

**Course outcomes:**

*After successful completion of the course, students will be able to:*

- CO 1. Obtain basic knowledge of principle concepts in economics, finance and various other aspects of business management and entrepreneurship in Biotechnology
- CO 2. Understand strategic options to manage and market technological innovations in Biotechnology
- CO 3. Acquire basic skills in project planning and management in Biotechnology
- CO 4. Analyse relevant real-world cases and examples in Biotechnology
- CO 5. Developing a Start-up plan and evaluate its feasibility in the field Biotechnology
- CO 6. Understand general guidelines and bio safety practices and rDNA research
- CO 7. Comprehend protection and registration of new plant varieties, plant germplasm conservation, Farmers rights and plant breeder's rights.
- CO 8. Elucidate general agreements on trade and tariff, use of traditional knowledge digital library i.e ayurvedic and unani medicinal plants

**UNIT I (13 hrs)**

Entrepreneurship and Innovation: Categories of innovation, The Start-up Process, Market segmentation, Elements of Marketing Mix, Case studies of commercialization of novel concepts in biotechnology. Intellectual property rights (IPR) (meaning, classification and forms), importance of IPR in Science and Technology. Patents, patentability criteria, patenting procedures, patent applications. Salient features of Patent Law in India, US and Europe. Biopiracy, patent-related litigations and controversies (neem, basmathi rice, turmeric). Traditional ecological knowledge. Traditional knowledge digital library (TKDL). PTE in pharma.

**UNIT II (13 hrs)**

Outline of Macro- and Micro-economics, Opportunity cost, Willingness to pay, Pricing, Simple and Compound interest, Time value of money, Inflation, Break-even analysis, IPO, Shares, Dividend. Project Management: Types of projects, Steps in a project, Project Life-cycle, Magic triangle concept, Project specifications, SWOT analysis, Feasibility study, Types of risks and management, Gantt chart, Outline of a business plan. TRIPs, WTO, WIPO. Plant variety protection, International union for the protection of new varieties of plants (UPOV). Case studies of small scale biotech companies.

**UNIT III (14hrs)**

Biosafety and research: General guidelines for recombinant DNA research activity. Containment facilities and biosafety practices; Rules for import and export of biological materials. Guidelines for use of small laboratory animals in experimentation and pre-clinical research, maintenance and regulations. Biological warfare and Bioterrorism. CBD, plant protection act in India, registration of new varieties, rights and obligations, farmer's rights; Plant germplasm conservation, characterization and documentation. Seed certification (laws, regulations and standards), seed patent law.

**References**

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2. Biotechnology. Rehm H.-G.& G. Reed, Wiley Blackwell Pub., 1983

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4. Ethical guidelines for Biomedical Research on Human participants, Indian Council for Medical Research, Govt. of India, New Delhi, 2006
5. Good Clinical Practices for Clinical Research in India, Central Drugs Standard Control Organization, Ministry of Health and Family Welfare, Govt. of India, 2013
6. Brealey, R.A., Myers, S.C. and Marcus, A.J., Fundamentals of Corporate Finance. McGraw-Hill, 2012
7. Davila, T., Epstein, M. and Shelton, R. Making innovation work: how to manage it, measure it and profit from it. Upper Saddle River: Wharton School Publishing, 2006
8. Trompenaars, F. and Hampden-Turner, C. Managing people across cultures. Capstone Publishing Ltd., 2004
9. Mankiw, G. Principles of Economics. Cengage Learning, 2015
10. A Guide to the Project Management Body of Knowledge. PMBOK® Guide – Sixth Edition, 2017

