

**Academic Regulations for B.Sc. (Honors) in Biotechnology
Programme
School of Biotechnology
Centurion University of Technology and Management
2025**

1. Introduction

This Programme provides flexibility to students to choose a single discipline or a combination of disciplines/ streams as an academic career path. The Programme envisages a competency-based, multi-disciplinary, holistic academic programme with a creative combination of disciplines/ skills/ Domain/ Research of study with multiple entry and exit options.

The curriculum emphasizes a flexible combination of a wide range of courses with a focus on analytical and critical thinking, computational skills, use of cutting-edge technology, innovation, creativity, experiential learning including the development of a competency-based skilling ecosystem and holistic development of students leading to specific career prospects.

The university follows a dynamic curriculum development approach. Hence, it reserves the rights to revise / modify the syllabus, structure, credits etc. as deemed fit.

2. Objective

- To provide basic knowledge and laboratory skills of the subjects.
- To create and apply appropriate techniques, resources, and modern instruments for biochemical estimation, animal tissue culture and plant tissue culture experiments, environment insults measurements, genetics, bioinformatics, cellular, molecular and physiological activities of all living organisms with an understanding of the application and limitations.
- To introduce with the area of research as per the recent outbreaks or demand in the society.
- To train and enhance skills using biological principles and systems to create new products.
- To practice biotechnological research, its importance for society, health, safety, legal and environmental issues and the consequent responsibilities relevant to the biodiversity conservation practice.
- To foster innovation and entrepreneurship skills, enabling students to identify opportunities, drive positive change and contribute to the growth of biotechnology field.
- To prepare students to adapt to evolving technologies and methodologies, emphasizing the importance of continuous learning and professional development.

3. Eligibility

A student who has passed the Higher Secondary (12th grade) or its equivalent examination with subjects - Physics, Biology and Chemistry as core subjects with minimum 50% overall (45% for SC/ST candidates) is eligible to take admission to the 1st year of B.Sc. Biotechnology programme.

4. Programme duration and multiple exits

The 4 years programme at CUTM is designed to offer two types of Bachelor's Degrees to the students at the end of the successful completion of the programme — (i) Bachelor's Degree in a Stream and (ii) Bachelor's Degree in a Discipline. The word stream here refers to Arts, Science, Commerce and Business Administration. In case of a degree in a stream, the student studies a multitude of different subjects, usually mixing different disciplines, which leads to a truly multidisciplinary degree. While in case of a degree in a discipline, the student is confined to a certain set of disciplines. However, in both cases, the student earns equal number of credit points.

UG Certificate: Students who opt to exit after completion of the first year and have secured 40 credits will be awarded a UG certificate if, in addition, they complete one vocational course of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.

UG Diploma: Students who opt to exit after completion of the second year and have secured 80 credits will be awarded the UG diploma if, in addition, they complete one vocational course of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.

3-years UG Degree: Students who wish to undergo a 3-years UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 120 credits and satisfying the minimum credit requirement as given in the semester wise credit breakup (section-9).

4-years UG Degree (Honours): A four-years UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 160 credits and have satisfied the credit requirements as given in the semester wise credit breakup (section-9).

4-years UG Degree (Honours with Research): Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University. The research project/dissertation will be in the

major discipline. The students who secure 160 credits, including 12 credits from a research project/dissertation, are awarded UG Degree (Honours with Research).

UG Degree Programmes with Single Major: A student has to secure a minimum of 50% credits from the major discipline for the 3-years/4-years UG degree to be awarded a single major. For example, in a 3-year UG programme, if the total number of credits to be earned is 120, a student of Physics with a minimum of 60 credits will be awarded a B.Sc. in Physics with a single major. Similarly, in a 4-years UG programme, if the total number of credits to be earned is 160, a student of Physics with a minimum of 80 credits will be awarded a B.Sc. (Hons./Hon. With Research) in Physics in a 4-years UG programme with single major.

UG Degree Programmes with Double Major: A student has to secure a minimum of 40% credits from the second major discipline for the 3-years/4-years UG degree to be awarded a double major. For example, in a 3-years UG programme, if the total number of credits to be earned is 120, a student of Physics with a minimum of 48 credits will be awarded a B.Sc. in Physics with a double major. Similarly, in a 4-years UG programme, if the total number of credits to be earned is 160, a student of Physics with a minimum of 64 credits will be awarded a B.Sc. (Hons./Hon. With Research) in Physics in a 4-years UG programme with double major.

