

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM
CHOICE BASED CREDIT SYSTEM (CBCS)
SCHEME OF TEACHING AND EXAMINATION 2016-2017

M.Tech. IN BIOMEDICAL SIGNAL PROCESSING AND INSTRUMENTATION

I SEMESTER

| Sl. No | Subject Code | Title | Teaching Hours / Week | | Examination | | | | Credit |
|--------------|--------------|--|-----------------------|---------------------------------|-------------|------------|------------------------|-------------|-----------|
| | | | Theory | Practical/Field Work/Assignment | Duration | I.A. Marks | Theory/Practical Marks | Total Marks | |
| 1 | 16LBI11 | Real Time Signal Processing | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 2 | 16LBI12 | Physiology for Biomedical Engineering | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 3 | 16LBI13 | Medical Instrumentation | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 4 | 16LBI14 | Advanced Biomedical Signal Processing | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 5 | 16LBI15X | Elective-1 | 3 | - | 3 | 20 | 80 | 100 | 3 |
| 6 | 16LBIL16 | Biomedical Signal Processing and Instrumentation Lab | - | 3 | 3 | 20 | 80 | 100 | 2 |
| 7 | 16LBI17 | Seminar | - | 3 | - | 100 | - | 100 | 1 |
| TOTAL | | | 19 | 6 | 18 | 220 | 480 | 700 | 22 |

| Elective-I | |
|-------------------|------------------------------------|
| 16LBI151 | Lasers in Medicine |
| 16LBI152 | ARM Embedded System Design |
| 16LBI153 | Biomaterials and Artificial Organs |
| 16LBI154 | Data Warehousing and Data Mining |
| 16LBI155 | Cloud Computing |

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II SEMESTER

| Sl. No | Subject Code | Title | Teaching Hours / Week | | Examination | | | | Credit |
|--------------|--------------|---|-----------------------|---------------------------------|-------------|------------|------------------------|-------------|-----------|
| | | | Theory | Practical/Field Work/Assignment | Duration | I.A. Marks | Theory/Practical Marks | Total Marks | |
| 1 | 16LBI21 | Neural Networks and Fuzzy Logic in Medicine | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 2 | 16LBI22 | Speech Signal Processing | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 3 | 16LBI23 | Medical Imaging Techniques and Systems | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 4 | 16LBI24 | Advanced Medical Image Processing | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 5 | 16LBI25X | Elective-II | 3 | - | 3 | 20 | 80 | 100 | 3 |
| 6 | 16LBIL26 | Speech and Image Processing Lab | | 3 | 3 | 20 | 80 | 100 | 2 |
| 7 | 16LBI27 | Seminar | - | 3 | - | 100 | - | 100 | 1 |
| TOTAL | | | 19 | 6 | 18 | 220 | 480 | 700 | 22 |

| Elective-II | |
|--------------------|--|
| 16LBI251 | Bioinformatics and Applications |
| 16LBI252 | Biosensors |
| 16LBI253 | Virtual Bio-Instrumentation |
| 16LBI254 | Medical Device Regulations, IPR and Medical Ethics |
| 16LBI255 | Clinical Medicine for Biomedical Engineers |

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III SEMESTER: Internship

| Sl. No | Subject Code | Title | Teaching Hours / Week | | Examination | | | | Credit |
|--------------|--------------|--|-----------------------|---------------------------------|-------------|------------|------------------------|-------------|-----------|
| | | | Theory | Practical/Field Work/Assignment | Duration | I.A. Marks | Theory/Practical Marks | Total Marks | |
| 1 | 16LBI31 | Seminar / Presentation on Internship (After 8 weeks from the date of commencement) | - | - | - | 25 | - | 25 | 20 |
| 2 | 16LBI32 | Report on Internship | - | - | - | 50 | - | 50 | |
| 3 | 16LBI33 | Evaluation and Viva-Voce of Internship | - | - | - | - | 75 | 75 | |
| 4 | 16LBI34 | Evaluation of Project phase -1 | - | - | - | 25 | - | 25 | 1 |
| TOTAL | | | - | - | - | 100 | 75 | 175 | 21 |

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IV SEMESTER

| Sl. No | Subject Code | Title | Teaching Hours /Week | | Examination | | | | Credit |
|--------|--------------|-------------------------------------|----------------------|----------------------------------|-------------|------------|-------------------------|-------------|--------|
| | | | Theory | Practical/Field Work/ Assignment | Duration | I.A. Marks | Theory/ Practical Marks | Total Marks | |
| 1 | 16LBI41 | Bio-MEMS and Nanotechnology | 4 | - | 3 | 20 | 80 | 100 | 4 |
| 2 | 16LBI42X | Elective-III | 3 | - | 3 | 20 | 80 | 100 | 3 |
| 3 | 16LBI43 | Evaluation of Project phase -2 | - | - | - | 50 | - | 50 | 3 |
| 4 | 16LBI44 | Evaluation of Project and Viva-Voce | - | - | 3 | - | 100+100 | 200 | 10 |
| TOTAL | | | - | - | 6 | 60 | 75 | 450 | 20 |

| Elective-III | |
|---------------------|--|
| 16LBI421 | Biostatistics |
| 16LBI422 | Biomechanics and Rehabilitation Engineering |
| 16LBI423 | Wavelets in Biomedical Engineering |
| 16LBI424 | Artificial Intelligence and Pattern Recognition |
| 16LBI425 | Modelling and Simulation in Biomedical Engineering |

Note:

1. **Project Phase-1:** 6-week duration shall be carried out between 2nd and 3rd Semester vacation. Candidates in consultation with the guide shall carry out literature survey/ visit industries to finalize the topic of Project.
2. **Project Phase-2:** 16-week duration during 4th semester. Evaluation shall be done by the committee constituted comprising of HoD as Chairman, Guide and Senior faculty of the department.
3. **Project Evaluation:** Evaluation shall be taken up at the end of 4th semester. Project work evaluation and Viva-Voce examination shall conducted
4. **Project evaluation:**
 - a. Internal Examiner shall carry out the evaluation for 100 marks.
 - b. External Examiner shall carry out the evaluation for 100 marks.
 - c. The average of marks allotted by the internal and external examiner shall be the final marks of the project evaluation.
 - d. Viva-Voce examination of Project work shall be conducted jointly by Internal and External examiner for 100 marks.