

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-I

subject	code
General English	EN18101
Value Education	VE18101
Cell & Molecular Biology	BT19101
Genetic Analysis	BT19102
Biochemistry and Metabolism	BT19103
Chemistry-I	BT19104

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: GENERAL ENGLISH I

COURSE CODE: EN18101

CREDITS: 3

DEPARTMENT: B. Sc. Biotechnology, Genetics & Chemistry

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge:** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):**Students will be able to:**

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

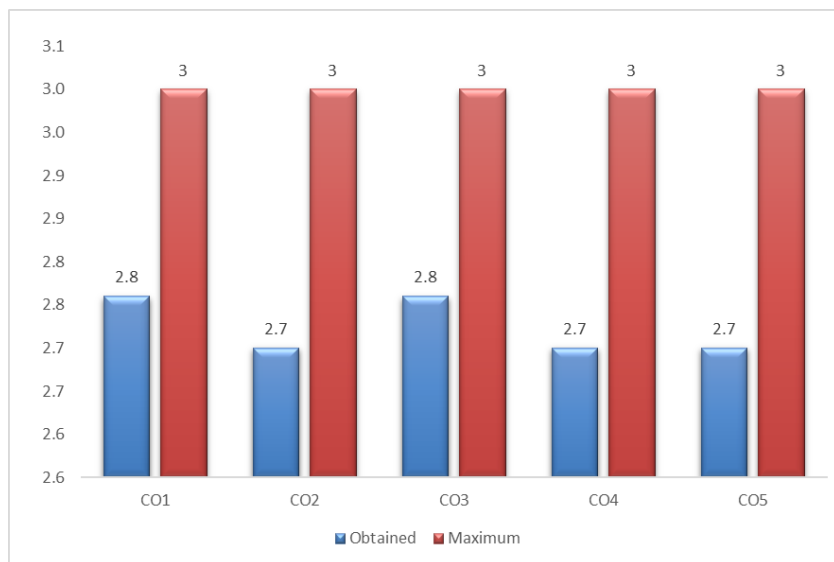
	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	CO1: Distinguish between words which are either spelt or pronounced alike, yet render distinct meanings; imparting a sound clarity on everyday usage and miscommunications embedded in language	III (APPLY)
CO2	CO2: Improve diction and gain understanding on the tense component, a pivotal constituent for language structuring.	IV(ANALYZE)
CO3	CO3: Identify with economical word constructions, paying specific attention to vocabulary building in English	III (APPLY)
CO4	CO4: Learn subject-verb agreement, the basic part involved in sentence constructing to improve their linguistic skills	VI(CREATE)
CO5	CO5: Polish their language efficiency through the grammar component of commonly confused and misspelt words, and errors related to vocabulary and different aspects of grammar, which would be seemingly helpful for language delivery	IV(ANALYZE)

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H					H	H		H
2			H	H				H	H		
3			H					H	H		
4	H			H				H	H	H	
5	H			H				H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3		H 2.76				3	3
CO2	3	3	H 2.7	H 2.7				3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3			H		H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	2.94	2.92	2.92	3	3	3	3	3
AVERAGE	2.9725							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES

COURSE TITLE: VALUE EDUCATION & PERSONALITY DEVELOPMENT

COURSE CODE: VE18101

CREDITS: 2

DEPARTMENT: B. Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

Programme Outcomes – (B. Sc.)

B. Sc.:

- **PO1. Scientific Knowledge:** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOMES (DEPARTMENTAL):

Students will be able to:

PSO1. Demonstrate in-depth knowledge in the foundational areas of the mathematical sciences and Communicate mathematical ideas using numerical, graphical and symbolic representations.

PSO2. Recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.

PSO3. Use emerging technologies and computing concepts.

PSO4. Apply mathematical, computational and statistical tools to detect patterns and model performance.

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	CO1: Students will be able to differentiate Accepted norms and counter values and be able to identify the various Dimensions of Human Development	III (APPLY)
CO2	CO2: Students will be able to demonstrate Love and Experience of God and identify the Basic Issues of Life and Happiness as a life goal	IV(ANALYZE)
CO3	CO3: They will able to understand the importance of concern for others and critique the various problems that deter the growth of the society	III (APPLY)
CO4	CO4: The students will be able to recognize the traits of a good personality and practice Self exploration	VI(CREATE)
CO5	CO5: Students will be able to interpret the purpose of life and goal setting and demonstrate self-management	IV(ANALYZE)

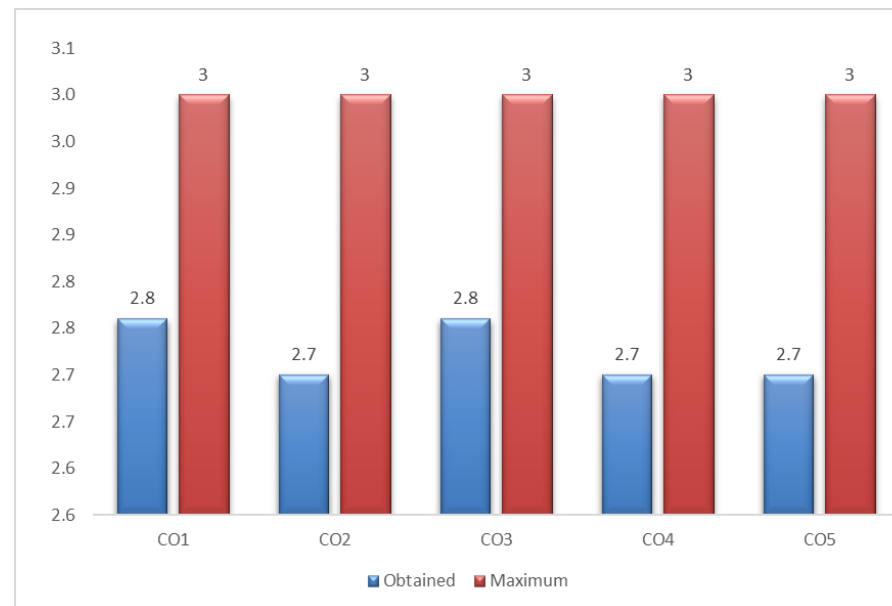
Table 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3	PSO4	
1	H		H	S			S	S		S		H	
2	H		H	H			S	S		H		H	
3	H		H	H	H		H	S		H		H	
4	S		H	H	S		S	S		H		S	
5	H		H	H	S		S	H		H		H	

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUCOME ATTAINMENT



WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

TABLE:3 PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3		H 2.76				3	3
CO2	3	3	H 2.7	H 2.7				3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3			H		H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	2.94	2.92	2.92	3	3	3	3	3
AVERAGE	2.9725							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Cell and Molecular Biology
COURSE CODE : BT19101
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the structures cytological, biochemical, physiological and genetic.	II (Understanding)
CO2	Acquire knowledge about the organizational and functional aspects of cell organelles.	I (Knowledge)
CO3	Explain the Cell division , Cell cycle and Cell signalling	III (Apply)
CO4	Analyse the variations of Cell growth (Elementary level) ,Cell differentiation (eg Haematopoiesis...) Cell motility (Elementary level) and Cell death (Apoptosis)	IV (Analyse)
CO5	Analyse the DNA reassociation kinetics (Cot curve analysis); C-value paradox, Tm curve, Genome complexity Genome organization in prokaryotes(Elementary level) Genome organization in Eukaryotes(Elementary level)	III (Apply)

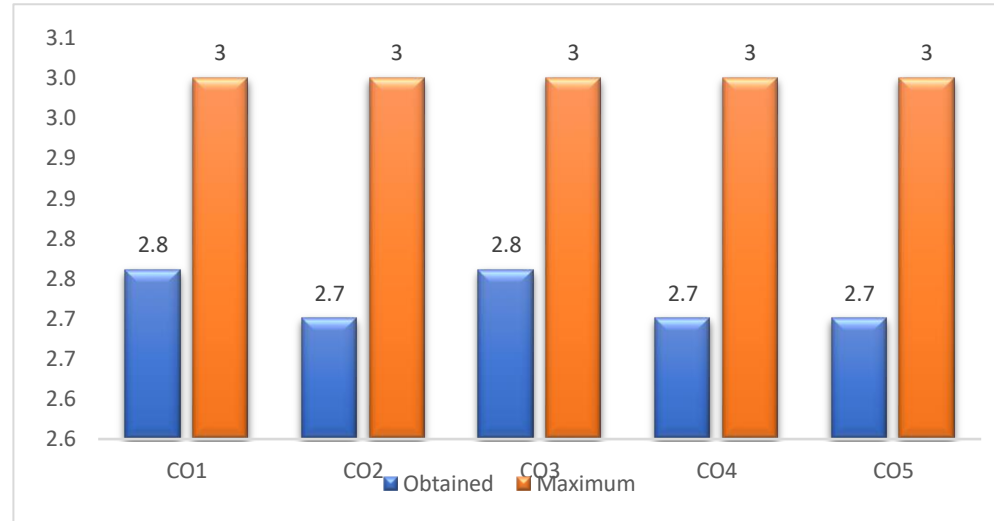
TABLE 1: CO, PO, PSO MAPPING :

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H					H	H		H
2			H	H				H	H		
3			H					H	H		
4	H			H				H	H	H	
5	H			H				H	H		H

H: Highly Supportive

S: Supportive

Table:2 Course outcome Attainment



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0			0.0	0.0	100.0	3.0	100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO2	100.0	3.0			0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO3	100.0	3.0	100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO4			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO5			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING :

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : GENETIC ANALYSIS
 COURSE CODE : BT19102
 CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

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PROGRAMME SPECIFIC OUTCOME: Students will be able to:

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- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

