RAJALAKSHMI ENGINEERING COLLEGE

(An Autonomous Institution Affiliated to Anna University Chennai)

DEPARTMENT OF BIOTECHNOLOGY

CURRICULUM AND SYLLABUS REGULATIONS – 2023

B. TECH –BIOTECHNOLOGY

CHOICE BASED CREDIT SYSTEM

VISION OF THE INSTITUTION

To be an institution of excellence in Engineering, Technology and Management Education & Research.

To provide competent and ethical professionals with a concern for society.

MISSION OF THE INSTITUTION

To impart quality technical education imbibed with proficiency and humane values

To provide right ambience and opportunities for the students to develop into creative, talented and globally competent professionals

To promote research and development in technology and management for the benefit of the society

VISION OF THE DEPARTMENT

To be a department of academic excellence focused on education, research and development and to conquer the frontiers of biotechnology, benefitting the society.

MISSION OF THE DEPARTMENT

- To impart quality technical education
- To continuously enhance and enrich the teaching / learning process
- To provide an ambience for overall development of the students to be more creative, innovative and globally competent ethical professionals
- To promote research and develop technologies and products for the sustenance and wellbeing of the society

PROGRAM EDUCATIONAL OBJECTIVES

This program enables Biotechnology graduates

I. To apply knowledge across the disciplines and in emerging areas of biotechnology for higher studies, research, employability and product development

II. To develop communication skills, sense of responsibility to protect the environment and ethical conduct towards their profession and commitment to serve the society

III. To possess academic excellence, managerial skills, leadership qualities and understand the need for lifelong learning for a successful professional career

CURRICULUM

SEMESTER – I

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY & PRACTICALS								
1	HS23111	Technical Communication I	2	0	0	2	2	HS
2	MA23112	Algebra and Calculus	3	1	0	4	4	BS
3	CY23132	Chemistry for Technologists	3	0	2	5	4	BS
4	GE23111	Engineering Graphics	2	0	4	6	4	ES
5	GE23121	Engineering Practices-(Civil and Mechanical)	0	0	2	2	1	ES
6	BT23131	Microbiology	2	0	4	6	4	PC
7	MC23112	Environmental Science and Engineering	3	0	0	3	0	MC
8	GE23117	தமிழர்மரபு /Heritage of Tamils	1	0	0	1	1	HS
		TOTAL	**16**	**3**	**8**	**27**	**20**	

SEMESTER – II

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY& PRACTICALS								
1	HS23221	Technical Communication II	0	0	2	2	1	HS
	HS23222	English for Professional Competence						
2	MA23212	Differential Equations and Complex Variables	3	1	0	4	4	BS
3	PH23231	Physics for Bioscience	3	0	2	5	4	BS
4	GE23231	Programming using Python	1	0	4	5	3	ES
	GE23212	Basic Civil and Mechanical Engineering	3	0	0	3	3	ES
5	BT23211	Biochemistry	3	0	0	3	3	PC
6	MC23111	Indian Constitution and Freedom Movement	3	0	0	3	0	MC
7	GE23217	தமிழரும் ததொழில்நுட்பமும் /Tamils and Technology	1	0	0	1	1	HS
8	BT23221	Biochemistry Laboratory	0	0	4	4	2	PC
		TOTAL	**17**	**1**	**12**	**30**	**21**	

SEMESTER –III

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY & PRACTICALS								
1	MA23311	Transforms and Applied Partial Differential Equations	3	1	0	4	4	BS
2	BT23311	Enzyme Technology and Biotransformations	3	0	0	3	3	PC
3	BT23312	Stoichiometry and Fluid Mechanics	3	1	0	4	3	ES
4	BT23313	Molecular Biology	3	0	3	3	3	PC
5	BT23314	Cell Biology	3	0	0	3	3	PC
6	BT23321	Basic Biotechnology Laboratory	0	0	2	2	1	ES
7	BT23331	Analytical Techniques in Biotechnology	2	0	2	4	3	ES
		TOTAL	**17**	**2**	**7**	**23**	**20**	

SEMESTER –IV

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY								
1	MA23431	Probability, Statistics and Reliability	3	0	2	5	4	BS
2	BT23411	Food Biotechnology	3	0	0	3	3	ES
3	BT23412	Genetic engineering	3	0	0	3	3	PC
4	BT23413	Thermodynamics and Heat transfer	3	1	0	4	3	ES
5	BT23414	Basic Industrial Biotechnology	3	0	0	3	3	PC
PRACTICALS								
6	CS23422	Python Programming for Machine Learning	0	0	4	4	2	ES
7	BT23421	Chemical Engineering Laboratory for Biotechnologists	0	0	4	4	2	ES
8	BT23422	Molecular Biology and Genetic Engineering Laboratory	0	0	4	4	2	PC
9	GE23421	Soft skills - I	0	0	2	2	1	EEC
		TOTAL	**15**	**2**	**14**	**32**	**23**	

