ST. JOSEPH'S COLLEGE (Autonomous) DEPARTMENT OF BIOTECHNOLOGY OPEN ELECTIVE SYLLABUS UNDER NEP MODEL (As per model curriculum suggested by university) Open elective: Sem I: Biotechnology for human welfare	
Number of Theory Credits	Number of lecture hours/semester
3	**42**

Course 2: OE 1T, BTC 301, Biotechnology for Human Welfare	**42Hrs**
Unit – 1: **Industry**	14Hrs
Application of biotechnology in industry: Industrial production of alcoholic beverage (wine), antibiotic (Penicillin), enzyme (lipase) Protein engineering applications in food, detergent and pharmaceutical industr**y**	
Unit – 2: **Environment**	14Hrs
Application of biotechnology in environmental aspects: Degradation organic pollutants - chlorinated and non-chlorinated compounds; degradation of hydrocarbons and agricultural wastes, PHB –production and its futuristic applications.	
Unit – 3: **Forensic science and Health**	14Hrs
Application of biotechnology in forensic science: Solving crimes of murder and rape; solving claims of paternity and theft by using DNA finger printing techniques **Health** Application of biotechnology in health: Genetically engineered insulin, recombinant vaccines, gene therapy, molecular diagnostics using ELISA, PCR; monoclonal antibodies and their use in cancer; human genome project	

Reference:

1. Crueger W and Crueger A. (2000). Biotechnology: A textbook of Industrial Microbiology.2nd edition. Panima Publishing Co. New Delhi.
2. Patel AH. (1996). Industrial Microbiology. 1st edition, Macmillan India Limited.
3. Stanbury PF, Whitaker A and Hall SJ. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.
4. Environmental Biotechnology, Pradipta Kumar Mohapatra
5. Environmental Biotechnology – Concepts and Applications, Hans-Joachim Jordening andJesef Winter
6. B.B. Nanda and R.K. Tiwari, Forensic Science in India: A Vision for the Twenty First

Century, Select Publishers, New Delhi (2001).
7. M.K. Bhasin and S. Nath, Role of Forensic Science in the New Millennium, University of Delhi, Delhi (2002).
8. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
9. W.G. Eckert and R.K. Wright in Introduction to Forensic Sciences, 2nd Edition, W.G.Eckert (ED.), CRC Press, Boca Raton (1997).

ST. JOSEPH'S COLLEGE (Autonomous) DEPARTMENT OF BIOTECHNOLOGY OPEN ELECTIVE SYLLABUS UNDER NEP MODEL (As per model curriculum suggested by university) OPEN ELECTIVE: SEM 2: Applications of Biotechnology in Agriculture	
Number of Theory Credits	Number of lecture hours/semester
3	**42**

Course 2 : Theory: Open Elective- 2T, Applications of Biotechnology in Agriculture	**42 Hrs**
Unit – 1: Agricultural Biotechnology	14 Hrs
Concepts and scope of biotechnology in Agriculture. Plant tissue culture, micro propagation, entrepreneurship in commercial plant tissue culture. Banana tissue culture - primary and secondary commercial setups, small scale bioenterprises: Mushroom cultivation	
Unit – 2: Transgenic plants	14 Hrs
The GM crop debate – safety, ethics, perception and acceptance of GM crops. GM crops case study: Bt cotton, Bt brinjal Plants as biofactories for molecular pharming: edible vaccines, plantibodies, nutraceuticals.	
Unit – 3: Bt based pesticides	14 Hrs
Baculovirus pesticides, Mycopesticides, Post-harvest Protection: Antisense RNA technology for extending shelf life of fruits and shelf life of flowers. Genetic Engineering for quality improvement: Seed storage proteins, Flavours– capsaicin, vanillin.	

References

1. Chrispeels M.J.et al. Plants, Genes and Agriculture-Jones and Bartlett Publishers, Boston.1994.
2. Gamborg O.L. and Philips G.C.Plant cell, tissue and organ culture (2nd Ed.) Narosa Publishing House. New Delhi.1998
3. Hammound J, P McGravey&Yusibov.V. Plant Biotechnology, Springer verlag.2000
4. Heldt. Plant Biochemistry and Molecular Biology.Oxford and IBH Publishing Co. Pvt.Ltd. Delhi. 1997
5. LydianeKyte and John Kleyn.Plants from test tubes. An introduction to
6. Micropropagation (3 rd. Ed.). Timber Press, Portland. 1996

7. Murray D.R. Advanced methods in plant breeding and biotechnology.Panima Publishing Corporation.1996
8. NickoloffJ.A.Methods in molecular biology, Plant cell electroporation and electrofusion protocols-Humana press incorp, USA. 1995.
9. Sawahel W.A. Plant genetic transformation technology.Daya Publishing House, Delhi.1997
10. Prescott, Harley, Klein's Microbiology, J.M. Willey, L.M. Sherwood, C.J. Woolverton, 7th International, edition 2008, McGraw Hill.
11. Foundations in Microbiology, K. P. Talaro, 7th International edition 2009, McGraw Hill.
12. A Textbook of Microbiology, R. C. Dubey and D. K. Maheshwari, 1st edition, 1999, S. Chand & Company Ltd.
13. Brock Biology of Microorganisms, M.T.Madigan, J.M.Martinko, P. V. Dunlap, D. P. Clark- 12th edition, Pearson International edition 2009, Pearson Benjamin Cummings.
14. Microbiology – An Introduction, G. J.Tortora, B. R.Funke, C. L. Case, 10th ed. 2008,Pearson Education.