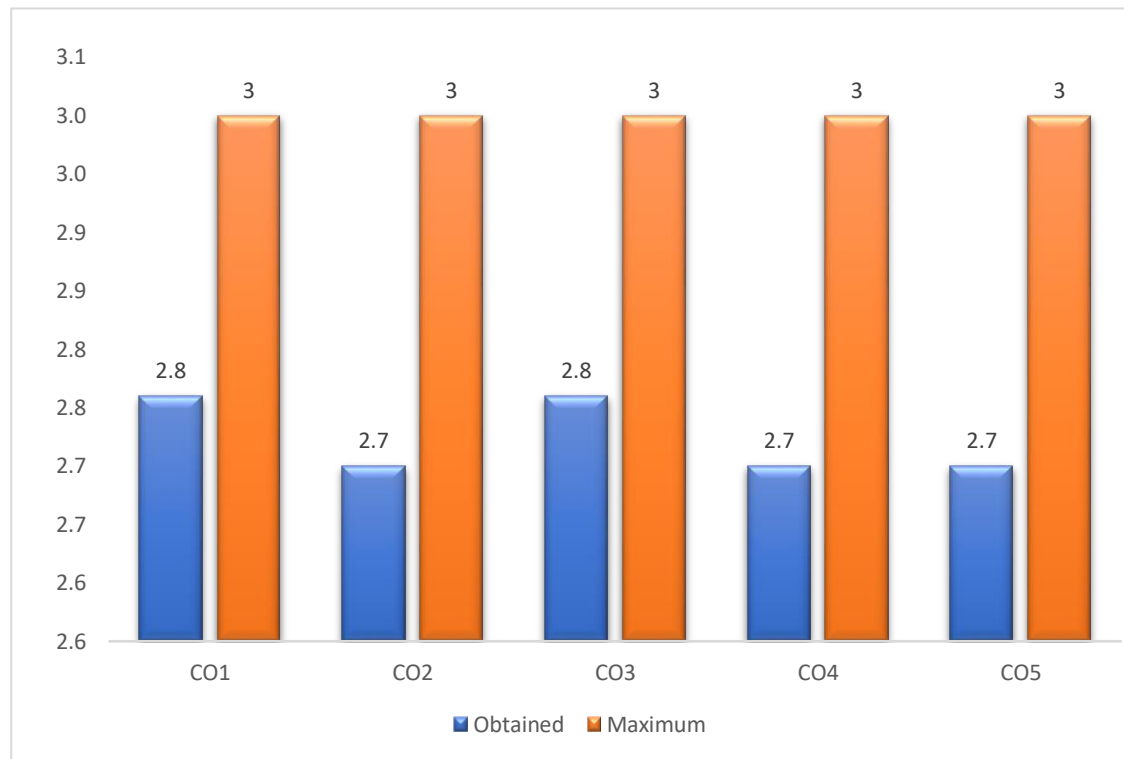
	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
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1	H	H			H				H		H
2	H	H	H	S			H	H	H	H	
3		H	H					H	H		
4	H	H		S	H				H	H	
5	H				H			H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0			0.0	0.0	100.0	3.0	100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO2	100.0	3.0			0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO3	100.0	3.0	100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO4			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO5			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : BIO-CHEMISTRY AND METABOLISM
COURSE CODE : BT19103
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
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- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understands about the carbohydrates and its metabolic pathways - the energy-yielding and energy requiring reactions in life	II (Understanding)
CO2	Illustrate different types of lipids and relate their structure to their role in biological systems.	III (Apply)
CO3	Recognize amino acid structures, describe their physical and chemical properties, and understand protein classification	I (Knowledge)
CO4	Identify the structure of nucleic acids, DNA and RNA.	I (Knowledge)
CO5	Understand the chemical nature of enzymes and Vitamins, its classification, and properties.	II (Understanding)

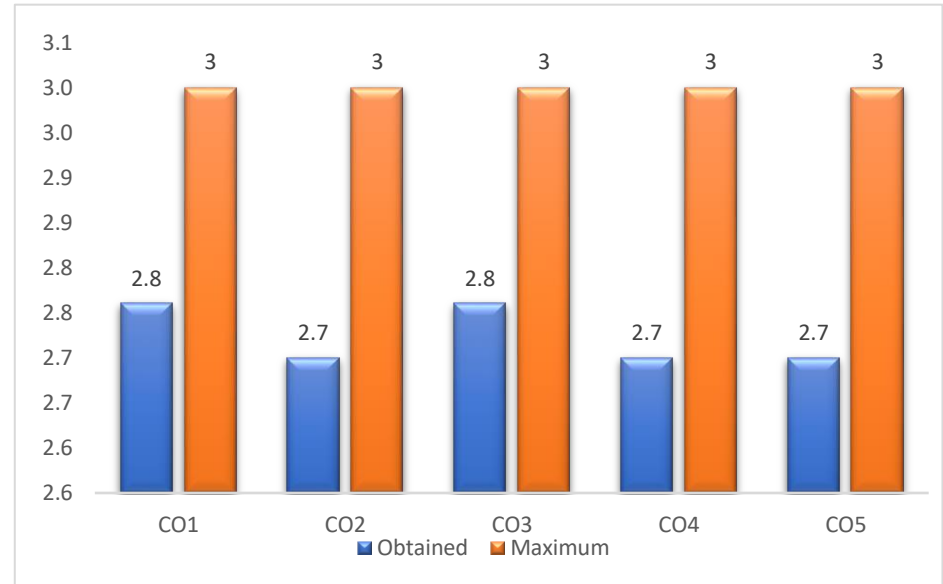
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H		H			H	H		H
2	H		H	H				H	H		
3	H		H					H	H		
4	H			H				H	H	H	H
5	H		H	H				H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam		co wise total average	
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level		
CO1	100.0	3.0			0.0	0.0	100.0	3.0	100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO2	100.0	3.0			0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO3	100.0	3.0	100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO4			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO5			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING :

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : CHEMISTRY-I
COURSE CODE : BT19105
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Analyse the energy changes in a given physical or chemical process.	IV (Analyse)
CO2	Apply the concept of feasibility of a process	III (Apply)
CO3	Compare the electrical conductivities of various conductors	III (Apply)
CO4	Evaluate cell potential, compare various electrodes	V (Evaluate)
CO5	Explain various phases in a heterogenous system, apply the concept to separate various phases	IV (Analyse)

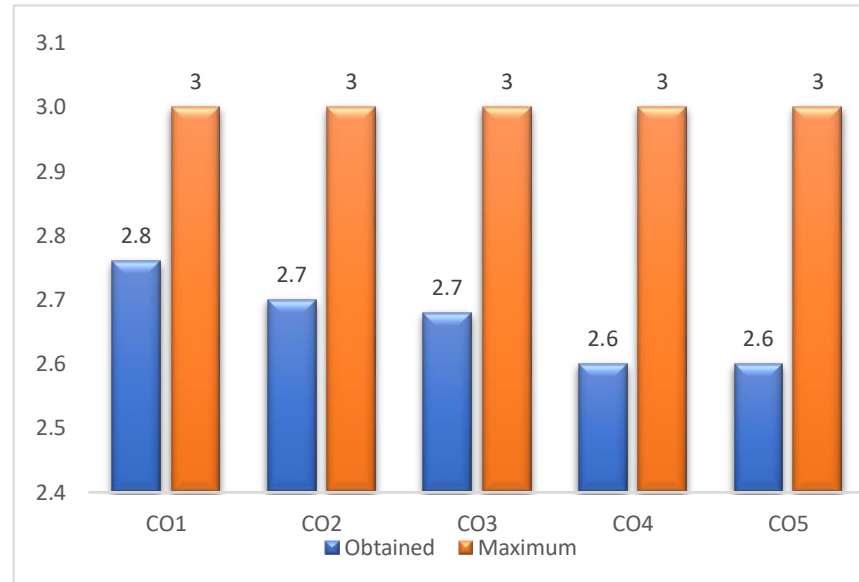
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H	H	H	H				H	H		H
2	H							H	H		
3	H			H				H	H		
4	H	H	H		H			H	H	H	
5	H	H	H		H	H	H	H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam		co wise total average	
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level		
CO1	100.0	3.0			0.0	0.0	100.0	3.0	100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO2	100.0	3.0			0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO3	100.0	3.0	100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.4	100.0	3.0	3.0	2.8
CO4			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7
CO5			100.0	3.0	0.0	0.0			100.0	3.0	100.0	3.0	2.3	100.0	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.684

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-II

subject	code
Molecular Genetics	BT19201
Microbial Genetics	BT19202
Immunology	BT19203
Chemistry-II	BT19204

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Molecular Genetics
COURSE CODE : BT19201
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Explain the concepts of DNA replication	III (Apply)
CO2	Understand the basic concepts of prokaryotic transcription and translation	II (Understand)
CO3	Understand the basic concepts of eukaryotic transcription and translation	II (Understand)
CO4	Explain the gene regulation	III (Apply)
CO5	Explain the transposition of transposable elements	III (Apply)

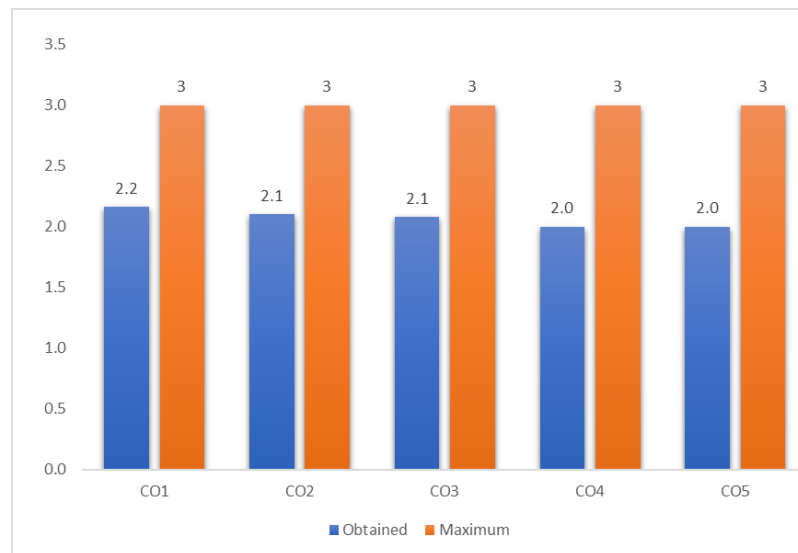
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H	H			H		H	H			
2		H			H			H	H	H	H
3	H							H		H	H
4	H				H			H		H	
5	H							H	H		

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	86.3	3.0			84.3	2.0	100.0	3.0	100.0	3.0	70.6	1.0	2.4	82.4	2.0	2.0	2.2
CO2	86.3	3.0			84.3	2.0			100.0	3.0	70.6	1.0	2.3	82.4	2.0	2.0	2.1
CO3	86.3	3.0	76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.2	82.4	2.0	2.0	2.1
CO4			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0
CO5			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0

AVERAGE	AVERAGE
3	2.083

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Microbial Genetics
COURSE CODE : BT19202
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
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- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the scope, evolution and history of microbiology	II (Understand)
CO2	Acquire the knowledge of Morphology and cell structure of major groups of microorganisms	I (Knowledge)
CO3	Analyse the different types of Sterilization and Disinfection Techniques	IV (Analyse)
CO4	Understand Concept of culture and type of culture media and Microbial growth	II (Understand)
CO5	Analyse the types of fermentations and primary and secondary metabolites,	IV (Analyse)

