



Program Schemes for [BE Biotechnology]

Cluster: Engineering

Institute: UIE

Department: Biotechnology Engineering & Food Technology

Type of Program: UG

First Year				Second Year			
Semester-1	Course Name	Course Category	Credits	Semester-3	Course Name	Course Category	Credits
	Logical Thinking & Problem Solving	Major Core	4		Biochemistry	MAJOR CORE	4
	Basic Mathematics-I	Major Core	5		Cell Biology and Molecular Biology	MAJOR CORE	4
	Basic Instrumentation	Major Core	4		Advanced Instrumentation in Biotechnology	MAJOR CORE	3
	Semiconductor Physics & Applications	Major Core	3		Process Thermodynamics	Minor Core	3
	Engineering Chemistry	Major Core	3		Critical Enquiry and Research Methodology	Ability Enhancement	1
	Engineering Graphics using CAD Lab	Major Core	2		Aptitude-1	Ability Enhancement	1
	AI Applications Lab	Ability Enhancement	1		Entrepreneurship Mindset	Ability Enhancement	1
	Communication Skills-1	Skill Enhancement	1		Universal Human Values, Ethics & Life-Skills-II	Value Education	2
	Academic and Career Pathway Planning	Value Education	0		Social Internship (Community Engagement and Social Responsibility)	Internship or Training	2
				Skill			

					General Proficiency-2	Enhancement	1
Semester-2	Basic Data Structures	Major Core	4	Semester-4	Enzyme Engineering	MAJOR CORE	4
	Mathematics-2	Major Core	5		Bioprocess Engineering	MAJOR CORE	4
	General Proficiency-1	Skill Enhancement	1		Immunology	Minor Core	4
	Emerging & Disruptive Technologies Workshop	Major Core	2		Genetics	Minor Core	2
	Soft Skills-1	Skill Enhancement	1		Gender Equality and Empowerment	Value Education	1
	Universal Human values, Ethics and Life Skills-I	Value Education	1		Mid-Grade Project [MGP-1]	PROJECT	1
	Communications Skills-2	Skill Enhancement	1		Program Elective Basket-1	MINOR Elective	3
	Workshop	Major Core	1				
	Microbiology	Major Core	4				
	Design Thinking & Innovation	Skill Enhancement	1				

Third Year				Fourth Year			
	Course Name	Course Category	Credits		Course Name	Course Category	Credits
Semester -5	Fermentation Biotechnology	MAJOR CORE	4	Semester-7	Environment Science & Management	Value Education	2
	Recombinant DNA Technology	MAJOR CORE	4		Capstone Project-1 / Dissertation (Part - I)	PROJECT	4

	Bioinformatics and Computational Biology	MAJOR Core	4		Industry Internship	Internship/ Training	1
	Biosensors	Minor Core	3		General Proficiency-4	Skill Enhancement	1
	Professional Ethics	Ability Enhancement	1		Open Elective-II	Open Elective	3
	General Proficiency-3	Skill Enhancement	1		Program Elective Basket-4	MINOR Elective	3
	Technical/Domain Internship	SUMMER INTERNSHIP	1		Program Elective Basket-5	MINOR Elective	3
	Program Elective Basket-2	MINOR Elective	3				
Semester-6	Cell Culture Technologies	MAJOR CORE	4	Semester-8	Capstone Project-2 / Dissertation (Part -I)	PROJECT	8
	Downstream Processing	MAJOR CORE	4		End Semester Internship	Internship/ Training	14
	Environmental Biotechnology	MAJOR CORE	4		Open Elective-III	Open Elective	3
	Genomics and Proteomics	Minor Core	2		Program Elective Basket-6	MINOR Elective	3
	Mid-Grade Project [MGP-2]	PROJECT	1				
	Introduction to SDGs	Value Education	1				
	Open Elective-I	Open Elective	3				
	Program Elective Basket-3	MINOR Elective	3				

