

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI**  
**Scheme of Teaching and Examination: 2018-19**  
**M.Tech. : Biomedical Signal Processing and Instrumentation (LBI)**  
**Outcome Based Education(OBE) and Choice Based Credit System (CBCS)**

<b>I SEMESTER</b>										
Sl. No	Course	Course Code	Course Title	Teaching Hours / Week		Examination				Credits
				Theory	Practical/ Field work/ Assignment	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	18LBI11	Real Time Signal Processing (Mathematics oriented)	04	--	03	40	60	100	4
2	PCC	18LBI12	Physiology for Biomedical Engineering	04	--	03	40	60	100	4
3	PCC	18LBI13	Medical Instrumentation	04	--	03	40	60	100	4
4	PCC	18LBI14	Advanced Biomedical Signal Processing	04	--	03	40	60	100	4
5	PCC	18LBI15	Medical Imaging Techniques and Systems	04	--	03	40	60	100	4
6	PCC	18LBIL16	Biomedical Signal Processing and Instrumentation Lab	-	04	03	40	60	100	2
7	PCC	18RMI17	Research Methodology and IPR	02	--	03	40	60	100	2
<b>TOTAL</b>				<b>22</b>	<b>04</b>	<b>21</b>	<b>280</b>	<b>420</b>	<b>700</b>	<b>24</b>
<b>Note: PCC: Professional Core Course, PEC: Professional Elective Course.</b>										
<b>Note:</b> <b>Internship:</b> All the students shall have to undergo mandatory internship of 6 weeks during the vacation of I and II semesters and /or II and III semesters. A University examination will be conducted during III semester and prescribed credit shall be included in the III semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the internship shall be declared as failed and have to complete during subsequent University examination after satisfying the internship requirements.										

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**II SEMESTER**

Sl. No	Course	Course Code	Course Title	Teaching Hours /Week		Examination			Credits	
				Theory	Practical/ Field work/ Assignment	Duration in hours	CIE Marks	SEE Marks		Total Marks
1	PCC	18LBI21	Advanced Medical Image Processing	04	--	03	40	60	100	4
2	PCC	18LBI22	Speech Signal Processing	04	--	03	40	60	100	4
3	PCC	18LBI23	Neural Network and Fuzzy Logic in Medicine	04	--	03	40	60	100	4
4	PEC	18LBI24X	Professional Elective-1	04	--	03	40	60	100	4
5	PEC	18LBI25X	Professional Elective-2	04	--	03	40	60	100	4
6	PCC	18LBIL26	Speech and Image Processing Lab	--	04	03	40	60	100	2
7	PCC	18LBI27	Technical Seminar	--	02	--	100	--	100	2
<b>TOTAL</b>				<b>20</b>	<b>06</b>	<b>18</b>	<b>340</b>	<b>360</b>	<b>700</b>	<b>24</b>

**Note:** PCC: Professional Core Course, PEC: Professional Elective Course

Professional Elective-1		Professional Elective-2	
Course Code	Course Title	Course Code	Course Title
18LBI241	Lasers in Medicine	18LBI251	Biomaterials and Artificial Organs
18LBI242	Bioinformatics and Applications	18LBI252	Clinical Medicine for Biomedical Engineers
18LBI243	Biosensors	18LBI253	ARM Embedded System Design
18LBI244	Virtual Bioinstrumentation	18LBI254	Data Warehousing and Data Mining

**Note:**

**1. Technical Seminar:** CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide / Co-guide, if any, and a Senior Faculty Member of the Department. Participation in seminar by all postgraduate students of the same and other semesters of the programme shall be mandatory.

The CIE marks awarded for Technical Seminar shall be based on the evaluation of Seminar Report, Presentation skills and Question and Answer session in the ratio 50:25:25.

**2. Internship:** All the students shall have to undergo mandatory internship of 6 weeks during the vacation of I and II semesters and /or II and III semesters. A University examination will be conducted during III semester and prescribed credit shall be included in the III semester. Internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take-up/complete the internship shall be declared as failed and have to complete during subsequent University examination after satisfying the internship requirements.

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<b>III SEMESTER</b>										
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week		Examination			Credits	
				Theory	Practical/ Field work/ Assignment	Duration in hours	CIE Marks	SEE Marks		Total Marks
1	PCC	18LBI31	Bio-MEMS and Nanotechnology	04	--	03	40	60	100	4
2	PEC	18LBI32X	Professional Elective-3	04	--	03	40	60	100	4
3	PEC	18LBI33X	Professional Elective-4	04	--	03	40	60	100	4
4	Proj	18LBI34	Evaluation of Project Work Phase -1	--	02	--	100	--	100	2
5	INT	18LBII35	Internship	(Completed during the intervening vacation of I and II semesters and /or II and III semesters.)		03	40	60	100	6
<b>TOTAL</b>				<b>12</b>	<b>02</b>	<b>12</b>	<b>260</b>	<b>240</b>	<b>500</b>	<b>20</b>
<b>Note: PCC: Professional Core Course, PEC: Professional Elective Course, Proj: Project, INT: Internship</b>										
<b>Professional Elective-3</b>						<b>Professional Elective-4</b>				
<b>Course Code</b>	<b>Course Title</b>			<b>Course Code</b>	<b>Course Title</b>					
18LBI321	Biometrics and Applications			18LBI331	Biostatistics					
18LBI322	Wavelet Transforms and Applications			18LBI332	Artificial Intelligence and Pattern Recognition					
18LBI323	Biomechanics and Rehabilitation Engineering			18LBI333	Cloud Computing					
18LBI324	Medical Device Regulations, IPR and Medical Ethics			18LBI334	Modelling and Simulation in Biomedical Engineering					
<b>Note:</b>										
<p><b>1. Project Work Phase-1:</b> Students in consultation with the guide/co-guide, if any, shall pursue literature survey and complete the preliminary requirements of selected Project work. Each student shall prepare relevant introductory project document, and present a seminar.</p> <p>CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide and a Senior Faculty Member of the Department. The CIE marks awarded for Project Work Phase -1, shall be based on the evaluation of Project Report, Project Presentation skill and Question and Answer session in the ratio 50:25:25. SEE (University examination) shall be as per the University norms.</p> <p><b>2. Internship:</b> Those, who have not pursued /completed the internship, shall be declared as failed and have to complete during subsequent University examinations after satisfying the internship requirements. Internship SEE (University examination) shall be as per the University norms.</p>										

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<b>IV SEMESTER</b>										
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week		Examination				Credits
				Theory	Practical/ Field work/ Assignment	Duration in hours	CIE Marks	SEE Marks Viva voce	Total Marks	
1	Proj	18LBI41	Project Work Phase -2	--	04	03	40	60	100	20
<b>TOTAL</b>				--	<b>04</b>	<b>03</b>	<b>40</b>	<b>60</b>	<b>100</b>	<b>20</b>
<b>Note: Proj: Project.</b>										
<b>Note:</b>										
<b>1. Project Work Phase-2:</b>										
CIE marks shall be awarded by a committee comprising of HoD as Chairman, Guide/co-guide, if any, and a Senior Faculty Member of the Department. The CIE marks awarded for Project Work Phase -2, shall be based on the evaluation of Project Report subjected to plagiarism check, Project Presentation skill and Question and Answer session in the ratio 50:25:25.										
SEE shall be at the end of IV semester. Project work evaluation and Viva-Voce examination (SEE), after satisfying the plagiarism check, shall be as per the University norms.										