Interdisciplinary UG Programmes: The credits for core courses shall be distributed among the constituent disciplines/subjects so as to get core competence in the interdisciplinary programme. For example, a degree in Econometrics requires courses in economics, statistics and mathematics. The total credits to core courses shall be distributed so that the student gets full competence in Econometrics upon completion of the programme. The degree for such students will be awarded as B.Sc. in Econometrics for a 3-years UG programme or B.Sc. (Honours) / B.Sc. (Honours with Research) in Econometrics for a 4-years UG programme.

Multidisciplinary UG Programmes: In the case of students pursuing a multidisciplinary programme of study, the credits to core courses will be distributed among the broad disciplines such as Life sciences, Physical Sciences, Mathematical and Computer Sciences, Data Analysis, Social Sciences, Humanities, etc., For example, a student who opts for a UG programme in Life sciences will have the total credits to core courses distributed across Botany, Zoology and Human biology disciplines. The degree will be awarded as B.Sc. in Life Sciences for a 3-years programme and B.Sc. (Honours) in Life Sciences or B.Sc. (Honours with Research) for a 4-years programme without or with a research component respectively.

5. Programme structure

Basket	Type of Course	Minimum Credit Requirement			
		4 years UG		3 years UG	
		Credit	Approx. Weightage	Credit	Approx. Weightage
I	Major (Core) Courses	80	50 %	60	50 %
II	Minor (Domain) Courses	32	20 %	24	20 %
III	Multi-Disciplinary Courses	9	5.6 %	9	7.5 %
IV	Skill Courses	9	5.6 %	9	7.5 %
	Ability Enhancement Courses	8	5 %	8	7 %
	Value Added Courses	6	3.8 %	6	5 %
V	Summer Internship / Dissertation	16	10 %	4	3 %
TOTAL		160	100 %	120	100 %

6. Types of courses

6.1 Major (Core) courses

Major (Core) Courses are the foundational and specialized courses directly related to a student's chosen major discipline. These courses form the core of the academic programme and provide in-depth knowledge and skills in the chosen field of study.

Major (Core) Courses aim to build a strong theoretical and practical foundation in the chosen major discipline. They equip students with the specialized knowledge and expertise required to excel in their field of study and future careers.

Please refer to Annexure-1 for courses offered in major (core) discipline.

6.2 Domain (Minor), Multi-Disciplinary and Skill Courses

Minor (Domain) Courses: These are courses from a chosen minor discipline, providing students with a secondary area of expertise. There are several domains offered by the university for the academic year 2023-24. Please refer to Annexure-2 for courses offered under this basket.

6.3 Multi-Disciplinary Courses

Multi-Disciplinary Courses: These are courses that broaden a student's knowledge beyond their major and minor disciplines. Students can opt for any discipline other than their selected major discipline under this basket or category. These courses aim to provide students with a well-rounded education. Minor courses enhance their knowledge in a secondary area, domain

courses encourage multidisciplinary thinking and skill enhancement courses equip them with practical skills relevant to their field of study.

6.4 Ability Enhancement, Skill and Value Added Courses

Ability Enhancement Courses typically focus on language skills. These courses aim to enhance students' proficiency in communication, both in written and oral forms, which is essential for academic success and future career prospects. Please refer to Annexure-4 for courses offered under this basket.

Ability Enhancement Courses help students improve their communication skills, enabling them to effectively convey their ideas, research findings and insights. Strong communication skills are valuable in academic, professional and personal contexts.

Skill Courses: These courses focus on developing practical skills and competencies that are valuable in various professional contexts. Please refer to Annexure-3 for courses offered under this basket.

Value Added Courses are additional courses that provide students with extra skills and knowledge beyond their major and minor disciplines. These courses are typically designed to enhance employability and provide a competitive edge in the job market.

Value Added Courses aim to make students more versatile and marketable by equipping them with skills that are in high demand in various industries. These courses enhance their career prospects and adaptability. Please refer to Annexure-4 for courses offered under this basket.

6.5 Summer Internship

Summer Internship or Community Engagement programmes involve students participating in real-world work experiences, either in industry or within the community, during the summer break. These experiences can be credit-bearing and provide practical exposure to their chosen field of study.

Summer Internship and Community Engagement experiences bridge the gap between theoretical knowledge and practical application. They offer students an opportunity to apply what they have learned in a real-world context, gain hands-on experience and develop professional networks.

6.6 Research Project / Dissertation / Production Action Learning

These are in-depth, research-oriented components of the academic programme. Students engage in original research, dissertation writing, or production action learning, depending on the programme's requirements. Research projects are typically carried out under the guidance of faculty members. These components aim to develop students' research skills, critical thinking abilities and problem-solving capabilities. They encourage students to explore, analyze and contribute to the knowledge base of their major discipline, preparing them for careers in research, academia, or industry leadership roles.

7. Assessment

7.1 Evaluation for Theory Components

i. End semester theory examinations (50% weightage):

- a. Duration – 3 hrs
- b. Full Mark – 100. During result processing, it will be proportionately added.
- c. Distribution of marks (should cover all COs)
 - i. 10 short questions x 2 marks = 20 marks
 - ii. 5 long questions x 12 marks = 60 marks
 - iii. 4 short notes x 5 marks = 20 marks

ii. Continuous assessments: Details are as indicated in the table below:

Sl. No.	Continuous Assessment	Score
1	Individual / Group Presentation <i>Rubric is as under:</i> <ul style="list-style-type: none">• Content & creativity – 05• Presentation & Discussion – 05	10
2	Mid-semester (Written Examination) <i>Mark Distribution:</i> <ul style="list-style-type: none">• 5 short questions x 1 marks = 5 marks• 2 long questions x 5 marks = 10 marks• 2 short notes x 2.5 marks = 5 marks	20
3	Assignment (2 assignments x 5 marks each)	10
4	Learning Record (<i>Based on the parameters indicated in the learning record format, course faculty to evaluate and award score</i>)	10
Total		50

7.2 Evaluation of Practice/ Laboratory Components

The evaluation of the practice component will be carried out 50% by concerned faculty and 50% by the external examiner and will be conducted as per the present policy. Details are as under:

Internal

A	Concept	10
B	Planning & Execution/ Practical/ Simulation/ Programming	10
C	Result and Interpretation	10
D	Record/ Report	10
E	Viva	10
Total		50

External

A	Execution & Result	20
B	Record of Applied and Action Learning	10
C	Viva	20
Total		50

7.3 Evaluation of Project Component

The evaluation of the project component will be completed 50% by concerned faculty and 50% by the external examiner and will be conducted as per the present policy. Following guideline may be referred during evaluation of internal and external components:

Internal

A	Understanding the relevance, scope and dimension of the project	10
B	Methodology	10
C	Quality of Analysis and Results	10
D	Interpretations and Conclusions	10
E	Report	10
Total		50

External

A	Understanding the relevance, scope and dimension of the project	10
B	Report	20
C	Viva	20
Total		50

7.4 Evaluation of Internship

The evaluation of the internship will be completed 50% by concerned faculty and 50% by the industry guide. Following guideline may be referred during evaluation of internal and external components:

Internal

A	Daily Diary & Log Report	20
B	Periodical (Weekly/Monthly) Report	10
C	Presentation & Viva	20
Total		50

External

A	Completion of the task / project assigned	30
B	Feedback of the industry supervisor	20
Total		50

7.5 Evaluation of Workshop Component

The evaluation of the workshop component will be completed 100% by concerned faculty as per the present policy. Following guideline may be referred during evaluation:

A	Critical Thinking/ Simulation/ Field work & Report	50
B	Presentation & Viva	50
Total		50

8. Pass criteria

A. **Theory papers:** students must secure a minimum of **30% in individual components** (both continuous assessment & end-semester theory) **along with 40% in aggregate.**

B. **Theory & practice papers**

- i. Theory component: minimum of 30% in individual components (both continuous assessment & end-semester theory) along with 40% in aggregate
- ii. Practice component: minimum of 50% marks both in internal & external

C. Theory & project type papers

- i. Theory component: minimum of 30% in individual components (both continuous assessment & end-semester theory) along with 40% in aggregate
- ii. Project component: minimum of 50% marks both in internal & external