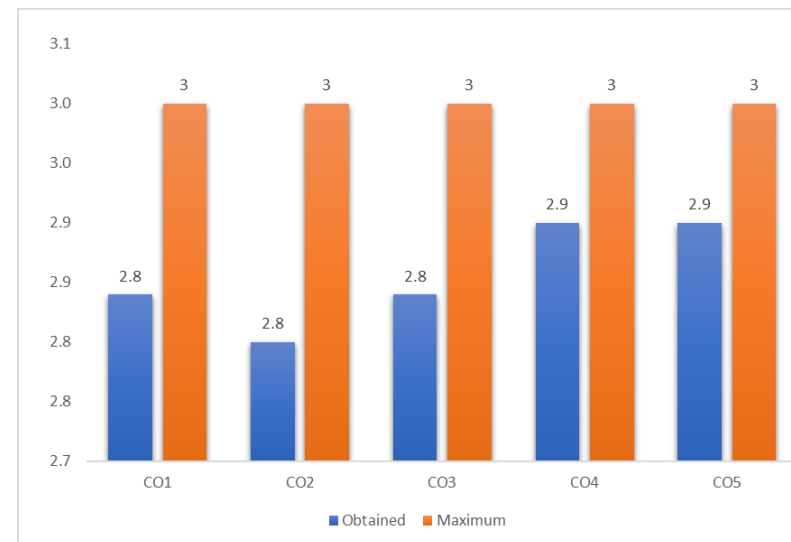
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		H
2	H		H					H	H		
3		H	H	H	H		H	H	H	H	
4	H							H	H		
5		H		H	H		H	H	H	H	H

H: Highly Supportive

S: Supportive

Table :2 Course Outcome Attainment



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	76.5	2.0			90.2	3.0	100.0	3.0	100.0	3.0	78.4	2.0	2.6	96.1	3.0	3.0	2.8
CO2	76.5	2.0			90.2	3.0			100.0	3.0	78.4	2.0	2.5	96.1	3.0	3.0	2.8
CO3	76.5	2.0	98.0	3.0	90.2	3.0			100.0	3.0	78.4	2.0	2.6	96.1	3.0	3.0	2.8
CO4			98.0	3.0	90.2	3.0			100.0	3.0	78.4	2.0	2.8	96.1	3.0	3.0	2.9
CO5			98.0	3.0	90.2	3.0			100.0	3.0	78.4	2.0	2.8	96.1	3.0	3.0	2.9

AVERAGE	AVERAGE
3	2.842

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : IMMUNOLOGY
COURSE CODE : BT19203
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
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- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	students will be able to gain knowledge on concepts of nonspecific ,specific immunity, organs of immune system.	I (Knowledge)
CO2	students will be able to Identify the structure, function, and characteristics of immunoglobulins ,State the principle of the routine serologic procedures performed in the laboratory	III (Apply)
CO3	students will gain an in depth understanding on antibody diversity ,Mab Production applications	II (Understanding)
CO4	students will be able to Demonstrate the relevance of immunity to infection and disease& gain basic knowledge on vaccines.	III (Apply)
CO5	students will be able to gain in depth knowledge on inflammation ,allergic reactions &autoimmunity	I (Knowledge)

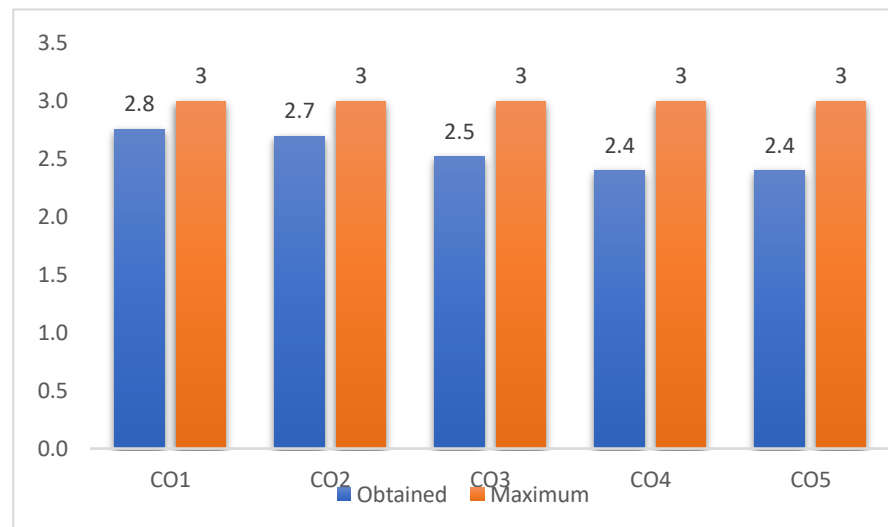
TABLE 1: CO, PO, PSO MAPPING :

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		H
2	H	H	H					H	H		
3	H	H		H				H	H		
4	H		H		H			H	H	H	H
5	H			H	H			H	H		H

H: Highly Supportive

S: Supportive

Table :2 Course Outcome Attainment



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	84.3	2.0			84.3	2.0	88.2	3.0	98.0	3.0	68.6	1.0	2.2	86.3	3.0	3.0	2.7
CO2	84.3	2.0			84.3	2.0			98.0	3.0	68.6	1.0	2.0	86.3	3.0	3.0	2.6
CO3	84.3	2.0	84.3	2.0	84.3	2.0			98.0	3.0	68.6	1.0	2.0	86.3	3.0	3.0	2.6
CO4			84.3	2.0	84.3	2.0			98.0	3.0	68.6	1.0	2.0	86.3	3.0	3.0	2.6
CO5			84.3	2.0	84.3	2.0			98.0	3.0	68.6	1.0	2.0	86.3	3.0	3.0	2.6

AVERAGE	AVERAGE
3	2.562

Table 3: PROGRAMME OUTCOME MAPPING :

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : CHEMISTRY-II
COURSE CODE : BT19205
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
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- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Analyse the structures of various molecules/ions based on LCAO concept.	IV (Analyse)
CO2	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO3	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO4	Explain the fundamentals of organic molecules.	III (Apply)
CO5	Explain the organic reaction mechanisms	III (Apply)

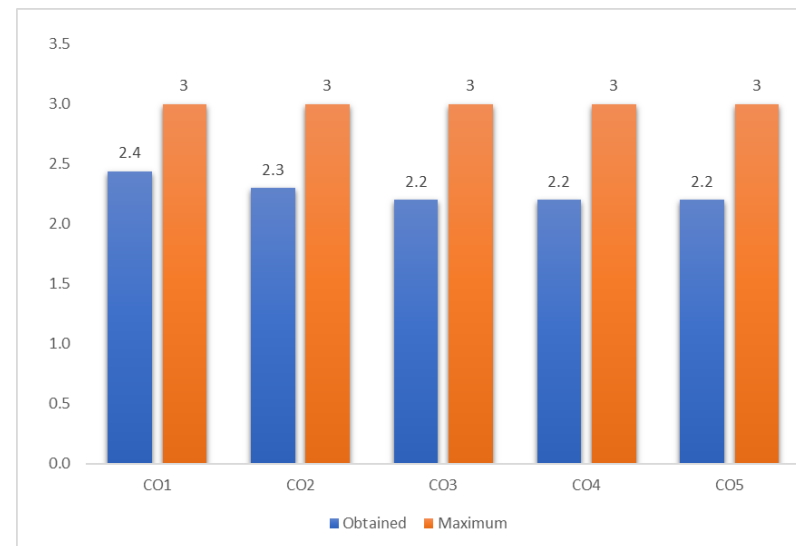
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H					H	H		H
2	H	H	H	H				H	H		
3	H		H		H			H	H		
4	H	H	H	H		H		H	H	H	
5	H		H	H			H	H	H		H

H: Highly Supportive

S: Supportive

Table :2 Course Outcome Attainment



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	74.5	1.0			68.6	1.0	100.0	3.0	100.0	3.0	43.1	0.0	1.6	92.2	3.0	3.0	2.4
CO2	74.5	1.0			68.6	1.0			100.0	3.0	43.1	0.0	1.3	92.2	3.0	3.0	2.3
CO3	74.5	1.0	64.7	0.0	68.6	1.0			100.0	3.0	43.1	0.0	1.0	92.2	3.0	3.0	2.2
CO4			64.7	0.0	68.6	1.0			100.0	3.0	43.1	0.0	1.0	92.2	3.0	3.0	2.2
CO5			64.7	0.0	68.6	1.0			100.0	3.0	43.1	0.0	1.0	92.2	3.0	3.0	2.2

AVERAGE	AVERAGE
3	2.266

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-III

subject	code
Bio-Analytical Techniques	BT20 301
Plant Biotechnology	BT20 302
Recombinant DNA Technology	BT20 303
Chemistry-III	BT20 304

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: BIO-ANALYTICAL TECHNIQUES
COURSE CODE: BT20 301
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the operating conditions (mobile phase, temperature, flow rate, program rate, etc.) for the various separation techniques.	II (Understand)
CO2	Analyse the various separations methods of Gas Chromatography and HPLC Definition, basic principle, procedure, and applications.	IV (Analyse)
CO3	Understand the instrumentation required for the various estimation techniques and their associated operating principles.	II (Understand)
CO4	Acquire the knowledge about the structure and function of important biomolecules and cellular systems. and methods for measuring the effects of radiation on these models and techniques for radiation therapy	I (Knowledge)
CO5	Analyse the UV & Vis absorption Spectra , Colorimetry , Spectrophotometry Instrumentation and applications.	IV (Analyse)

