



# GUJARAT TECHNOLOGICAL UNIVERSITY

## Bachelor of Engineering

Subject Code: 3180301

Semester – VIII

**Subject Name:** Internship/ Project

**Type of course:** Project work or Industrial Internship

**Prerequisite:** Biomedical Engineering courses (Analog and Digital Electronics, Embedded System, Core Biomedical Subject), Effective Technical Communication and Design Engineering

**Rationale:** To enhance the employability skills of the students Industrial Internship or Project work is required. It provides practical experience in the field of Biomedical Engineering and helps to reinforce theoretical knowledge gained in different courses to solve real-life challenges. The students are given exposure to explore the new techniques and developments in a medical device, which can lead them to self-employment or even employment generation through the extension of the work done in a project.

**Note:** Students must submit an SoP (Statement of Purpose) to the department within 15 days of the semester's commencement and get the project title/internship approval.

### Teaching and Examination Scheme:

| Teaching Scheme |   |    | Credits | Examination Marks |        |                 |        | Total<br>Marks |
|-----------------|---|----|---------|-------------------|--------|-----------------|--------|----------------|
| L               | T | P  | C       | Theory Marks      |        | Practical Marks |        |                |
|                 |   |    |         | ESE (E)           | PA (M) | ESE (V)         | PA (I) |                |
| 0               | 0 | 24 | 12      | 0                 | 0      | 100             | 100    | 200            |

### Content:

Final semester of Biomedical Engineering is dedicated to Industry relevant project or Industrial internship for at least 12 weeks.

### Industrial Internship:

Students have to undergo a minimum of 12-14 weeks of practical training in medical device manufacturing companies. In addition, the student may also work on a specified task or project which may be assigned to them by an industry mentor or faculty. The outcome of the Industrial Training should be presented in the form of a report.

### Guidelines for Internship:

1. It shall be of a minimum duration of 12 weeks.
2. A student may submit a brief proposal about the work to be carried out in the internship to a committee formed by the department within two weeks after starting the training.
3. The internship shall be full time for the whole duration.
4. A detailed daily diary is supposed to be maintained by the student. It shall be signed duly by the concerned supervisor of Industry. It shall be submitted to the department.
5. A comprehensive report is required to be prepared and submitted to the department at the end of the semester. A certificate shall be attached with this report duly signed by the competent authority of



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the Industry for the successful completion of the internship. An attendance report shall be sent to the department after every four weeks.

6. The internal evaluation shall be done at the start, mid and end of the semester. The internal marks shall be divided as decided by the department.
7. A plan for the whole internship duration shall be prepared after joining the Industry after consultation with the supervisor/mentor/guide of Industry. It shall contain the activities/visits to different sections etc., with appropriate timelines.
8. The Training report shall be submitted to the institute, which may include the objective of training, about the Industry, process, product line, equipment/machineries involved, divisions/sections in the Industry, any competitor, scope of some improvement in the process/product/efficiency, benefit by the training etc.
9. The industry supervisor may be invited at the time of external examination of the internship, if possible. It can be an online presence.
10. The evaluation by an external examiner shall be made considering all the guidelines.

OR

### Project work (Major):

Students have to undertake a minimum 12 weeks Industry defined project work in field of biomedical engineering, which will help them test their theoretical knowledge gained in earlier semesters. The Project work will enhance their capacity to undertake real-life medical engineering challenges and providing solutions by utilizing the concept of Human anatomy & physiology and Biomedical instrumentation to address problems related to human needs, improving the healthcare system in urban and rural areas, green technologies, utilizing non-conventional energy sources, latest technologies for the differently-abled people and technologies like Artificial Intelligence for health benefit of human beings.

### Guidelines for project work (Major):

1. Do a literature Survey, Industrial Survey and study relevant published literature related to the project.
2. Do Patent search analysis and Submit Patent Search Analysis Report (PSAR).
3. Design algorithm/circuit/configuration for the project and analyse/verify through simulations software.
4. The project work can be a simulation of circuits/systems or hardware based on the area and the complexity of the work involved.
5. If it contains the only simulation, it shall be comprehensive. The team is expected to know the various aspects of simulation techniques in detail. The team shall explain the results obtained, in fact with all the elements and different cases.
6. Decide implementation method and list components or parts required.
7. It can be a case study, innovative solution to real life problems, modelling and analysis, design, optimization, hardware prototype for Industry defined problems.
8. If the project is about modelling, the team is expected to know the proper mathematical formulation and justification, its limitations and its possible applications. The comparison of the performance of various models shall be covered as a part of the work. A detailed analysis of the results shall be done with the help of the model.



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9. If the team and supervisor find it appropriate, the overall work can be a combination of the different types of work mentioned above.
10. To Optimize the project design in terms of cost, area, power, computation complexity etc.
11. Compare results of projects with other similar design specifications.
12. Prepare project report and do a presentation before department project committee.
13. Conclude the project work and suggest future work.
14. The intermediate and final seminar in the presence of the department project committee for review of the work done
15. To explore possibilities of patent or research paper publications

### Course Outcomes :

After doing this course, the students should be able to:

| Sr. No. | CO statement                                                                                                                                                                 | Marks % weightage |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| CO-1    | Undertake problem identification, formulation and solution by applying fundamental principles of engineering                                                                 | 20%               |
| CO-2    | Identify, formulate and design engineering solutions to complex problems utilising a systematic approach and teamwork                                                        | 30%               |
| CO-3    | Communicate with biomedical professionals and community at large in written and oral forms                                                                                   | 20%               |
| CO-4    | Demonstrate the knowledge and understanding of engineering principles, management principles, leadership, and entrepreneurship skills and apply them to the assigned project | 15%               |
| CO-5    | Students can determine the social, health, environment, safety and ethical practices during the project.                                                                     | 15%               |

### Reference:

- AICTE Model curriculum
- AICTE Internship Policy:  
<https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf>