

UNDERGRADUATE PROGRAMME IN BIOCHEMISTRY

Paper No- 18

Advanced Techniques and Technologies

THEORY

This paper would deal with techniques such as cellular FRET analysis, whole body imaging, TEM and SEM, Chip-Seq, Chip on Chip, Protein-interaction technologies (yeast-2-hybrid, bacterial-2-hybrid, protein-complementation, phage display, surface plasmon resonance), X-ray crystallography, NMR for protein structure determination and other biophysical techniques such as CD spectroscopy, Calorimetry and others as deemed fit. After teaching the fundamental of various techniques, their applications would be taught/discussed using case studies.

PRACTICAL

The practicals will involve use of several instruments, analysis and interpretation of data.

Suggested Readings:

1. Protein-Protein Interactions: Methods and Applications (Methods in Molecular Biology) (2004) Vol. 261, Haiyan, F. (ed), Humana Press (Totowa, NJ), ISBN: 1-58829-120-0 / ISBN: 978-1588291202.
2. Protein-Protein Interactions: A Molecular Cloning Manual (2005) 2nd ed., Golemis, E.A. and Adams, P.D., Cold Spring Harbour Laboratory Press (New York), ISBN: 0879697237/ ISBN: 13: 9780879697235.
3. The Ultimate Guide to Your Microscope (2008) Levine, S. and Johnstone, L., Sterling, ISBN: 9781402743290.
4. Physical Biochemistry: Principles and Applications (2010) 2nd ed., Sheehan, D., Wiley Blackwell (West Sussex), ISBN: 978-0-470-85602-4 / ISBN: 978-0-470-85603-1.
5. Principles and Techniques of Biochemistry and Molecular Biology (2010) 7th ed., Wilson, K., and Walker, J. (eds), Cambridge University Press (New Delhi), ISBN: 978-0-521-73167-6 / ISBN: 978-0-521-51635-8.
6. Introduction to Instrumentation in Life Sciences (2012) Bisen, P.S. and Sharma, A., CRC Press/Taylor and Francis Group (California), ISBN: 978-1-4665-1240-5.
7. Molecular Cloning: A Laboratory Manual (2012) Vol. 1-3, 4th ed., Green M.R. and Sambrook J., Cold Spring Harbour Laboratory Press (New York). ISBN: 978-1-936113-41-5 / ISBN: 978-1-936113-42-2.
8. Biophysical Chemistry (2013), Schimmel, C.R.C., Macmillan Higher Education, ISBN : 0716738619, 9780716738619.
9. Current Protocols in Protein Science (2013) Coligan, J.E., Dunn, B.M., Speicher, D.W., Wingfield, P.T., Lippincott-Schwartz, J. and Yamada, K.M., John Wiley and Sons (Somerset, NJ), Print ISSN: 1934-3655 / Online ISSN: 1934-3663.
10. Current Protocols in Molecular Biology (2013) Ausubel, F.M. et al., John Wiley and Sons (Somerset, NJ), Print ISSN: 1934-3639 / Online ISSN: 1934-3663.
11. Current Protocols in Immunology (2013) Coligan, J.E. et al., John Wiley and Sons (Somerset, NJ), Print ISSN: 1934-3671 / Online ISSN: 1934-368X.
12. Current Protocols in Cell Biology (2013) Bonifacino, J.S., Dasso, M., Harford, J.B., Lippincott-Schwartz, J. and Yamada, K.M., John Wiley and Sons (Somerset, NJ), ISBN: 1934-2500.