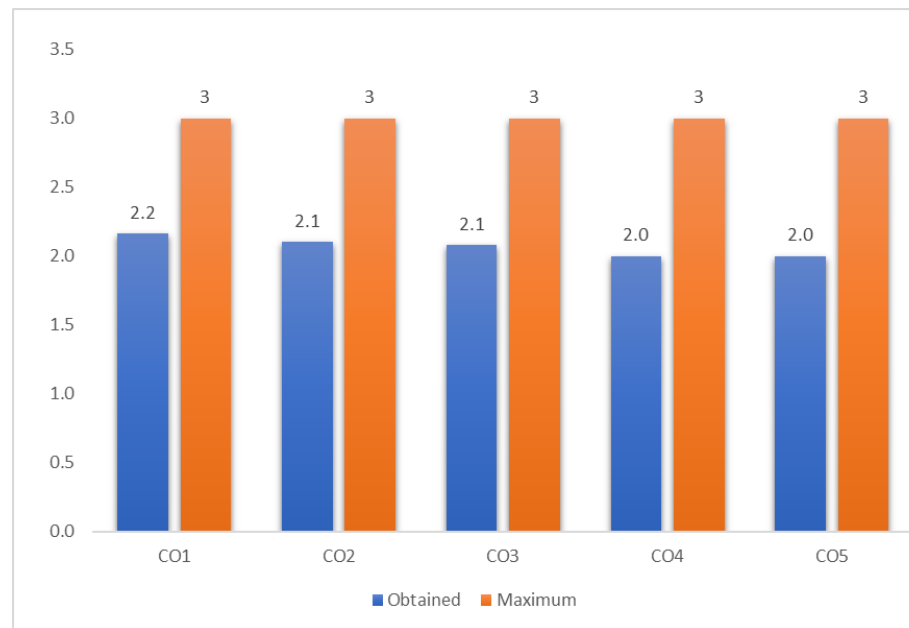
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H	H	H	H	H		H	H			H
2	H	H		H	H			H	H	H	H
3	H	H		H		H		H		H	H
4	H		H		H			H		H	
5	H	H		H	H		H	H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		External Exam				
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	86.3	3.0			84.3	2.0	100.0	3.0	100.0	3.0	70.6	1.0	2.4	82.4	2.0	2.0	2.2
CO2	86.3	3.0			84.3	2.0			100.0	3.0	70.6	1.0	2.3	82.4	2.0	2.0	2.1
CO3	86.3	3.0	76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.2	82.4	2.0	2.0	2.1
CO4			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0
CO5			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0

AVERAGE	AVERAGE
3	2.085

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: PLANT BIOTECHNOLOGY
COURSE CODE: BT20 302
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Acquire the knowledge of historical & current perspectives of plant biotechnology, plant tissue culture requirements and media components in plant tissue culture media	I (Knowledge)
CO2	Understand the methods of isolation and fusion of protoplast	II (Understand)
CO3	Understand Transformation techniques for production of disease resistant plants	II (Understand)
CO4	Understand the scale up strategies for production of secondary metabolites, and cryopreservation	II (Understand)
CO5	Understand various transformation techniques employed in plants	II (Understand)

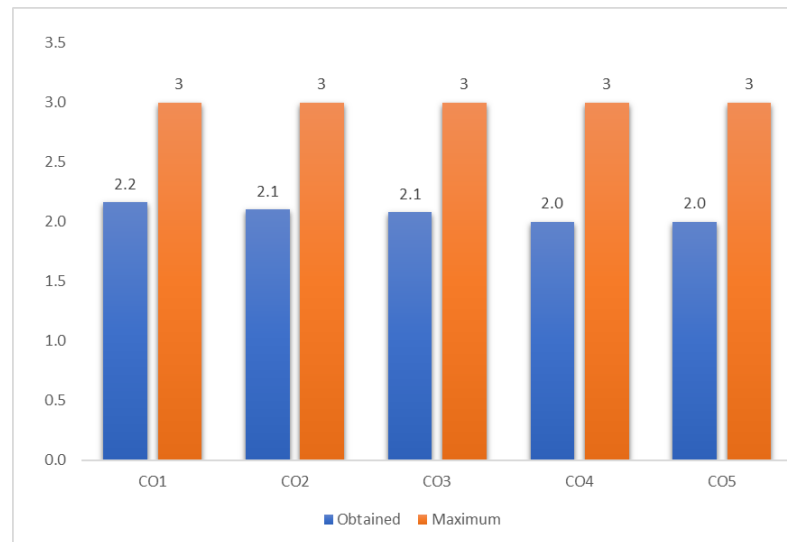
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H		H	H	H		H
2	H							H	H		
3	H				H		H	H	H	H	
4	H							H	H		
5	H				H		H	H	H	H	H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	86.3	3.0			84.3	2.0	100.0	3.0	100.0	3.0	70.6	1.0	2.4	82.4	2.0	2.0	2.2
CO2	86.3	3.0			84.3	2.0			100.0	3.0	70.6	1.0	2.3	82.4	2.0	2.0	2.1
CO3	86.3	3.0	76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.2	82.4	2.0	2.0	2.1
CO4			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0
CO5			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0

AVERAGE	AVERAGE
3	2.086

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: RECOMBINANT DNA TECHNOLOGY

COURSE CODE: BT20 303

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Explain basic and advanced concepts of r-DNA technology	III (Apply)
CO2	Understand the cloning strategies and screening of Recombinants	II (Understanding)
CO3	Analyze methodology of PCR and sequencing	IV (Analyse)
CO4	Select appropriate vector used for cloning.	III (Apply)
CO5	Apply r-DNA Technology principles for pharmaceutical applications	III (Apply)

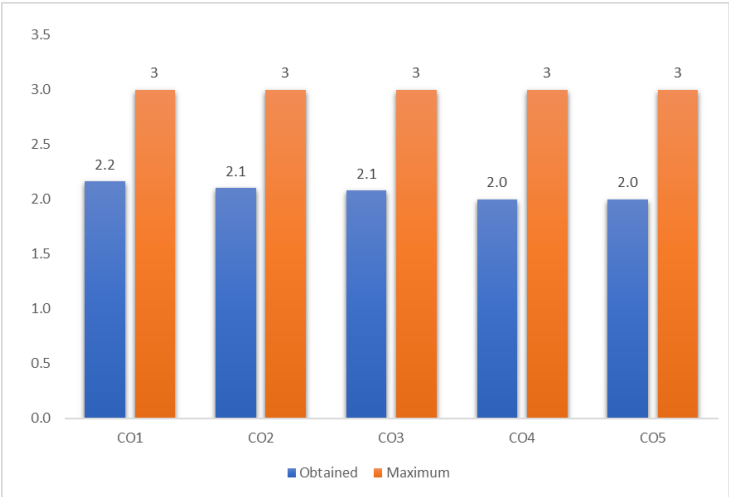
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		H
2	H	H			H			H	H		
3	H	H	H	H			H	H	H	H	H
4	H		H		H	H	H	H	H	H	H
5	H	H	H	H	H	H	H	H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	86.3	3.0			84.3	2.0	100.0	3.0	100.0	3.0	70.6	1.0	2.4	82.4	2.0	2.0	2.2
CO2	86.3	3.0			84.3	2.0			100.0	3.0	70.6	1.0	2.3	82.4	2.0	2.0	2.1
CO3	86.3	3.0	76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.2	82.4	2.0	2.0	2.1
CO4			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0
CO5			76.5	2.0	84.3	2.0			100.0	3.0	70.6	1.0	2.0	82.4	2.0	2.0	2.0

AVERAGE	AVERAGE
3	2.088

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : CHEMISTRY-III
COURSE CODE : BT20 304
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
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- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Analyse the structures of various molecules/ions based on LCAO concept.	IV (Analyse)
CO2	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO3	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO4	Explain the fundamentals of organic molecules.	III (Apply)
CO5	Explain the organic reaction mechanisms	III (Apply)

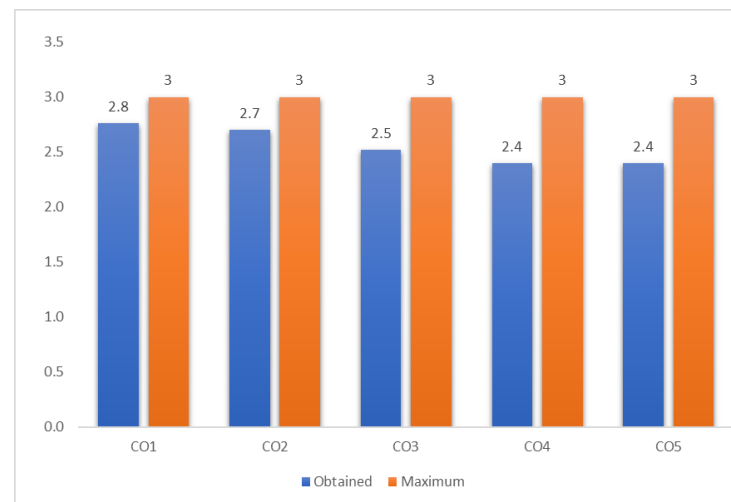
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H		H			H	H		H
2	H		H	H		H	H	H	H		
3	H		H		H			H	H		
4	H			H	H	H	H	H	H	H	
5	H			H	H			H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0			95.8	3.0	100.0	3.0	100.0	3.0	62.5	0.0	2.4	87.5	3.0	3.0	2.8
CO2	100.0	3.0			95.8	3.0			100.0	3.0	62.5	0.0	2.3	87.5	3.0	3.0	2.7
CO3	100.0	3.0	62.5	0.0	95.8	3.0			100.0	3.0	62.5	0.0	1.8	87.5	3.0	3.0	2.5
CO4			62.5	0.0	95.8	3.0			100.0	3.0	62.5	0.0	1.5	87.5	3.0	3.0	2.4
CO5			62.5	0.0	95.8	3.0			100.0	3.0	62.5	0.0	1.5	87.5	3.0	3.0	2.4

AVERAGE	AVERAGE
3	2.568

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-IV

subject	code
Biodiversity (GE-4)	BT20 401
Biostatistics (SEC-2)	BT20 402
Agriculture Biotechnology	BT20 403
Human Genetics	BT20 404
Medical Biotechnology	BT20 405
Chemistry-IV	BT20 406

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: BIO-DIVERSITY
COURSE CODE: BT20 401
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
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- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	students will gain an in depth understanding on biodiversity and its importance	II (Understanding)
CO2	students will acquire basic knowledge on values of biodiversity and microbial taxonomy and toxins	I (Knowledge)
CO3	students will be able to gain basic knowledge on different types of diversity and ways to conserve wildlife	I (Knowledge)
CO4	students will be able to gain knowledge on extinct threatened and endangered species, Biodiversity Hotspots & their protection	I (Knowledge)
CO5	students will be able to gain knowledge on importance of biodiversity conservation	II (Understanding)