D. Theory, practice & project type papers

- i. Theory component: minimum of 30% in individual components (both continuous assessment & end-semester theory) along with 40% in aggregate
- ii. Practice component: minimum of 50% marks both in internal & external
- iii. Project component: minimum of 50% marks both in internal & external

E. Practice & project type papers

- i. Practice component: minimum of 50% marks both in internal & external
- ii. Project component: minimum of 50% marks both in internal & external

F. Workshop or Internship type papers: 50% in aggregate

9. Grading

CUTM follows “Absolute” grading system / Grade point or marks scheme applicable for different programmes. Under absolute grading system, a Ten Point grading system on base of 10 shall be followed in CUTM. Categorization of these grades and their correlation shall be as under:

Qualification	Grade	Score on 100 Percentage Points	Point
Outstanding	O	90 and above up to 100	10
Excellent	E	80 and above but less than 90	9
Very Good	A	70 and above but less than 80	8
Good	B	60 and above but less than 70	7
Fair	C	50 and above but less than 60	6
Pass	D	40 and above but less than 50	5
Failed	F	Below 40	2
Malpractice	NOT APPLICABLE	NOT APPLICABLE	0
Absent	NOT APPLICABLE	NOT APPLICABLE	0

N.B. Grade C shall be considered as average, Grade D shall be the passing Grade for theory and Grade C shall be the Pass Grade for Practical/ Project/ Workshop mode paper.

10. Attendance

Attendance will be calculated from the date of commencement of classes or date of admission, whichever is later.

- a. A student attending at least 75% of the total number of classes held shall be allowed to sit for the concerned Semester Examinations subject to fulfilment of other conditions laid down in the regulation.
- b. A student attending at least 60% but less than 75% of the total number of classes held shall be allowed to sit for the concerned Semester Examinations subject to the payment of prescribed fees and fulfilment of other conditions laid down in the regulations.
- c. A student attending less than 60% of the total number of classes held shall not be allowed to sit for the concerned Semester Examinations and he /she has to take admission to the same Semester in the very next year for attending the classes and appearing at the said Semester Examination.

Details of the Courses for B.Sc. Biotechnology Choice-based Credit System (CBCS) Structure

Basket	Type of Course	Minimum Credit Requirement			
		4 years UG		3 years UG	
		Credit	Approx. Weightage	Credit	Approx. Weightage
I	Major (Core) Courses	80	50 %	60	50 %
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IV	Skill Courses	9	5.6 %	9	7.5 %
	Ability Enhancement Courses	8	5 %	8	7 %
	Value Added Courses	6	3.8 %	6	5 %
V	Summer Internship / Dissertation	16	10 %	4	3 %
TOTAL		160	100 %	120	100 %

Basket- I

Sl. No.	Course Type	Course Code	Course Title	Credit	Type (T+P+Pj)
1	Major (Core)	CUTM4115	Cell Biology	4	3+1+0
2	Major (Core)	CUTM4116	Molecular Biology	4	3+1+0
3	Major (Core)	CUTM4117	Microbial Biotechnology	4	3+1+0
4	Major (Core)	CUBOT205	Basics of Genetics	4	3+1+0
5	Major (Core)	CUTM4119	Biochemistry	4	3+1+0
6	Major (Core)	CUTM4352	Immunology	4	3+1+0
7	Major (Core)	CUTM1430	Developmental Biology and Phytotomy	4	3+1+0
8	Major (Core)	CUBOT304	Plant Physiology	4	3+1+0
9	Major (Core)	CUTM4121	Bioanalytical Techniques	4	3+1+0
10	Major (Core)	CUTM4353	Metabolic Engineering	4	3+1+0
11	Major (Core)	CUTM4351	Genetic Engineering	4	3+1+0
12	Major (Core)	CUTM4350	Fermentation Biotechnology	4	3+1+0
13	Major (Core)	CUTM1569	IPR, Biosafety and Bio-entrepreneurship	4	2+0+2
14	Major (Core)	CUTM4355	Cancer Biology	4	3+1+0
15	Major (Core)	CUTM1565	Biostatistics and Bioinformatics	4	2+2+0
16	Major (Core)	MPC203T	Computer Aided Drug Designing	4	4+0+0
17	Major (Core)	CUTM1567	Frontiers in Genomics	4	3+1+0
18	Major (Core)	CUTM4120	Animal Biotechnology	4	2+1+1
19	Major (Core)	CUTM1439	Plant Biotechnology	4	3+1+0
20	Major (Core)	CUTM1674	Environmental Science	4	3+0+1

Credits to be completed from Basket I \geq 60 for 3 years exit and 80 for 4 years exit.

