



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
(Autonomous Institution, Affiliated to Anna University, Chennai)
Elayampalayam, Tiruchengode – 637 205



DEPARTMENT OF BIOTECHNOLOGY

Course Code / Name : U13BT742 & DOWNSTREAM PROCESSING

Class (Year / Programme / Department / Section): IV/ B.TECH/ BT

UNIT-1 DOWNSTREAM PROCESSING IN BIOTECHNOLOGY

| S.No | Topics To Be Covered | Duration in Minutes | Teaching Aid | Books Referred |
|------|--|---------------------|--------------|----------------|
| 1. | Role and Importance of downstream processing in biotechnological processes | 45 | BB | T1 |
| 2. | Problems and requirements of bioproduct purification | 45 | BB | T1,R1 |
| 3. | Economics of downstream processing in Biotechnology | 45 | BB | T2 |
| 4. | Cost -cutting strategies | 45 | BB | T1 |
| 5. | Characteristics of biological mixtures | 45 | PPT | T1,R1 |
| 6. | Cell disruption for product release | 45 | BB | T2 |
| 7. | Mechanical, enzymatic and chemical methods | 45 | PPT | T1,R1 |
| 8. | Pretreatment | 45 | BB | T1 |
| 9. | Stabilization of bioproducts | 45 | PPT | T2 |

UNIT-II SEPARATION BY PHYSICAL METHODS

| | Topics To Be Covered | Duration in Minutes | Teaching Aid | Books Referred |
|-----|---|---------------------|--------------|----------------|
| 10. | Unit operations for solid-liquid separation | 45 | BB | T1 |
| 11. | Flocculation | 45 | PPT | T2, R1 |
| 12. | Sedimentation | 45 | BB | T1 |
| 13. | Centrifugation | 45 | PPT | T1 |
| 14. | Filtration methods | 45 | BB | T2, R1 |

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| 15. | Perevaporation | 45 | PPT | R1 |
| 16. | Problems on centrifugation, sedimentation | 45 | BB | T1,R1 |
| 17. | Applications on sedimentation, centrifugation | 45 | PPT | T1 |
| 18. | Applications on perevaporation, Filtration & Quiz questions discussion | 45 | BB | T1 |

UNIT-III ISOLATION OF PRODUCTS

| | Topics To Be Covered | Duration in Minutes | Teaching Aid | Books Referred |
|-----|--|---------------------|--------------|----------------|
| 19. | Adsorption | 45 | PPT | T1 |
| 20. | liquid - liquid extraction | 45 | BB | T1,R1 |
| 21. | Aqueous two-phase extraction and equipment | 45 | PPT | T2 |
| 22. | Membrane separation – ultrafiltration | 45 | BB | T2 |
| 23. | Reverse osmosis | 45 | PPT | T1,R1 |
| 24. | Dialysis and equipment | 45 | BB | R1,T2 |
| 25. | Precipitation of proteins by different methods | 45 | PPT | T1,R1 |
| 26. | Adsorption Process | 45 | BB | T2 |
| 27. | Adsorption Isotherms; batch Adsorption , Adsorption in CSTR; Adsorption in fixed bed | 45 | PPT | T1 |

UNIT-IV PRODUCT RESOLUTION/FRACTIONATION

| | Topics To Be Covered | Duration in Minutes | Teaching Aid | Books Referred |
|-----|---|---------------------|--------------|----------------|
| 28. | Chromatography | 45 | BB | T1 |
| 29. | Principles & Instruments and practice | 45 | BB | T1,R1 |
| 30. | Qualitative and quantitative aspects of chromatography- Column Efficiency, Selectivity and Resolution | 45 | PPT | T1 |
| 31. | SEC,IEC, reverse phase Chromatography | 45 | BB | T1 |
| 32. | Hydrophobic interaction CHROMATOGRAPHY,RP-HPLC | 45 | BB | T1,R1 |
| 33. | Bioaffinity | 45 | PPT | R1 |
| 34. | Pseudo affinity chromatographic techniques | 45 | BB | T1,R1 |

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| 35. | Iso electric focusing | 45 | BB | T1 |
| 36. | Aplication of chromatography | 45 | BB | T1 |
| UNIT-V FINAL PRODUCT FORMULATION AND FINISHING OPERATIONS | | | | |
| | Topics To Be Covered | Duration in Minutes | Teaching Aid | Books Referred |
| 37. | Crystallization | 45 | BB | T1 |
| 38. | Crystallization theory | 45 | BB | T1,R1 |
| 39. | Crystallization practice | 45 | BB | T1 |
| 40. | Equipment for crystallization | 45 | BB | T1 |
| 41. | Drying | 45 | PPT | T1,R1 |
| 42. | Theoretical Consideration | 45 | BB | R1 |
| 43. | Drying equipment | 45 | PPT | T1,R1 |
| 44. | Different types of formulation procedure | 45 | BB | T1 |
| 45. | Applications of crystallization | 45 | PPT | T1 |

TEXT BOOK:

1. B. Sivasankar, BioSeparation – Principles and Techniques, Prentice Hall of India Private Limited, NewDelhi, 2006.
2. Keith Wilson, John Walker, John M. Walker - Principles and Techniques of Practical Biochemistry, 7th edition, Camebridge Publication, 2010.

REFERENCES:

1. Bioseparations science and Engineering, Roger G. Harrison, Paul Todd, Scott. R. Rudge, Demetri P. Petrides, Oxford University, Indian Edition 2006