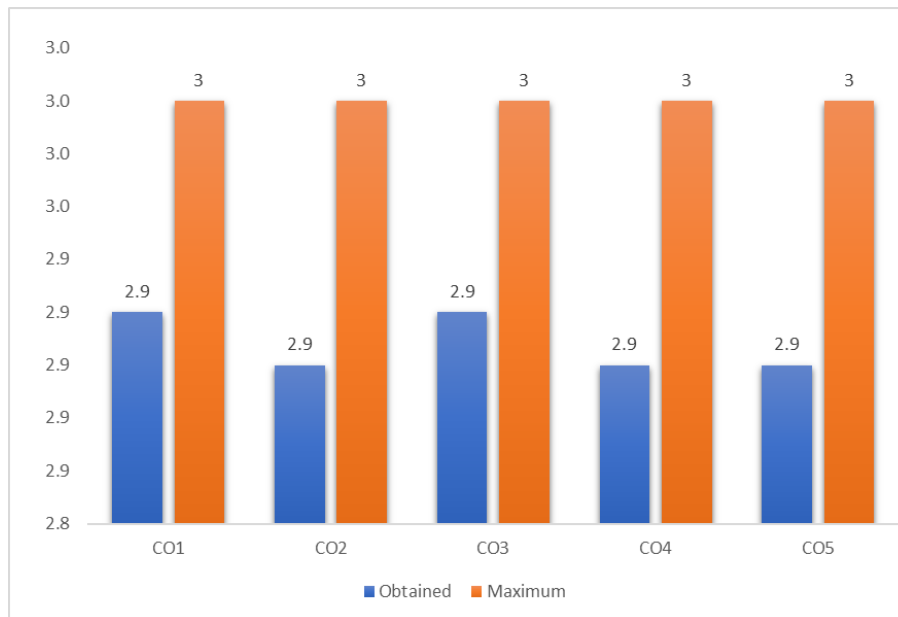
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H		H		H		S
2	H				H		H		H	S	
3	H		H		S		H	H	H		
4	H		H		H	H	H	H	H	H	H
5	H				H		H	H	H		

H: Highly Supportive

S: Supportive

TABLE:2COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	93.8	3.0			97.9	3.0	95.8	3.0	100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO2	93.8	3.0			97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO3	93.8	3.0	100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO4			100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO5			100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9

AVERAGE	AVERAGE
3	2.920

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: BIOSTATISTICS
COURSE CODE: BT20 402
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
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- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Students will be able to acquire the knowledge in the concepts of data and its collection	I (Knowledge)
CO2	Students will be able to analyse the various Diagrams and Graphs	IV (Analyse)
CO3	Students will be able to gain knowledge on measures of central tendency	I (Knowledge)
CO4	Students will be able to gain basic knowledge on measures of central dispersion	I (Knowledge)
CO5	Students will gain a basic understanding on sampling	II (Understanding)

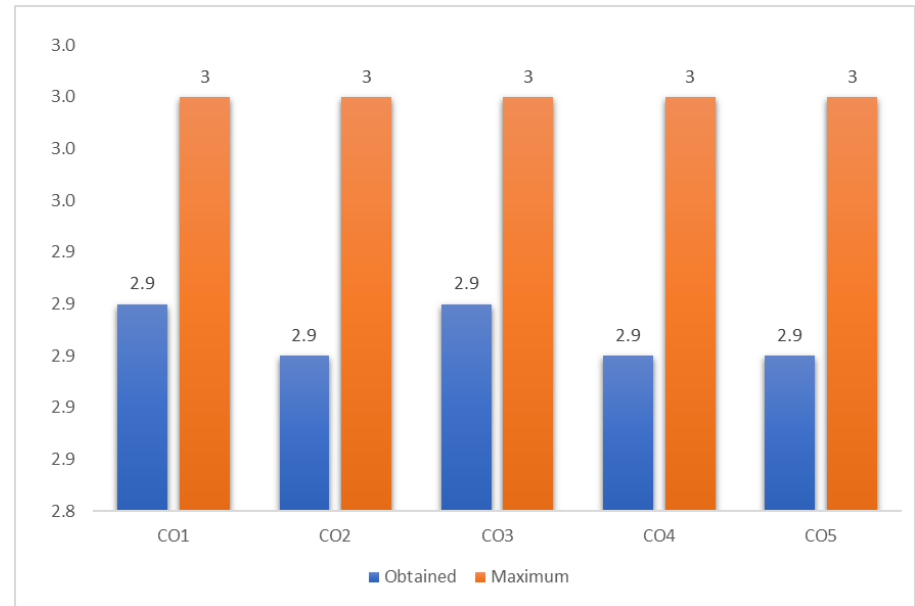
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H		H	H			
2	H				H			H	H	H	
3	H		H		H	H		H		S	H
4	H		H		H			H		H	H
5	H		H		H		H	H	H		S

H: Highly Supportive

S: Supportive

TABLE 2: COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	93.8	3.0			97.9	3.0	95.8	3.0	100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO2	93.8	3.0			97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO3	93.8	3.0	100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO4			100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9
CO5			100.0	3.0	97.9	3.0			100.0	3.0	77.1	2.0	2.8	95.8	3.0	3.0	2.9

AVERAGE	AVERAGE
3	2.988

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: AGRICULTURAL BIOTECHNOLOGY

COURSE CODE: BT20403

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the Plant breeding methods and limitations of conventional breeding	II (Understand)
CO2	Understand the Concept of plant pathology, classification of plant diseases based on symptoms, Plant diseases	II (Understand)
CO3	Understand Transformation techniques for production of disease resistant plants	II (Understand)
CO4	Understand the Genetic Engineering techniques to improve quality of plants	II (Understand)
CO5	Understand Environmental issues, legal aspects of agriculture biotechnology	II (Understand)

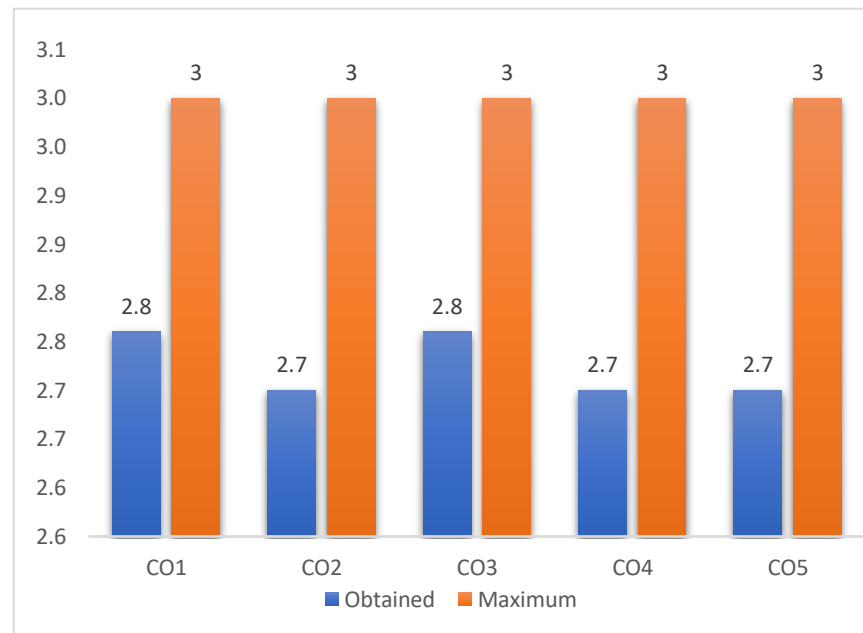
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		H
2	H							H	H		
3	H				H			H	S		H
4	H				S			H	H		
5	H				H			H	H		S

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	97.9	3.0			97.9	3.0	100.0	3.0	100.0	3.0	62.5	0.0	2.4	100.0	3.0	3.0	2.8
CO2	97.9	3.0			97.9	3.0			100.0	3.0	62.5	0.0	2.3	100.0	3.0	3.0	2.7
CO3	97.9	3.0	87.5	3.0	97.9	3.0			100.0	3.0	62.5	0.0	2.4	100.0	3.0	3.0	2.8
CO4			87.5	3.0	97.9	3.0			100.0	3.0	62.5	0.0	2.3	100.0	3.0	3.0	2.7
CO5			87.5	3.0	97.9	3.0			100.0	3.0	62.5	0.0	2.3	100.0	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.742

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: HUMAN GENETICS

COURSE CODE: BT20404

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering

- **PSO2.**design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Students will be able to gain concepts of different types of inheritance pattern	I (Knowledge)
CO2	Students will be able to evaluate and analyse different blood related genetic diseases	V (Evaluate)
CO3	Students will be able to gain knowledge on cancer	I (Knowledge)
CO4	Students will be able to gain basic knowledge on gene therapy used in treating disease	I (Knowledge)
CO5	Students will gain a basic understanding on prenatal diagnosis and genes in population	II (Understanding)

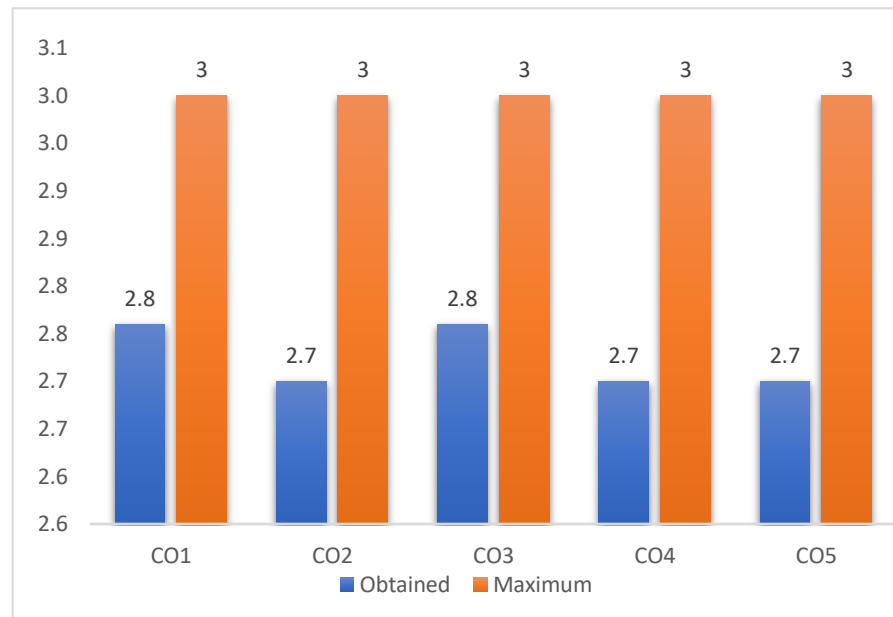
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		
2	H	H			H			H	H		
3	H	H					H	H	H	H	
4	H				H		H	H	H	H	H
5	H	H			H	H	H	H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	95.8	3.0			100.0	3.0	100.0	3.0	100.0	3.0	72.9	1.0	2.6	100.0	3.0	3.0	2.8
CO2	95.8	3.0			100.0	3.0			100.0	3.0	72.9	1.0	2.5	100.0	3.0	3.0	2.8
CO3	95.8	3.0	91.7	3.0	100.0	3.0			100.0	3.0	72.9	1.0	2.6	100.0	3.0	3.0	2.8
CO4			91.7	3.0	100.0	3.0			100.0	3.0	72.9	1.0	2.5	100.0	3.0	3.0	2.8
CO5			91.7	3.0	100.0	3.0			100.0	3.0	72.9	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	3				3		3	
CO2	3				3			
CO3	3	0	3		3	3	3	
CO4	3		3	0	3			
CO5	3		3		3			
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	
AVERAGE OF POS	3	3	3	3	3	3	3	
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: MEDICAL BIOTECHNOLOGY