Basket- II

Sl. No.	Course Type	Course Code	Course Title	Credit	Type (T+P+Pj)
1	Domain (29 Credits) [Genetics and Genomics]	CUGE2270	Computational Biology	3	1+2+0
2		CUGE2271	Genetic Engineering and its applications	3	1+2+0
3		CUGE2277	Genetics and Genomics	3	1+2+0
4		CUGE2273	Molecular Genomics	3	0+3+0
5		CUGE2274	Plant Tissue Culture Technologies	3	0+3+0
6		CUGE2275	Techniques in Molecular Biology	3	0+3+0
7		CUGE2276	AELP Project	11	0+0+11
8	Domain (29 Credits) [Nutraceuticals]	CUNU2280	Introduction to Nutraceuticals	3	1+2+0
9		CUNU2281	Functional Food	3	1+2+0
10		CUNU2282	Nutrigenetics	3	1+2+0

11		CUNU2283	Development of Personalized Food and Medicine	3	0+1+2
12		CUNU2284	Development of Biopesticides and Biofertilizers	3	0+1+2
13		CUNU2285	Development of Immune Boosters	3	0+1+2
14		CUNU2286	AELP Project	11	11
15	Minor Stream	CUTM4332	Medical Microbiology	3	2+1+0
16	Minor Stream	CUTM2375	Nanobiotechnology	3	2+0+1
17	Minor Stream	CUTM1171	Phyto-Pharmacology	4	2+1+1

Credits to be completed from Basket II \geq 24 for 3 years exit and 32 for 4 years exit.

Basket- III

Sl. No.	Course Type	Course Code	Course Title	Credit	Type (T+P+Pj)
1	Multidisciplinary	CUTM1005	Probability & Statistics	3	2+0+1
2	Multidisciplinary	CUTM1400	Bio and Biomimetic Nanomaterials	4	3+0+1
3	Multidisciplinary	CUTM1008	Applied Analytical Chemistry	3	2+1+0

Credits to be completed from Basket III \geq 09 for 3 years and 4 years exit.

Basket- IV

Sl. No.	Course Type	Course Code	Course Title	Credit	Type (T+P+Pj)
1	Ability Enhancement Courses (AEC)	CUTM1021	Design Thinking	2	0+0+2
2	Ability Enhancement Courses (AEC)	CUTM1016	Job Readiness	6	0+6+0
3	Skill Enhancement Courses (SEC)	CUTMXXXX	Skill I	4	0+3+1
4	Skill Enhancement Courses (SEC)	CUTMXXXX	Skill II	4	0+2+2
5	Skill Enhancement Courses (SEC)	CUTMXXXX	Skill III	4	0+2+2
6	Value Added Courses (VAC)	CUTM1013	Project Management	3	2+0+1
7	Value Added Courses (VAC)	CUVA4063	Introduction to Indian Knowledge System	3	2+0+1
8	Value Added Courses (VAC)	CUTM1015	Climate Change, Sustainability and Organisation	3	2+0+1

For AEC, Credits to be completed ≥ 08 for 3 years and 4 years exit.

For SEC, Credits to be completed ≥ 09 for 3 years and 4 years exit.

For VAC, Credits to be completed ≥ 06 for 3 years and 4 years exit.

Basket- V

Sl. No.	Course Type	Course Code	Course Title	Credit	Type (T+P+Pj)
1	Summer Internship	CUTM1578	Summer Internship I	2	0+0+2
2	Summer Internship	CUTM1579	Summer Internship II	2	0+0+2
3	Project	CUTM1849	Project	12	0+0+12

For Internships, Credits to be completed $\geq 02-04$ for 3 years and 4 years exit.

For Research Project / Dissertation, Credits to be completed ≥ 12 4 years exit. Not applicable for 3rd year exit.