

**Courses in M.Sc. Biotechnology/ Medical Biotechnology to enhance Entrepreneurship/ communication skill development**

MBT&Med BT 210: Option I (210.1) Bio-entrepreneurship Elective Course I – Theory; 2 Credits		Total 30L
UNIT I		
1	Sectors: Pharma, Biotech, Food, Agri-biotech, Research, Diagnostics, Analytic Labs	3
2	Developing flair for business in students	1
3	Short-term opportunities available for business	2
4	Import substitute product list	2
5	Regulatory Affairs: SSI, MSME, FICCI, MCC, IEC	3
6	Firm registration, GST registration, SME Loan, ISO 22000/14000 etc.,	3
7	Export counsel	1
UNIT II		
8	Finance: Banking, MoFPI, SIDBI, Foreign collaboration, Investors	3
9	Subsidies: BIRAC, SSI, MSME, MoFPI	2
10	Marketing: Promotion, Distribution, Rolling Cycle	2
11	Business Concept and Competitors' knowledge	1
12	Export benefits, procedures	2
13	Make In India	1
14	Knowledge about taxation, GST, custom duty, excise	3
15	Packaging suitability knowledge	1
References:		
1. Forbat, John, "Entrepreneurship" New Age International. 2. Havinal, Veerbhadrappa, "Management and Entrepreneurship" New Age International 3. Joseph, L. Massod, "Essential of Management", Prentice Hall of India.		
2. Principles of Management – P.C.Tripathi, P.N.Reddy – Tata McGraw Hill,		
3. Dynamics of Entrepreneurial Development & Management – Vasant Desai – Himalaya Publishing House 3. Entrepreneurship Development – Poornima.M.Charantimath – Small Business Enterprises – Pearson Education – 2006 (2 & 4). 4. Management Fundamentals – Concepts, Application, Skill Development – RobersLusier – Thomson – 5. Entrepreneurship Development – S.S.Khanka – S.Chand& Co. 6. Management – Stephen Robbins – Pearson Education/PHI – 17 th Edition, 2003.		

MBT&MedBT 210: Option II (210.2) – Intellectual property rights I (IPR-I)	Total
Elective Course I – Theory; 2 Credits	30L

#### UNIT I

1	Introduction to Intellectual Property	15
	General Introduction to IP & IPR; Introduction, History & role of International Conventions & Treaties- GATT, WTO, WIPO, TRIPS, Budapest Treaty, CBD, Nagoya Protocol; International framework for the protection of IP; IP as a factor in R&D; IPs of relevance to Biotechnology, Agriculture, Bioinformatics and Pharma sector	

#### UNIT II

2	Types of IP Industries: Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications, Plant variety and Protection of New GMOs	8
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3	Concept of 'prior art'	7
	Need of Prior Art for IP types, Classification search and its implications; Invention in context of "prior art"; Patent databases; Searching International Databases; Country-wise patent searches (USPTO, EPO, India etc.); Analysis and Report formation	

#### References:

1. Intellectual property rights in agricultural biotechnology By Frederic H. Erbis, Karim M. Maredia, Biotechnology in Agriculture Series No 28,
2. The role of intellectual property rights in biotechnology innovation By David Castle, Edward Elgar Publishing
3. <http://www.wipo.int/portal/index.html.en>
4. [http://www.ipr.co.uk/IP\\_conventions/patent\\_cooperation\\_treaty.html](http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html)
5. [www.patentoffice.nic.in](http://www.patentoffice.nic.in)
6. [www.iprlawindia.org/](http://www.iprlawindia.org/) - 31k - Cached - Similar page
7. <http://www.cbd.int/biosafety/background.shtml>

MBT&Med BT 310: Option I (310.1) – Biomedical Waste Management	Total
Elective Course II – Theory; 2 Credits	30 L

#### UNIT I

1	Introduction, definition, classification/ categories, composition and sources. Radioactive waste Health Impacts, direct and Indirect hazards Modern technology for handling biomedical waste Basic steps in waste management, segregation, collection and handling of waste On site pre-treatment of waste Mechanical treatment and chemical disinfections store and off-site transportation Common treatment facilities in-site and off-site Liquid waste treatment and different technologies, cost aspect	15
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#### UNIT II

2	Technologies available for treatment of biomedical waste Conventional treatment technologies a) Wet thermal technology b) Incineration - different models Treatment of general/non-infectious waste a) Composting, rotating jumbling system French composting b) Vermi-composting Disposal Technologies a) Sharp disposal pit b) Deep- burial pit c) Secured land Controls applied to waste management, Environmental safety, risks & public issues, Instrumentation and monitoring, Crematories, Risk management in hospitals -Environment issues in hospitals -Risk analysis Legislation and policies on health care waste management.	15
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#### References:

1. Principles of Hospital Management - S. A. Tabish
2. Hospital Management - S. L. Goel
3. Hospital Administration - Francis
4. Bio-Medical Waste Act & Rules Govt. of India
5. Current Issues In BMW Waste Handling-ISHA, Bangalore
6. Management and Handling Rules for: municipal solid waste, biomedical waste, hazardous waste and radioactive wastes, Government of India Publications.
7. Bio-Medical Waste Management- Sushma Sahai

MBT& Med BT 310: Option III (310.3) – Intellectual property rights II (IPR II) Elective Total  
 Course II - Theory; 2 Credits 30 L

UNIT I

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|---|-------------------|---|
| 1 | Basics of Patents | 5 |
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Indian Patent Act 1970; Patent Rules, 2003; Recent Amendments; Definitions, non-patentable subject matter, patentability criteria, anticipation, infringement, opposition, biopiracy; Precautions before patenting-disclosure/non-disclosure.

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|---|------------------|---|
| 2 | Types of patents | 5 |
|---|------------------|---|

Provisional and Complete specification; Contents of specification

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|---|---------------------------------|---|
| 3 | Introduction to Patent drafting | 5 |
|---|---------------------------------|---|

National, PCT and Convention patent applications; PCT and Implications; Role of a Country Patent Office; Procedure for filing requirements National and international Patent application, Forms, fees and timelines  
 Cost and financial assistance for patenting, introduction to existing schemes

UNIT II

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|---|---|----|
| 4 | Relevant case studies (3-4 cases) related to patentability criteria, anticipation, infringement, opposition, bio-piracy | 12 |
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| 5 | Career opportunities in the field of IPR. | 3 |
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References:

1. Erbis, Karim M. Maredia, Intellectual property rights in agricultural biotechnology  
 By Frederic H. Biotechnology in Agriculture Series No 28,
2. David Castle, The role of intellectual property rights in biotechnology innovation,  
 Edward Elgar Publishing
3. <http://www.wipo.int/portal/index.html.en>
4. [http://www.ipr.co.uk/IP\\_conventions/patent\\_cooperation\\_treaty.html](http://www.ipr.co.uk/IP_conventions/patent_cooperation_treaty.html)
5. [www.patentoffice.nic.in](http://www.patentoffice.nic.in)
6. [www.iprlawindia.org/](http://www.iprlawindia.org/) - 31k - Cached - Similar page
7. <http://www.cbd.int/biosafety/background.shtm>

Med BT 302: Plant Biotechnology Total  
Core Course – Theory; 3 Credits 45L

UNIT I

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|---|---|
| 1 Biodiversity hotspots in India: Characterization of biodiversity through different biochemical and molecular methods (chemical printing of biodiversity), | 3 |
| 2 Conservation strategies of biodiversity, threatened and extinct species   | 2 |
| 3 Bio-prospecting of biodiversity for product development   | 2 |

UNIT II

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|---|---|
| 4 Plant tissue culture and micropropagation<br>Introduction, Different systems and stages in axillary shoot proliferation, organogenesis, somatic embryogenesis with examples..   | 4 |
| 5 Cell culture technology and its application for the production of artificial seeds and secondary metabolites..  | 4 |
| 6 Homozygous plant production through anther and pollen culture, Embryo rescue and embryo culture in rearing viable hybrid plants, Endosperm culture and production of triploids, Somaclonal and gametoclonal variations and their applications | 4 |
| 7 Protoplast technology for the production of somatic hybrids and cybrids. Applications in crop improvement.  | 3 |

UNIT III

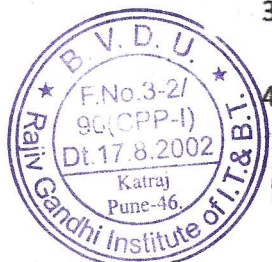
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|--|---|
| 8 Transgenic Plants<br>Introduction, vertical versus horizontal gene transfer, vectors, reporter genes | 3 |
| 9 Direct and indirect methods for gene transformation, plant cell and chloroplast transformation,      | 3 |
| 10 Introduction to markers, Marker – Assisted Crop Improvement, Genetic Markers and Linkage Maps       | 3 |

Unit IV

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| 10 Applications of transgenic plants<br>Development of transgenes for the production of biofuels, single cell proteins, pigments, nutraceuticals, pharmaceuticals, biopesticides, pharmaceuticals, vaccines, plantibodies, value addition, bio-fortification. | 3 |
| 11 Selection and characterization of transformants for biotic and abiotic stress tolerance, for increase in crop and timber productivity  | 3 |
| 12 Marker Technology in Crop Improvement  | 3 |

References:

1. Altman A, Hasegawa PM (Ed) (2012) – Plant Biotechnology and agriculture. Prospects for the 21st century (Academic press).
2. Bhojwani S S. & Razdan M K (1996). - Plant Tissue Culture : Theory and Practice (Elsevier)
3. Slater A, Scott NW, Fowler MR (2008) – Plant Biotechnology: the genetic manipulation of plants (Oxford Press)
4. Plant Molecular Breeding, (2009), Newbury HJ, John Wiley and Sons., USA



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