COURSE CODE: BT20405

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	students will be able to gain concepts on vaccines ,different types of vaccines and their production	I (Knowledge)
CO2	students will be able to evaluate and analyse different markers and methods used for diagnosing diseases	V (Evaluate)
CO3	Students will be able to gain knowledge on different therapeutic agents used for treating disease	I (Knowledge)
CO4	Students will be able to gain basic knowledge on advanced techniques & strategies used in treating disease	I (Knowledge)
CO5	students will gain a basic understanding on drug discovery, designing, targets, properties& delivery	II (Understanding)

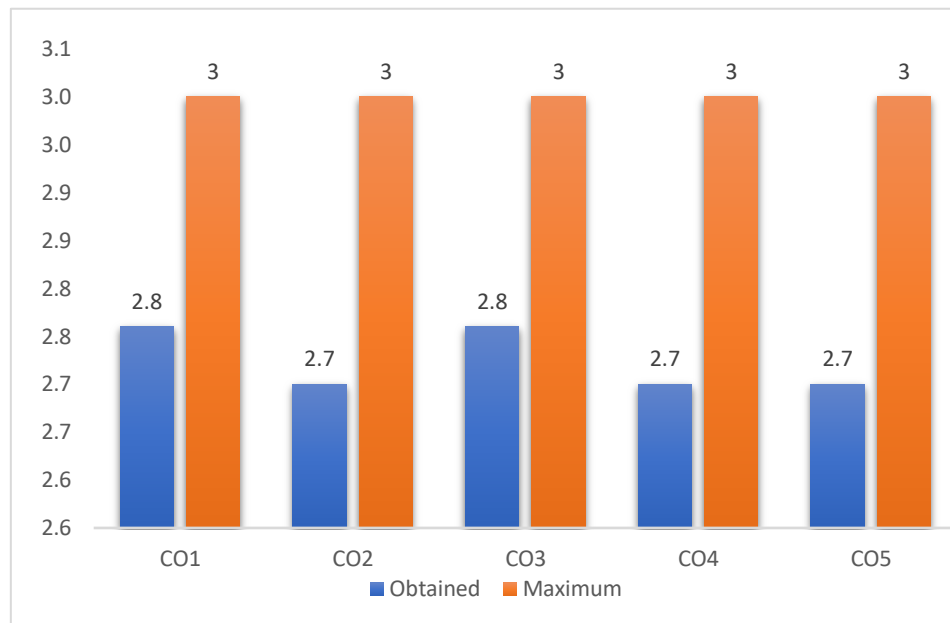
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H							H	H		H
2	H	H	H	H	H	H	H	H	H		
3	H		H					H	H		
4	H					H		H	H	H	
5	H	H	H		H			H	H		H

H: Highly Supportive

S: Supportive

TABLE 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	91.7	3.0			91.7	3.0	95.8	3.0	100.0	3.0	52.1	0.0	2.4	95.8	3.0	3.0	2.8
CO2	91.7	3.0			91.7	3.0			100.0	3.0	52.1	0.0	2.3	95.8	3.0	3.0	2.7
CO3	91.7	3.0	93.8	3.0	91.7	3.0			100.0	3.0	52.1	0.0	2.4	95.8	3.0	3.0	2.8
CO4			93.8	3.0	91.7	3.0			100.0	3.0	52.1	0.0	2.3	95.8	3.0	3.0	2.7
CO5			93.8	3.0	91.7	3.0			100.0	3.0	52.1	0.0	2.3	95.8	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE: CHEMISTRY IV

COURSE CODE: BT20406

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Analyse the structures of various molecules/ions based on LCAO concept.	IV (Analyse)
CO2	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO3	Explain the synthesis and structures of compounds of P-Block elements.	III (Apply)
CO4	Explain the fundamentals of organic molecules.	III (Apply)
CO5	Explain the organic reaction mechanisms	III (Apply)

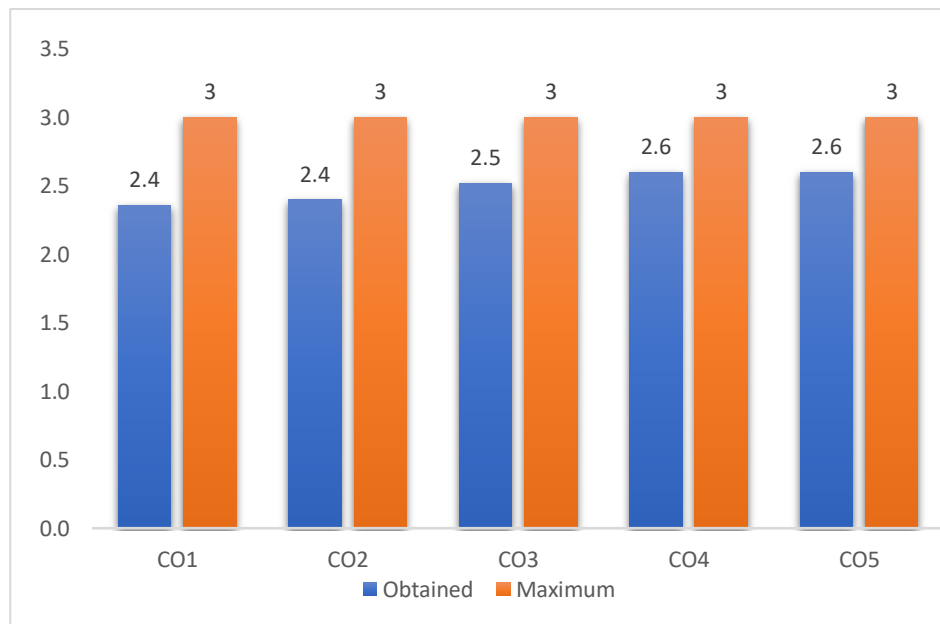
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H		H					H	H		S
2			H	H				H	H		
3			S					S	H		
4	H			H				H	H	S	
5	H			H				H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	72.9	1.0			81.3	2.0	75.0	1.0	93.8	3.0	41.7	0.0	1.4	95.8	3.0	3.0	2.4
CO2	72.9	1.0			81.3	2.0			93.8	3.0	41.7	0.0	1.5	95.8	3.0	3.0	2.4
CO3	72.9	1.0	87.5	3.0	81.3	2.0			93.8	3.0	41.7	0.0	1.8	95.8	3.0	3.0	2.5
CO4			87.5	3.0	81.3	2.0			93.8	3.0	41.7	0.0	2.0	95.8	3.0	3.0	2.6
CO5			87.5	3.0	81.3	2.0			93.8	3.0	41.7	0.0	2.0	95.8	3.0	3.0	2.6

AVERAGE	AVERAGE
3	2.564

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3			3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-V

subject	code
Toxicology (DSE-1)	BT21 501 A
Stem cell Biology (DSE-1)	BT21 501 B
Environmental Biotechnology (DSE-2)	BT21 502 A
Food Biotechnology (DSE -2)	BT21 502 B
Bioinformatics (Core-14)	BT21 503
Animal Biotechnology(Core-15)	BT21 504
Bioprocess and Fermentation Technology (Core-16)	BT21 505
Chemistry-V	BT18506

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Toxicology (DSE-1)
COURSE CODE : BT21 501
CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the basics of toxicity and concept of dose-response relationship	II (Understanding)
CO2	Understand the concepts of molecular mechanisms of toxicity induction.	II (Understanding)
CO3	Understand the basics of genetic toxicology.	II (Understanding)
CO4	Understand the basics of effects of xenobiotics in environmental compartments .	II (Understanding)
CO5	Understand the effect of toxic substances on health at workplace.	II (Understanding)

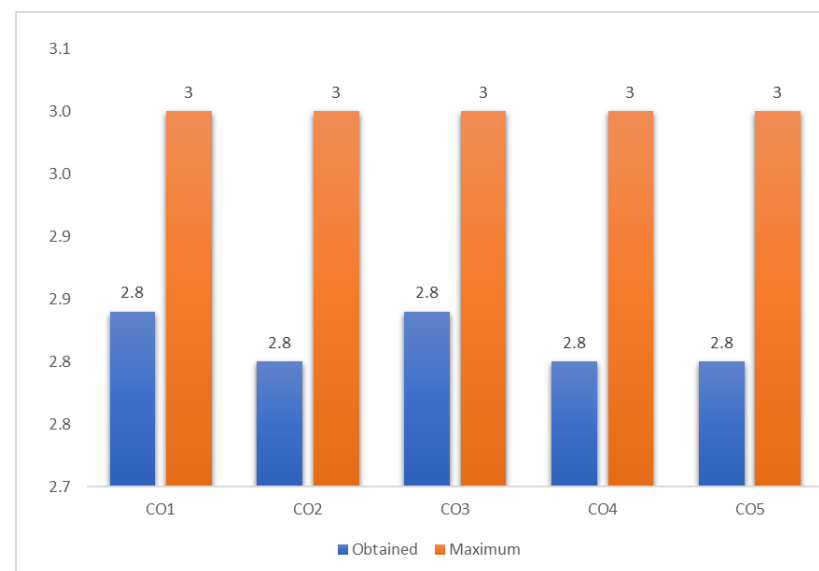
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H		H	H			
2	H				H			H	H	H	
3	H		H		H	H		H		H	H
4	H		H		H			H		H	H
5	H		H		H		H	H	H		H

H: Highly Supportive

S: Supportive

TABLE 2: COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam		co wise total average	
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level		
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Stem cell Biology (DSE-1)

COURSE CODE : BT21 501 B

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the history, characteristics and types of stem cells	II (Understand)
CO2	Understand the methods of isolation and culturing of embryonic stem cells	II (Understand)
CO3	Understand the types of adult stem cells and differentiation of adult stem cells	II (Understand)
CO4	Understand the Genetic Manipulation of stem cells	II (Understand)
CO5	Understand Tissue Engineering and Therapeutic Application of Stem Cell	II (Understand)