SEMESTER – V

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY								
1	BT23511	Bioprocess Principles	3	0	0	3	3	PC
2	BT23512	Bioinformatics	3	0	0	3	3	PC
3	BT23513	Separation Process Principles	3	1	0	4	3	ES
4		Professional Elective I	3	0	0	3	3	PE
5		Professional Elective II	3	0	0	3	3	PE
6		Professional Elective III	3	0	0	3	3	PE
PRACTICALS								
7	BT23521	Bioprocess Laboratory- I	0	0	4	4	2	PC
8	BT23522	Bioinformatics Laboratory	0	0	4	4	2	PC
9	GE23521	Soft Skills-II	0	0	2	2	1	EEC
		TOTAL	**18**	**1**	**8**	**27**	**23**	

SEMESTER – VI

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY								
1	BT23611	Bioprocess Technology	3	0	0	3	3	PC
2	BT23612	Chemical Reaction Engineering	3	0	0	3	3	ES
3		Professional Elective IV	3	0	0	3	3	PE
4		Professional Elective V					3	PE
5		Professional Elective VI					3	PE
6		Open Elective I	3	0	0	3	3	OE
PRACTICALS								
7	BT23621	Bioprocess Laboratory II	0	0	4	4	2	PC
8	BT23622	Innovation and Design Thinking for Biotechnologists	0	0	4	4	2	EEC
9	BT23623	Numerical Programming for Biotechnologists	0	0	2	2	1	PC
10	GE23622	Problem Solving Techniques	0	0	2	2	1	EEC
		TOTAL	**15**	**0**	**20**	**35**	**24**	

SEMESTER – VII

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
THEORY								
1	BT23711	Downstream Processing	3	0	0	3	3	PC
2	BT23712	Immunology	3	0	0	3	3	PC
3	BT23713	Protein Engineering	3	0	0	3	3	PC
4	BT23714	Comprehensive Course for Biotechnologists	2	0	0	2	2	PC
5		Open Elective II	3	0	0	3	3	OE
PRACTICALS								
6	BT23721	Downstream Processing Laboratory	0	0	4	4	2	PC
7	BT23722	Immunology lab	0	0	4	4	2	PC
8	BT23723	Artificial Intelligence and Machine Learning for Biotechnologist	0	0	4	4	2	PC
9	BT23724	Industry Training (2 weeks Training during vacation)	0	0	0	0	1	EEC
10	CR23P62	Microfluidics Laboratory	0	0	2	2	1	ES
		TOTAL	**17**	**0**	**14**	**28**	**22**	

SEMESTER – VIII

Sl. No	COURSE CODE	COURSE TITLE	L	T	P	Total Hours	Total Credits	Category
PRACTICALS								
1	BT23821	Project Work	0	0	24	24	12	EEC
		TOTAL			**24**	**24**	**12**	

TOTAL CREDITS: 165

PROFESSIONAL ELECTIVE VERTICAL LIST

VERTICAL I	VERTICAL II	VERTICAL III	VERTICAL IV	VERTICAL V	VERTICAL VI
Bioprocess & biochemical Technology	**Biosciences**	**Medical Biotechnology**	**Animal Biotechnology**	**Computational Biotechnology**	**Agro and Marine Biotechnology**
BT23A11 Bioprocess control and Instrumentation	BT23B21 Biosensors	BT23C31 Human Genetics	BT23D41 Fundamentals of Animal Biotechnology	BT23E51 Programming for Bioinformatics Applications	BT23F61 Plant Biotechnology
BT23A12 Food Processing and Preservation	BT23B22 Nano Biotechnology	BT23C32 Cancer Biology	BT23D42 Gene Therapy	BT23E52 Computer Aided Drug Design	BT23F62 Therapeutic Applications of Phytochemicals
BT23A13 Bioreactor Design and scale up process	BT23B23 Biomaterials Engineering	BT23C33 Biopharmaceuti cal Technology	BT23D43 Animal Cell Culture technology	BT23E53 Molecular Modelling	BT23F63 Marine Biotechnology
BT23A14 Bioreactor consideration for recombinant products	BT23B24 Genome Editing	BT23C34 Clinical Trials and Health Care Policies in Biotechnology	BT23D44 Developmental Biology	BT23E54 Fundamentals for algorithms for Bioinformatics	BT23F64 Transgenic Plants
BT23A15 Advances in Bioenergy and Biofuels	BT23B25 Personalized Medicine	BT23C35 Free radicals in Health and Diseases	BT23D45 Biosafety and Bioethics	BT23E55 Metabolomics and Metabolic engineering	BT23F65 Plant tissue culture and Transformation techniques
BT23A16 Environmental Biotechnology	BT23B26 Neurobiology and Cognitive Sciences	BT23C36 Medical Microbiology	BT23D46 Tissue Engineering	BT23E56 Data Mining and Machine Learning for Bioinformatics	BT23F66 Quality Management in Biotechnology