1.1. Programme structure/Courses to be offered:

S. No.	Courses Offered	Duration	Eligibility/ qualification*	Curriculum	Fees (Rs.)	Intake
1.	Certificate course in Bioproducts and Bioprocesses	6 Months	12th Science stream/ B.Sc./ B.Sc. (H)/ B.Sc. Ag.	Module 1	1500	20
2.	Certificate course in *In vitro* Techniques	6 Months	12th Science stream/ B.Sc./ B.Sc. (H)/ B.Sc. Ag./ B.Tech.-Biotech/ M.Sc./ M. Phil./Ph. D in Life Science or related subjects	Module 2	1500	20
3	Certificate course in Tools and Techniques in Biosciences	6 Months	M.Sc./ M. Phil./Ph. D in Life Science or related subjects	Module 3	1500	20
4.	Diploma in Bioprocesses and Biotechniques	1 Year	12th Science stream/ B.Sc./ B.Sc. (H)/ B.Sc. Ag./B.Tech.-Biotech/M.Sc./ M. Phil./Ph. D in Life Science or related subjects	Module 1 *Module 2 or Module 3 *Choice b/w Module 2 & 3	1500 Per Module	20
5.	Post Graduate Diploma in Bioprocesses and Biotechniques	2 Year	B. Sc./ B. Sc. (H)/ B. Sc. Ag./ M. Sc. in Botany/ Zoology/ Biochemistry Biotechnology/ Microbiology/ Life Sciences/ Pharmacy/ Food Technology Forestry/ Agriculture/ Dairy Technology/ Chemistry & allied sciences	Module 1 Module 2 Module 3 & 6 months Industry exposure**	1500 per Module	20

Syllabus for module 3

Certificate course in Tools and Techniques in Biosciences

Unit:1

Basic Instruments and techniques: Working principles, basic operation and application of Microtome, weighing balance, PH meter, autoclave, Oven, laminar air flow, Water Baths, CO_2 Incubators, Shaking Incubators, Hot Air Ovens, Bio-Safety Hoods, Fume Hoods, Pipettes and MiliQ water system.Principle of asepsis and sterilization technique.

Unit:2

Microscopy and its modifications – Working principles, basic operation and application ofLight, phase contrast and interference, Fluorescence, Confocal, Electron (TEM and SEM)

Centrifugation: Working principles, basic operation and application ofmicro-centrifuge, ultracentrifuge and density gradient centrifugation, applications (isolation of cell components), determination of molecular weight by sedimentation velocity and sedimentation equilibrium methods

Unit:3

Electrophoretic and PCR techniques: Working principles, basic operation and application ofagarose, polyacrylamide and SDS-polyacrylamidegel electrophoresis, capillary electrophoresis, 2-D electrophoresis, pulsed field gel electrophoresis.

Working principles, basic operation and application ofGradient PCR,RT-PCR and Gel Documentation system.

Unit: 4

Chromatography techniques: Working principles, basic operation and application of TLC, gel permeation, ion exchange and affinity chromatography, HPLC.

Spectroscopy technique: Working principles, basic operation and application ofUV-visible spectroscopy, fluorescence, NMR, ESR, plasma emission spectroscopy, Atomic Absorption Spectroscopy, GC-MS, LC- MS, FTIR and X- ray crystallography

Unit: 5

Calibration, Validation, and certification of instruments like PCR's, Ovens, Incubators, Volumetric Dispensers, Spectrophotometers, and Electronic Balances etc. using International Standards.

Documentation for Instrumentation systems and procurement procedures, design of typical laboratory, safety measurement and IPR's.

Practicals:

Practicals based on theory papers

***Suggested Readings*:**

1. Freifelder D., Physical Biochemistry, Application to Biochemistry and Molecular Biology, W.H. Freeman and Company, San Fransisco.
2. Wilson, K. and Walker, J. Principles and Techniques of Practical Biochemistry Cambridge University Press.
3. Holmeand, D. and Peck, H. Analytical Biochemistry. Longman
4. Scopes, R. Protein Purification - Principles and Practices. Springer Verlag.
5. Pattabhi V and Gautham N. Biophysics, Kluwer Academic Publishers.
6. Narayanan P. Essentials of Biophysics, New Age International Pvt Ltd.
7. Volkenshtein, M.V. General Biophysics Academic Press, Inc.
8. Daniel, M. Basic Biophysics for biologists Agrobios.
9. Van, Holde, Johnson, K. E., Cutis, W. and Shing Ho, P. Principles of physical biochemistry, Pearson education Pvt. Ltd.

1.1. Job Opportunities

S.No.	Courses	Opportunity
1.	Certificate course in Bioproducts and Bioprocesses	Herbal plant propagation and ayurvedic industry, pharmaceuticals, phytocosmetics, perfumeries, nutraceuticals etc.
2.	Certificate course in *In vitro* Techniques	Plant Tissue Culture and Biotechnology Industry, Technical Assistant, Forestry, Microbial Technology, Food Industry, Dye Industry
3	Certificate course in Tools and Techniques in Biosciences	Diagnostic And Therapeutic Laboratories, Technician Assistant, Research Officer, Chemical Industry, High End Instrument Industry
4.	Diploma in Bioprocesses and Biotechniques	Ayurvedic Industry, Pharmaceuticals, Phytocosmetics, Perfumeries, Nutraceuticals, Biotech Industries etc.
5.	Post Graduate Diploma in Bioprocesses and Biotechniques	Ayurvedic Industry, Pharmaceuticals, Biotechnology Industry, Forestry, Microbial Technology, Food Industry, Diagnostic Laboratories, Research Officer, Ayurvedic Industry, Pharmaceuticals, Phytocosmetics, Perfumeries, Nutraceutical industry.

1.2. Special Attraction of the courses

- Individual Hands-on-experiment based learning of all various basic and advanced techniques (every student will be able to perform every experiment on their own).
- Frequent visits and lectures by renowned Resource personals/ Visiting faculty/ Scientist/ Researchers from Industry and Research Institutes and Universities.
- One day or two days workshops on soft skills, personality development, etc. (Separate Certificate will be provided for these Workshops).
- Free Special Lectures/Talks on Future Prospects and career counseling services to all the participants.
- Well equipped laboratory with separate class rooms and Wi-Fi facility.
- Printed Protocol Booklet/ study material for every participant will be delivered
- Library and e-book facility along with computer facility
- Dedicated team well-connected through Facebook & Whatsapp for guiding students.
- Approved Certificate to all students on successful completion of training from Mohanal Sukhadia University, Udaipur- An “A” grade accredited University by NAAC.