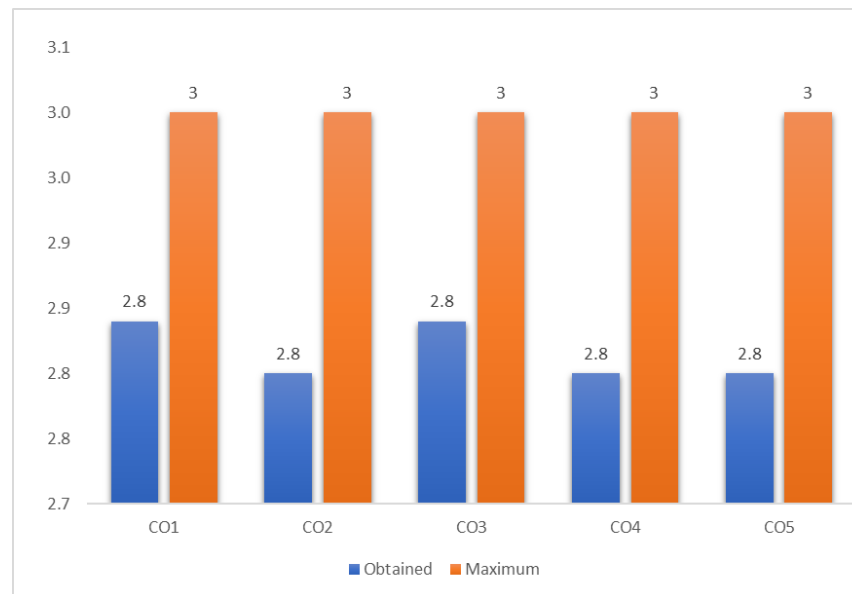
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		
2	H			H			H	H	H	H	
3	H			H	H	H		H	H	H	
4	H				H			H	H		
5	H				H			H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Environmental Biotechnology (DSE-2)

COURSE CODE : BT 20 502 A

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the concepts of pollution and ecosystem	II (Understand)
CO2	Understand the basics of wastewater treatment & bioremediation	II (Understand)
CO3	Understand the concepts of biofertilizers & biopesticides	II (Understand)
CO4	Understand the basics of renewable, non-renewable resources& biofuel production	II (Understand)
CO5	Understand the basics of GMO's & their role in degradation of pollutants.	II (Understand)

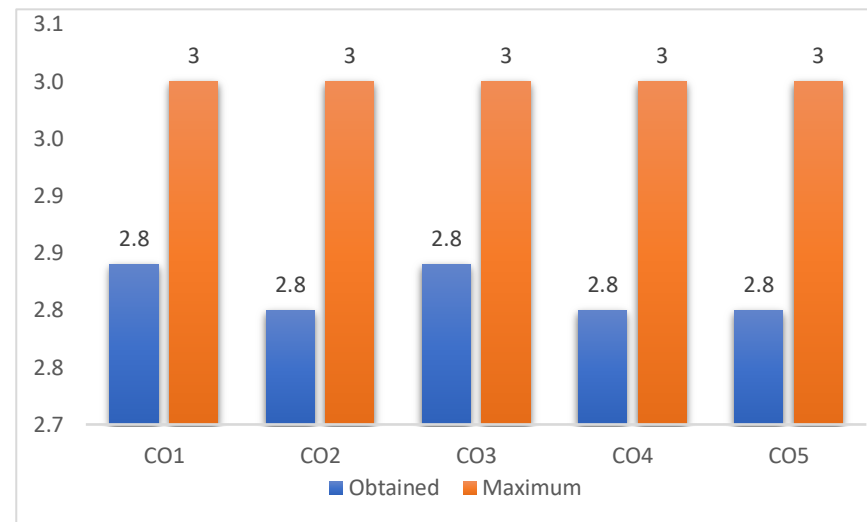
TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		
2	H	H			H			H	H		
3	H	H						H	H	H	
4	H				H			H	H	H	H
5	H	H			H	H		H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : FOOD BIOTECHNOLOGY

COURSE CODE : BT21 502 B

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand the concepts of food biotechnology	II (Understand)
CO2	Understand the Methods of food preservation and principles of canning of food items	II (Understand)
CO3	Understand the applications of biotechnology in food processing	II (Understand)
CO4	Understand classification and characterization of food industrial wastes and Waste disposal methods	II (Understand)
CO5	Understand the importance of Genetically modified food	II (Understand)

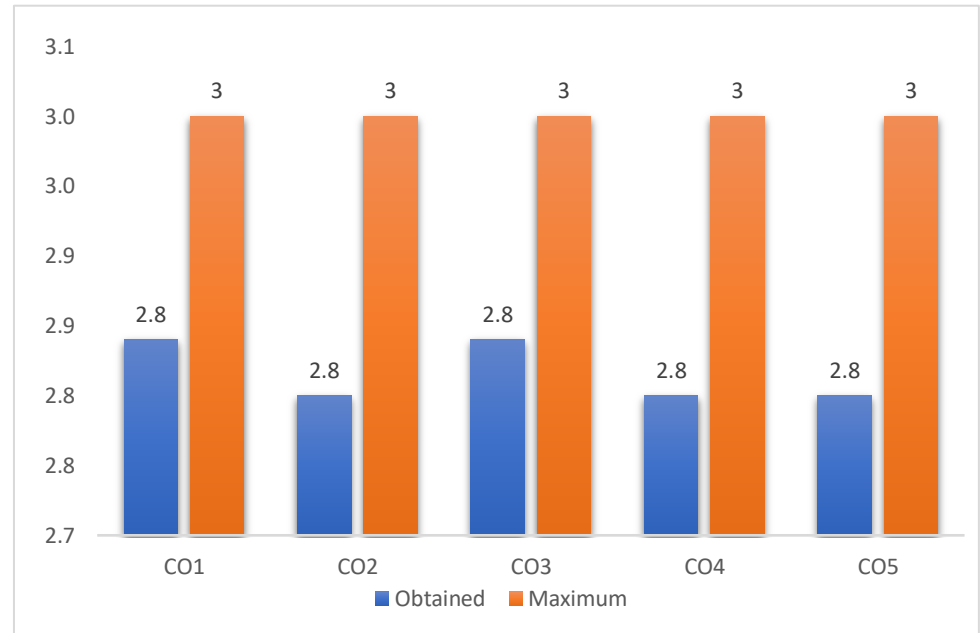
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H							H	H		H
2	H	H			H	H	H	H	H		
3	H							H	H		
4	H					H		H	H	H	
5	H	H			H			H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		External Exam				
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : BIO - INFORMATICS

COURSE CODE : BT 21 503 (CORE-14)

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	students will be able to gain knowledge on different types of databases available	IV (Knowledge)
CO2	students will acquire basic knowledge on gene prediction methods and scoring matrix significance in alignment of sequences	III (Knowledge)
CO3	students will be able to describe principles and algorithms of pairwise and multiple alignments, and sequence similarity searching	III (Apply)
CO4	students will be able to evaluate and analyse methods for secondary structure prediction and phylogenetic tree construction	V (Evaluate)
CO5	students will gain an in depth understanding on modelling of unknown protein structure by using template and application of bioinformatics in various fields	II (Understand)

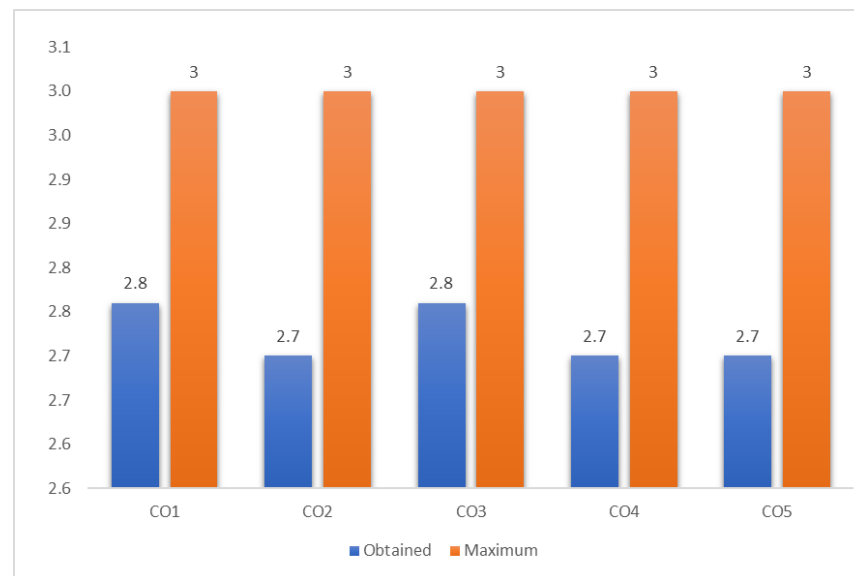
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3
1	H		H					H	H		H
2		H	H	H	H			H	H		
3			H			H	H	H	H		
4	H			H	H			H	H	H	
5	H			H		H	H	H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.4	95.9	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	55.1	0.0	2.3	95.9	3.0	3.0	2.7

AVERAGE	AVERAGE
3	2.724

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3		H 2.76				3	3
CO2	3	3	H 2.7	H 2.7				3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3			H		H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	2.94	2.92	2.92	3	3	3	3	3
AVERAGE	2.9725							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : ANIMAL BIOTECHNOLOGY

COURSE CODE : BT 21 504 (CORE-15)

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
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- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Students will be able to explain basics concepts of animal cell culture	II(Understand)
CO2	Classify the types of animal cell culture media	I (Knowledge)
CO3	Design bioreactors suitable for large scale culture of animal cells	III (Analyse)
CO4	Apply the principles of genetic engineering to transfect animal cells for industrial use	IV (Apply)
CO5	Apply the concepts of Transgenic animal	IV (Apply)

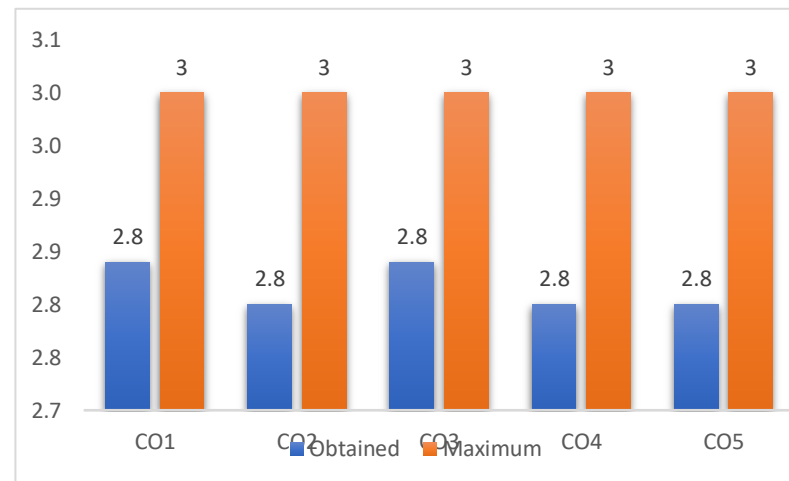
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H							H	H		H
2	H	H	H					H	H		
3	H		H			H	H	H	H		
4	H							H	H	H	
5	H					H	H	H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		External Exam				
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	co wise internal average	pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : Bioprocess and Fermentation Technology (Core-16)

