GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3180401
Semester – VII
Subject Name: Internship/Project

Type of course: Industrial training or Industrial internship

Prerequisite: The Knowledge of bioprocesses like fermentation including its control, tissue culture, Techniques in molecular biology and genetics as well as knowledge of proteins and enzymes, Mass transfer, heat transfer operations for biotechnology added with skills in computing like bioinformatics and biostatistics, is required.

Rationale: The exposure to industrial operations in the fields of Biotechnology in the domains of Food, Pharmaceuticals, Health care, Medical and Agriculture industries (but not limited to) will enhance skills sets needed in a student to be ready for employment or to be entrepreneurs. This training/ internship will also boost the goals of those students who wish to pursue further studies or select research area.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total 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: Biotechnology engineering students of semester 8 can opt for any one of the following mode.

[1] Industrial training
[2] Industrial internships

- Head of the Department can take decisions pertaining to any problems that needs address on realistic demands from industry(ies), but fulfilling the aim of 12 weeks.
- The total duration of the Industrial training or Industrial internships would be for a period equal to the 12 calendar weeks.
- A student can complete the entire 12 weeks duration in a single organization or can take in two different organizations fulfilling the criteria of 12 weeks, in the areas as mentioned in the rationale.
- Student can combine the work in maximum of two domains (Food, Pharmaceuticals, Health care, Medical and Agriculture industries/Bioinformatics/biostatistics etc)
- Student can combine the modes of work – i.e. one being from internships and the other being training, however, the 12 weeks duration must be fulfilled by them in total.

The Industrial training/ Industrial internships could be of the following forms:

1. Industrial training/ Industrial internships in a company or organizations (private/govt.) involved in R&D / Process design / manufacturing (QA / QC / Plant engineering / Production / Consultancy / Technical services / Engineering Projects including turn-key projects)

2. At the end of first phase and second phase of Industrial training/ Industrial internships, each student need needs to submit written report based on the work carried out during Industrial training / Industrial internships with weekly diary. The report and weekly diary will be counter signed by the supervisor / in charge of company.
3. Faculty supervisors from the institute may visit the specific organization / industry to observe the progress of the student and to have interaction with the industry representative, with their consent.
4. The performance of the student will be assessed based on the written report, weekly diary & a presentation to the committee consisting of expert faculty(ies) members assigned from the University.
5. Generalized points those need attention of students during the report preparation of Industrial training/ Industrial internships are:
    1. Company Profile, company domain and area of work with its capacity in various ways
    2. Clear objectives of problems must be defined.
    3. Process steps/Protocols – Bioprocess involved, parameters involved in manufacturing or synthesis processes
    4. Techniques used to make those products
    5. The required calculations, and softwares used
    6. Design of any process/ equipment (like fermenter, autoclave/sterilization reactors/ Sequencers/gel doc/microscopy etc)
    7. Treatment & handling of various materials / chemicals / glassware / utilities etc
    8. Safety and handling procedures/practices/protocols
    9. Plagiarism report must be checked by the guide for report or any literary method and must be passed with plagiarism levels below 18%.
    10. Bibliography is mandatory for report as well as every slide of presentation.

Course Outcomes:

Sr. No.	**CO statement**	**Marks % weightage**
CO-1	Identify the domains of work and make the strategy to learn the respective techniques/process with its parameters, in order to correlate it with corresponding theories	20%
CO-2	Observe the process and/or relevant protocols in regard to its overall manufacturing/synthesizing steps and compare it with their earlier learning	30%
CO-3	Propose appropriate changes in process or its control including optimization, if required. Or apply the techniques	30%
CO-4	Analyze the safety and handling procedures/practices/protocols	20%

References:

1. AICTE internship policy

2. AICTE model curriculum