Elective Basket Course			
Semester	Course Name	Course Category	Credits
	Transport Phenomenon in Biotechnology	Minor Elective	3
	Industrial Microbiology	Minor Elective	3

4	Cancer Cell Biology	Minor Elective	3
	Molecular basis of Diseases	Minor Elective	3
	Crop Improvement	Minor Elective	3
	Plant based drugs	Minor Elective	3
5	Bioreactor and Bioprocess Design	Minor Elective	3
	Bioenergy and Bioresource Technology	Minor Elective	3
	Modern Vaccine Design and Delivery System	Minor Elective	3
	3D-Bioprinting	Minor Elective	3
	Post-Harvest Technology and Food Preservation	Minor Elective	3
	Modern Agricultural Techniques and its relationship to Climate Change	Minor Elective	3
6	Biochemical Reaction Engineering	Minor Elective	3
	Protein Engineering	Minor Elective	3
	Systems and Synthetic Biology	Minor Elective	3
	Toxicology	Minor Elective	3
	Plant-Microbial Interactions	Minor Elective	3
	Biofertilizers & Biopesticides	Minor Elective	3
	Marine Biotechnology and the Bioeconomy	Minor Elective	3
	Biomaterials in Biotechnology	Minor Elective	3
	Medical Diagnostic Techniques	Minor Elective	3
	Biomedical Engineering	Minor Elective	3
	Plant Metabolic Engineering & Molecular Farming	Minor Elective	3
	Genome Editing in Agricultural Biotechnology	Minor Elective	3
7	Secondary Metabolites in Microbes	Minor Elective	3
	Clean Fuel Technology	Minor Elective	3
	Stem Cell Technology	Minor Elective	3
	Tissue Engineering	Minor Elective	3
	Traditional Herbal Medicine to Rational Drug Discovery	Minor Elective	3
	Organic Farming and Sustainable Agriculture	Minor Elective	3
8	Green Chemicals and Sustainable Products	Minor Elective	3
	Biotechnology Entrepreneurship	Minor Elective	3
	Biotherapeutics and Biologics	Minor Elective	3
	Drug Design and Delivery	Minor Elective	3
	Agro-waste Management	Minor Elective	3
	Mushroom Cultivation Technology	Minor Elective	3
RIE Tracks (Student will earn 2 credit by selecting any one of the Track)			
4	Course Name	Course Category	Credits
	Aptitude-2	Ability Enhancement	1
	Soft Skills-2	Skill Enhancement	1
	Marketing & Management Essentials	Ability Enhancement	1
	AI Automation & Sustainability	Skill Enhancement	1
	Academic Writing	Ability Enhancement	1
	Research Ethics & Intellectual Property Rights	Skill Enhancement	1
	Aptitude-3	Ability Enhancement	1

5	Soft Skills-3	Skill Enhancement	1
	Business Strategies & Operations	Ability Enhancement	1
	Finance & Economics Fundamentals	Skill Enhancement	1
	Statistical Data Analysis	Ability Enhancement	1
	Emerging Research Tools and Technologies	Skill Enhancement	1
6	Aptitude-4	Ability Enhancement	1
	Soft Skills-4	Skill Enhancement	1
	Customer Engagement & Organic Growth	Ability Enhancement	1
	Business Planning & Legal Basics	Skill Enhancement	1
	AI & Data-Driven Research	Ability Enhancement	1
	Domain Specific Term Paper	Skill Enhancement	1

4th Year Curriculum Design Framework [For Hons. / Hons. with Research Tracks of Four Year Undergraduate Programs (FYUP)]

Extending Expertise	Course Category	Credit	Contextualizing Learning	Course Category	Credit	Experiential Learning	Course Category	Credit
General Proficiency-4	Skill Enhancement	1	Capstone Project-1 / Dissertation (Part - I)	PROJECT	4	Industry Internship	Internship / Training	1
			Capstone Project-2 / Dissertation (Part -I I)	PROJECT	8	End Semester Internship	Internship / Training	14