



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for M.Sc. in Industrial Biotechnology, Semester - 2
Branch: Industrial Biotechnology
Subject Name: Bioentrepreneurship
Subject Code: 1320105

With effective
from academic
year 2021-22

1. Learning Outcomes

Learning Component	Outcome	Learning Outcome (Learner will be able to)
Theoretical and practical understanding of Bioentrepreneurship		<ul style="list-style-type: none">Understand the nature and function of bioentrepreneurship in the successful, commercial application of innovations.
Need and significance of Bioentrepreneurship development		<ul style="list-style-type: none">Describe new techniques to protect the environment from diseases, fuel production, feed the hungry and various other product preparation.
Effective Communication		<ul style="list-style-type: none">Communicate concepts and ideas effectively.
Leadership and Teamwork (LT)		<ul style="list-style-type: none">A quality management team, adequate financing, and access to new technology that leads to products.

LO – PO Mapping: Correlation Levels:

1 = Slight (Low); 2 = Moderate (Medium); 3 = Substantial (High), “-“= no correlation

Sub Code: 1320105	PO1	PO2	PO3	PO4	PO5	PO6	PO7
LO1: Theoretical and practical understanding of Bioentrepreneurship	2	2	3	2	2	3	2
LO2: Need and significance of Bioentrepreneurship development	3	3	3	2	2	3	2
LO3: Effective communication	2	3	2	2	3	3	2
LO4: Leadership and Teamwork (LT)	3	3	3	2	2	2	3

2. Course Duration: The course duration is of 30 sessions of 60 minutes each.

3. Course Contents:

Module No:	Module Content	No. of Sessions	70 Marks (External Evaluation)
1	Innovation and entrepreneurship in bio-business Introduction and scope in Bio-entrepreneurship, Types of bio-industries and competitive dynamics between the sub-industries of the bio-sector (e.g. pharmaceuticals vs. Industrial biotech), Strategy and operations of bio-sector firms; Factors shaping opportunities for innovation and entrepreneurship in bio-sectors, and the business implications of those opportunities, Alternatives faced by emerging bio-firms and the relevant tools for strategic decision,	8	20



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	Entrepreneurship development programs of public and private agencies (MSME, DBT, BIRAC, Make In India), strategic dimensions of patenting & commercialization strategies.		
2	Bio markets: business strategy and marketing Negotiating the road from lab to the market (strategies and processes of negotiation with financiers, government and regulatory authorities), Pricing strategy, Challenges in marketing in bio business (market conditions & segments; developing distribution channels, the nature, analysis and management of customer needs), Basic contract principles, different types of agreement and contract terms typically found in joint venture and development agreements, Dispute resolution skills.	8	20
3	Finance and accounting Business plan preparation including statutory and legal requirements, Business feasibility study, financial management issues of procurement of capital and management of costs, Collaborations & partnership, Information technology.	6	10
4	Technology management Technology – assessment, development & upgradation, Managing technology transfer, Quality control & transfer of foreign technologies, Knowledge centers and Technology transfer agencies, Understanding of regulatory compliances and procedures (CDSCO, NBA, GCP, GLA, GMP); Bi-specific T-cell engagers (BiTEs) as artificial bispecific monoclonal antibodies for the use as anti-cancer drug.	8	20



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4. Pedagogy:

- ICT enabled Classroom teaching
- Practical / live assignment
- Interactive classroom discussions

5. Evaluation:

Students shall be evaluated on the following components:

A	Mid-Semester Examination	(Internal assessment-30 Marks)
B	End-Semester Examination	(External assessment-70 Marks)

6. Reference Books:

No	Author	Name of the Book	Publisher	Year of Publication / Edition
1	Adams, D. J., & Sparrow, J. C.	Enterprise for Life Scientists: Developing Innovation and Entrepreneurship in the Biosciences	Scion	Latest Edition
2	Shimasaki, C. D.	Biotechnology Entrepreneurship: Starting, Managing, and Leading Biotech Companies	Academic Press	Latest Edition
3	Onetti, A., & Zucchella, A.	Business Modeling for Life Science and Biotech Companies: Creating Value and Competitive Advantage with the Milestone Bridge	Routledge	Latest Edition
4	Jordan, J. F.	Innovation, Commercialization, and Start-Ups in Life Sciences	CRC Press	Latest Edition
5	Desai, V.	The Dynamics of Entrepreneurial Development and Management.	Himalaya Pub. House	Latest Edition

Note: Wherever the standard books are not available for the topic appropriate print and online resources, journals and books published by different authors may be prescribed.

7. List of Journals/Periodicals/Magazines/Newspapers / Web resources, etc

- <https://biotech.co.in/sites/default/files/2020-01/Bioentrepreneurship-Development.pdf>
- <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.463.4354&rep=rep1&type=pdf>
- https://www.nature.com/articles/nbt0598supp_13



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Course Outcomes:

On completion of this course, students should be able to:

Gain entrepreneurial skills, understand the various operations involved in venture creation, identify scope for entrepreneurship in biosciences.

Utilize the schemes promoted through knowledge centres and various agencies.

Build up a strong network within the industry.