Name of Faculty: Engineering and Technology

Name of the College/Institute/Department/School: Institute of Biosciences and Technology
Name of the Programme: B.Tech. Biomedical Engineering
Programme Type (UG/PG): UG **Duration: 04 Years (08 Semesters)**

First Year - Semester I												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
BSC	BBE42BSL101	Engineering Graphics	Lecture	2	2	-	60	40	100	-	16	40
BSC	BBE42BSL102	Chemistry For Biology	Lecture	2	2	-	60	40	100	-	16	40
ESC	BBE42ESL101	Physics For Biology	Lecture	3	3		60	40	100	-	16	40
ESC	BBE42ESL105	Python Programming	Lecture	3	3	-	60	40	100	-	16	40
AEC	MGM54AEL101	Communicative English	Lecture	2	2	-	30	20	50	-	8	20
VSEC	BBE42VSP103	Python Programming Lab	Practical	2	-	4	30	20	50	-	8	20
BSC	BBE42BSP101	Graphics Lab	Practical	2	-	4	30	20	50	-	8	20
ESC	BBE42ESP101	Physics Lab	Practical	2	-	4	30	20	50	-	8	20
ESC	BBE42ESP102	Chem Bio Lab	Practical	2	-	4	30	20	50	-	8	20
CCA	MGM82CCP101/ MGM82CCP102/ MGM82CCP103/ MGM82CCP201	NCC/ Yoga/ Sports/ Health & Wellness	Practical	2	-	4	50	-	50	20	-	20
		Total		**22**	**12**	**20**	**440**	**260**	**700**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation
Course Category: BSC- Basic Science Course, **ESC**- Engineering Science Course, **AEC**-Ability Enhancement course, **VSEC**-Vocational Skill

and Skill Enhancement course, **CCA**- Co-curricular course

First Year - Semester II												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
BSC	BBE42BSL103	Signals and Systems	Lecture	2	2	-	60	40	100	-	16	40
BSC	BBE42BSL104	Molecular Biology	Lecture	2	2	-	60	40	100	-	16	40
ESC	BBE42ESL106	Internet of Things (IoT) essentials	Lecture	2	2	-	60	40	100	-	16	40
ESC	BBE42ESL104	Numerical and Computational Fundamentals-I	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL101	Cell Genetics and Evolution	Lecture	2	2	-	60	40	100	-	16	40
VSEC	BBE42VSP104	Internet of Things (IoT) essentials Lab	Practical	2	-	4	30	20	50	-	8	20
ESC	BBE42ESP103	Bio-Computational Lab	Practical	2	-	4	30	20	50	-	8	20
BSC	BBE42BSP102	Immuno Lab	Practical	2	-	4	30	20	50	-	8	20
BSC	BBE42BSP103	Mol Bio Lab	Practical	2	-	4	30	20	50	-	8	20
CCA	MGM85CCP107/ MGM82CCP104/ MGM73CCP105/ MGM73CCP106	Cultural Activities/ NSS/ Fine Arts/ Visual Arts	Practical	2	-	4	50	-	50	20	-	20
IKS	APS21IKL101	Indian Knowledge System	Lecture	2	2	-	60	40	100	-	16	40
		Total		**22**	**12**	**20**	**530**	**320**	**850**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation
Course Category: BSC- Basic Science Course, **ESC**- Engineering Science Course, **PCC**- Programme Core Course, **VSEC**-Vocational Skill and Skill Enhancement course, **CCA**- Co-curricular course, **IKS**-Indian Knowledge system

Second Year - Semester III

Course Category	Course Code	Course Title	Nature of Course	No. of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
PCC	BBE42PCL201	Human Anatomy and Physiology-I	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL202	Enzymology	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL203	Numerical and Computational Fundamentals- II	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL207	Sensor Technologies	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCP201	Cell Physiology-I Lab	Practical	1	-	2	30	20	50	-	8	20
PCC	BBE42PCP202	Enzymology Lab	Practical	1	-	2	30	20	50	-	8	20
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
OE	OE-1	Refer MGMU Basket of Open Electives	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-2	Refer MGMU Basket of Open Electives	Practical	2	-	4	30	20	50	-	8	20
EEMC	BBE42HSL201	Entrepreneurship Management-I	Lecture	2	2	-	60	40	100	-	16	40
VEC	MGM56VEL102	Constitution of India	Lecture	2	2	-	30	20	50	-	8	20
FP	BBE42FPJ202	Mini Project	Project	2	-	4	50	-	50	20	-	20
		Total		**22**	**16**	**12**	**560**	**340**	**900**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation
Course Category: **PCC**- Programme Core Course, **MDM**- Multidisciplinary Minor, **OE**- Open electives, **EEMC**- Entrepreneurship/Economics/ Management Courses, **VEC**- Value Education course, **FP**-Field project

Second Year - Semester IV												
Course Category	**Course Code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
PCC	BBE42PCL204	Human Anatomy & Physiology II	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL205	Recombinant DNA Technology	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL206	Numerical and Computational Fundamentals- III	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL208	Wireless Sensor Networks	Lecture	2	2	-	60	40	100	-	16	40
PCC	BBE42PCP203	Cell Physiology- II Lab	Practical	1	-	2	30	20	50	-	8	20
PCC	BBE42PCP204	Recombinant DNA Technology Lab	Practical	1	-	2	30	20	50	-	8	20
MDM		Refer MDM Basket (Annexure A)	Lecture	2	2	-	60	40	100	-	16	40
AEC	MGM54AEL103	Refer MGMU Basket of AEC	Lecture	2	2	-	30	20	50	-	8	20
OE	OE-3	Refer MGMU Basket for Open Elective	Lecture	2	2	-	30	20	50	-	8	20
VSEC	BBE42VSP202	Mini Project II	Practical	2	-	4	30	20	50	-	8	20
EEMC	BBE42HSL202	Entrepreneurship Management-II	Lecture	2	2	-	60	40	100	-	16	40
VEC	MGM21VEL101	Environmental studies	Lecture	2	2	-	30	20	50	-	8	20
		Total		**22**	**18**	**8**	**540**	**360**	**900**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation

Course Category: PCC- Programme Core Course, **MDM**- Multidisciplinary Minor, **AEC**-Ability Enhancement course, **OE**- Open electives, **VSEC**-Vocational Skill and Skill Enhancement course, **EEMC**- Entrepreneurship/Economics/ Management Courses, **VEC**- Value Education course

Third Year - Semester V												
Course Category	**Course code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
PCC	BBE42PCL301	Introduction to Organ Design	Theory	3	3	-	60	40	100	-	16	40
PCC	BBE42PCL302	Biochemistry	Theory	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL303	Numerical And Computational Fundamentals- IV	Theory	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL307	Embedded Systems for IoT	Theory	2	2	-	60	40	100	-	16	40
PCC	BBE42PCP301	Biochemistry Lab	Practical	1	-	2	30	20	50	-	8	20
PCC	BBE42PCP305	Mini Project III	Practical	2	-	4	30	20	50	-	8	20
Program Elective - I												
PEC	BBE42PEL301	Biomedical Signal Processing	Theory	2	2	-	60	40	100	-	16	40
	BBE42PEL302	Techniques in Bioinformatics										
PEC	BBE42PEP301	Signal Processing Lab	Practical	2	-	4	30	20	50	-	8	20
	BBE42PEP302	Bioinformatics Lab										
MDM		Refer to MDM Basket (Annexure A)	Theory	4	4	-	60	40	100	-	16	40
OE	OE-4	Refer MGMU Basket of Open Electives	Theory	2	2		30	20	50	-	8	20
		TOTAL		**22**	**17**	**10**	**480**	**320**	**800**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation

Course Category: PCC- Programme Core Course, **PEC**- Programme Elective Course, **MDM**- Multidisciplinary Minor, **OE**- Open electives

Third Year - Semester VI												
Course Category	**Course code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
PCC	BBE42PCL304	Stem Cell and Cancer Biology	Theory	2	2	-	60	40	100	-	16	40
PCC	BBE42PCL308	Edge Computing: Performance, Security, and Scalability	Theory	3	3	-	60	40	100	-	16	40
PCC	BBE42PCL309	Animal Tissue Engineering	Theory	2	2	-	60	40	100	-	16	40
PCC	BBE42PCP306	Animal Tissue Lab	Practical	2	-	4	30	20	50	-	8	20
PCC	BBE42PCP307	Edge Computing: Performance, Security, and Scalability Lab	Practical	1	-	2	30	20	50	-	8	20
Program Elective - II												
PEC	BBE42PEL303	Biomaterial Science	Theory	3	3	-	60	40	100	-	16	40
	BBE42PEL304	Neurophysiology										
PEC	BBE42PEP303	Digital Electronics and Microprocessor Lab	Practical	2		4	30	20	50	-	8	20
	BBE42PEP304	Membrane Biophysics Lab										
Program Elective - III												
PEC	BBE42PEL305	Digital Electronics and Microprocessor	Theory	3	3	-	60	40	100	-	16	40
	BBE42PEL306	Membrane Biophysics										
MDM		Refer to MDM Basket (Annexure A)	Theory	2	2		60	40	100	-	16	40
VSEC	BBE42VSP301	Micro Project	Practical	2	-	4	30	20	50	-	8	20
		TOTAL		**22**	**15**	**14**	**480**	**320**	**800**			

Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D-Dissertation
Course Category: PCC- Programme Core Course, **PEC**- Programme Elective Course, **MDM**- Multidisciplinary Minor, **VSEC**-Vocational Skill and Skill Enhancement course

Fourth Year - Semester VII												
Course Category	**Course code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/ week)**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
PCC	BBE42PCL401	Medical Devices, Image processing and analysis	Theory	3	3	-	60	40	100	-	16	40
PCC	BBE42PCP401	Medical Devices, Image processing and analysis Lab	Practical	3	-	6	60	40	100	-	16	40
PCC	BBE42PCL403	IoT Architecture and Design: Building Connected Solutions	Theory	3	3	-	60	40	100	-	16	40
PCC	BBE42PCP403	IoT Architecture and Design: Building Connected Solutions Lab	Practical	3	-	6	60	40	100	-	16	40
RM		Research Methodology	Theory	4	4	-	60	40	100	-	16	40
MDM		Refer MDM Basket (Annexure A)	Theory	2	2	-	60	40	100	-	16	40
MDM		Refer MDM Basket (Annexure A)	Theory	2	2	-	60	40	100	-	16	40
RP	BBE42RPJ402	Capstone Project	Practical	4	-	8	60	40	100	-	16	40
		Total		**24**	**14**	**20**	**480**	**320**	**800**			

Fourth Year - Semester VIII												
Course Category	**Course code**	**Course Title**	**Nature of Course**	**No. of Credits**	**Teaching (Contact hrs/week**		**Evaluation Scheme (Marks)**			**Minimum Passing (Marks)**		
					L	**P**	**Internal**	**External**	**Total**	**Internal**	**External**	**Total**
PEC	BBE42PEL401	Dynamics of Biofluids	Theory	4	4	-	60	40	100	-	16	40
	BBE42PEL405	Industries Case Studies of IOT										
PEC	BBE42PEL403	Membrane and Ion Channel Biophysics	Theory	4	4	-	60	40	100	-	16	40
	BBE42PEL406	Bioprinting										
JT	BBE42JTI401	Internship	Internship	12	-	24	90	60	150	-	24	60
	BBE42JTI402	Major Project	Project									
		Total		**20**	**8**	**24**	**210**	**140**	**350**			

Note: Nature of Course: L- Lecture, P-Practical, S-Seminar, J-Project, I-Internship, D- Dissertation

Course Category: PCC- Program Core Course, **PEC**- Programme Elective Course, **MDM**- Multidisciplinary Minor, **RM**-Research methodology, **RP**-Research project

Exit Options after FY One Year UG certificate in (Biomedical Engineering)

Exit Options after FY
One Year UG certificate in (Biomedical)

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
OJT	BBE42JTI101	In-Plant Training (8 weeks)	Practical	8	-	16	60	40	100	-	16	40
		Total		**8**	**-**	**16**	**60**	**40**	**100**			

Exit Options after SY UG Diploma Biomedical Engineering with Multidisciplinary Minor.

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
Project	BBE42RPJ201	Mini Project (8 weeks)	Practical	8	-	16	60	40	100	-	16	40
		Total		**8**	**-**	**16**	**60**	**40**	**100**			

Exit Options after TY B. Voc in Biomedical Engineering

Course Category	Course Code	Course Title	Nature of Course	No of Credits	Teaching (Contact hrs/ week)		Evaluation Scheme (Marks)			Minimum Passing (Marks)		
					L	P	Internal	External	Total	Internal	External	Total
OJT	BBE42JTI301	In-Plant Training (8 weeks)	Practical	6	-	16	60	40	100	-	16	40
		Total		**6**	**-**	**16**	**60**	**40**	**100**			