type	Cr.
ENG1001	Communication for Technical Professionals	LT	3	ENG2001	Technical writing and composition	LT	2	MAT3011	Transform Techniques	LT	3
PHY1001	Engineering Physics	LTP	4	CHY1002	Environmental Science	LT	3	PHY2011	Biophysics	LT	3
CHY1003	Biochemistry	LTP	4	MAT2101	Applications of Differential Equations	LT	3	BIO3001	Computational Biology and Analytics	LP	3
CSE1001	Introduction to problem solving and programming	LTP	4	HUM1008	Swacch Bharat	PJ	2	BIO2001	Human Physiology	LT	3
MAT1002	Calculus for Bio Engineers	LT	4	BIO1001	Introduction to Bioengineering	LT	3	EEE3100	Bio signals and Image Processing	LTP	4
EEE1001	Electric Circuits and Systems	LTP	4	BIO1101	Physiology of Cells and Tissues	LT	3	BIO3012	Global Health Challenges	LT	2
HUM1007	Ethics and Values	LT	2	BIO1102	Cell and Tissue culture techniques	LP	3	BIO2003	Biomaterials	LT	3
				ECE2101	Analog Circuits	LTP	4	EXC1001	Extra-Curricular Activities	LT	2
				BIO1501	Bio-inspired Design (Program elective)	LT	3	DSN2098	Project Exhibition-I		1
Total credits		:	**25**	**Total credits**			**26**				**24**

Semester 4				Semester 5				Interim Semester			
Code	**Course Title**	**Type**	**Cr.**	**Code**	**Course Title**	**Type**	**Cr.**	**Code**	**Course Title**	**Type**	**Cr.**
Natural Science Elective-I CHY2007	Modeling and simulation of Biological systems	LT	3	Natural Science Elective-II PHY3001	Bio-optics	LT	3	Program Elective V BIO3016	Design of Medical Devices & Implants	LT	3
MAT3015	Biostatistics	LT	4	EEE3101	Biosystems and Control	LP	3	Program Elective IV BIO3017	Advanced Biomaterials and Manufacturing Process	LP	3
BIO2002	Molecular Biology and genetic engineering	LTP	4	BIO3010	Biosafety, bioethics and IPR	LT	2	Program Elective VII BIO3019	Epigenetics	LT	3
BIO4011	Bio-fluid Mechanics	LT	3	Program Elective II BIO3011 /BIO3007	Biomedical Instrumentation / Drug Design and Delivery (PE)	LT	3	Program Elective VI BIO3020	Personalized Medicines	LT	3
Open Elective – I CSE3011	Python Programming	LT	3	Program Elective III BIO3014 /BIO3015	Cancer Biology /Biosensors and MEMS (PE)	LT	3				
ECE2003	Signals and Systems	LT	3	STS1001	Soft Skills for Engineers - I	P	1				
Humanities and Management HUM1014	Course – I (Indian Constitution)	LT	3	Humanities and Management PLA1001	Placement Training – I	LT	4				
DSN2099	Project Exhibition – II	PJ	1	DSN3009	Engineering Project in Community Service	PJ	2				
Total credits			**24**	Total credits			**21**	**Total credits**			**12**

Semester 6				Semester 7				Semester 8			
Code	**Course Title**	**Type**	**Cr.**	**Code**	**Course Title**	**Type**	**Cr.**	**Code**	**Course Title**	**Type**	**Cr.**
BIO3003	Tissue Engineering	LTP	4					DSN4099	Capstone Project	PJ	20
BIO3002	Immune Engineering	LTP	4	BIO3023	Bio Mechanics	LTP	4	STS2001	Soft Skills for Engineers - II	P	1
BIO3022	Stem Cells and Regenerative Medicine	LT	3	DSN2097	Industrial Internship	PJ	2				
PLA1003	Placement Training – II	LT	4	DSN4099	Capstone Project	PJ	20				
DSN2096	Engineering Design	LT	2	DSN4098	Comprehensive Exam	PJ	2				
MGT2003	Technology Enterprenership	LT	3								
ECE4006	Sensors and IoT	LP	3								
Total credits			**23**	Total credits			**26**	**Total credits**			**21**

*COURSERA: Open Elective – 2 credit (offered during COVID–19 LOCKDOWN 1.0

*VTOL: Humanities and Management (Course III)- 3 credits