COURSE CODE : BT 21 505 (CORE-16)

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Students will gain knowledge on bioreactor & Apply techniques and processes for batch and continuous sterilization and solve related problems	I (Knowledge)
CO2	students will gain an in-depth understanding on different types of fermentor ,sensors and control system for monitoring and controlling bioprocess parameters	II(Understand)
CO3	Students will be able to formulate suitable media ,comprehend and apply the inoculum development and strain improvement techniques for a desired fermentation process.	IV (Apply)
CO4	Students will be able to apply various downstream techniques for product isolation, separation and purification	IV (Apply)
CO5	Students will be able to learn & Conduct experiments for production, isolation and recovery of bio - products	II (Apply)

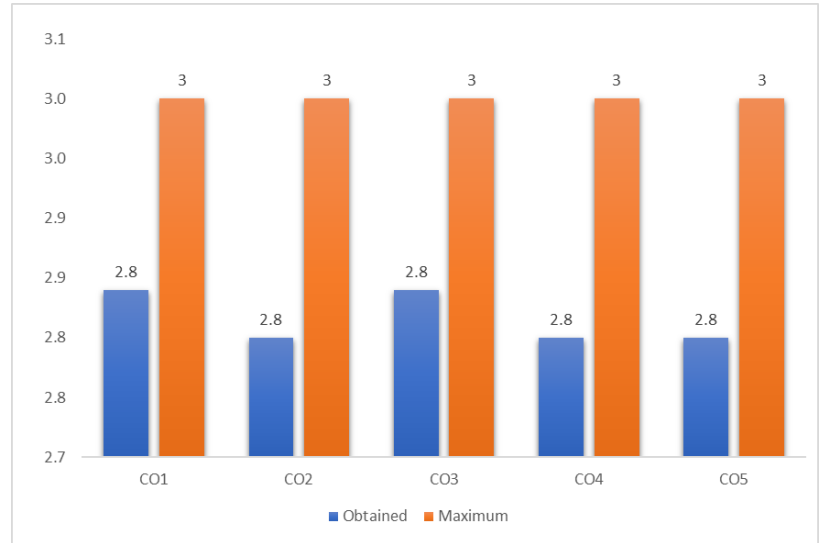
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H			H				H	H		H
2	H							H	H		
3	H	H	H	H	H	H	H	H	H		
4	H	H	H	H	H			H	H	H	
5	H	H	H	H	H	H	H	H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDENCE		co wise internal average	External Exam			co wise total average
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING:

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : CHEMISTRY IV COURSE CODE : BT18506 CREDITS: 4
DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY
PROGRAMME OUTCOMES: B.Sc. <ul style="list-style-type: none">• PO1. Scientific Knowledge. Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.• PO2. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.• PO3. Problem analysis: Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.• PO4. Modern tool usage: Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.• PO5. Environment and sustainability: Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.• PO6. Individual and team work: Function objectively as an individual and as a member in diverse teams.• PO7. Communication: Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.• PO8. Life-long learning: Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.
PROGRAMME SPECIFIC OUTCOME: Students will be able to: <ul style="list-style-type: none">• PSO1. Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve

problems related to field of Biotechnology and engineering

- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Analyze various nuclear processes and applications of radio isotopes.	IV (Analyse)
CO2	Explain fundamental concepts of spectroscopic techniques.	III (Apply)
CO3	Compare synthesis and properties of nitrogen compounds	IV (Analyse)
CO4	Evaluate photo processes and compare various organometallic compounds	V (Evaluate)
CO5	Evaluate order and molecularity of a reaction and catalytic processes.	V (Evaluate)

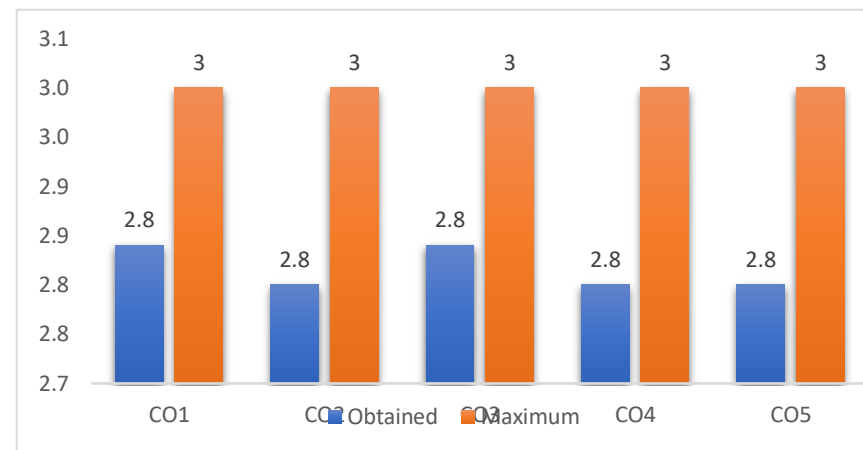
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	P08	PSO1	PSO2	PSO3
1	H	H	H		H	H		H	H	H	H
2	H	H	H	H	H	H		H	H	H	
3	H	H	H		H	H		H	H	H	H
4	H			H				H	H		
5	H	H		H	H	H		H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		pass%	Attainment level	co wise external average	co wise total average
CO1	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.6	100.0	3.0	3.0	2.8
CO4	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8
CO5	100.0	3.0	100.0	2.0	100.0	3.0	100.0	3.0	100.0	3.0	71.4	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	2.816

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3						3	3
CO2	3	3	H 2.8					3
CO3	3		3			3	H 3	3
CO4	3		3	0	0			3
CO5	3					H 3		3
AVERAGE OF COS FOR POS	3	3	3	0	0	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

SEMESTER-V

subject	code
Fundamentals of Genomics & Proteomics (DSE-3)	BT21 601 A
Enzyme Technology (DSE-3)	BT21 601 B
IPR, Bio safety and Bioethics (DSE-4)	BT21 602 A
Fundamentals of entrepreneurship (DSE-4)	BT21602 B

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE FUNDAMENTALS OF GENOMICS & PROTEOMICS (DSE-3)

COURSE CODE : BT 21 601 A

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

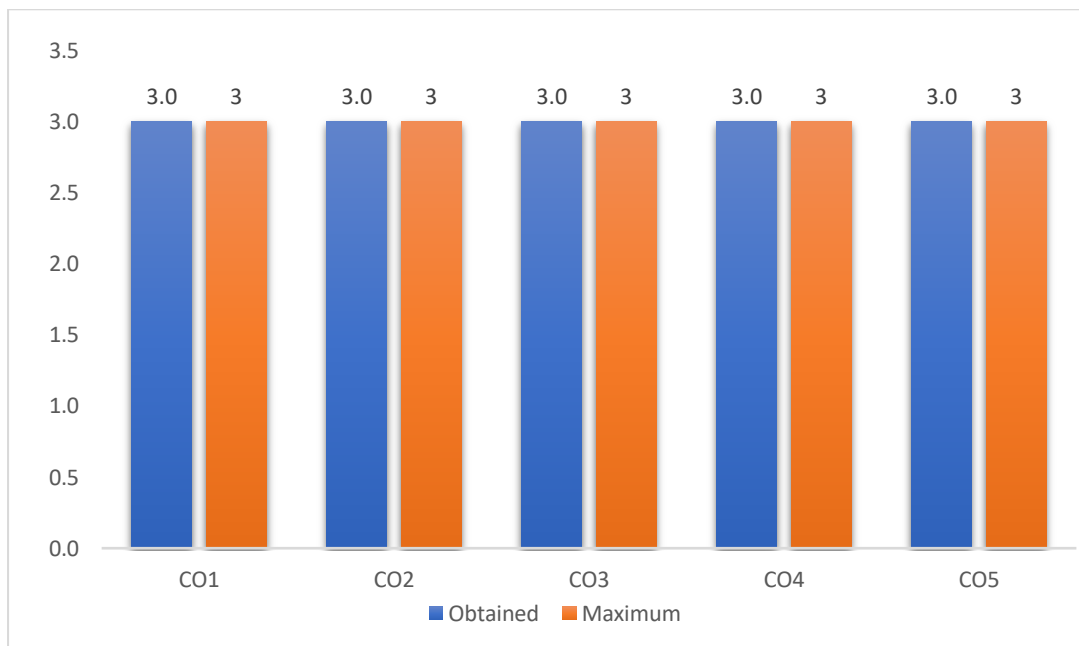
	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Students will acquire the knowledge of about the introduction to Genomics	I (Knowledge)
CO2	Students will apply the DNA sequencing techniques	IV (Apply)
CO3	Students understand about the Genome sequence assembly software and Web based servers and software's for genome analysis	II (Understand)
CO4	Students will acquire the knowledge of about the introduction to Proteomics	I (Knowledge)
CO5	Suggest and outline solution to theoretical and experimental problems in Genomics and Proteomics fields	IV (Apply)

TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H		H	H			
2	H	H			H			H	H	H	
3	H		H		H	H		H		H	H
4	H	H	H	H	H		H	H		H	H
5	H	H	H	H	H	H	H	H	H		H

H: Highly Supportive

S: Supportive



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	81.3	2.0			75.0	1.0	100.0	3.0	100.0	3.0	100.0	3.0	2.4	81.3	2.0	2.0	2.2
CO2	81.3	2.0			75.0	1.0			100.0	3.0	100.0	3.0	2.3	81.3	2.0	2.0	2.1
CO3	81.3	2.0	93.8	3.0	75.0	1.0			100.0	3.0	100.0	3.0	2.4	81.3	2.0	2.0	2.2
CO4			93.8	3.0	75.0	1.0			100.0	3.0	100.0	3.0	2.5	81.3	2.0	2.0	2.2
CO5			93.8	3.0	75.0	1.0			100.0	3.0	100.0	3.0	2.5	81.3	2.0	2.0	2.2

AVERAGE	AVERAGE
3	3

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3		3	3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : ENZYME TECHNOLOGY (DSE-3)

COURSE CODE : BT21 601 B

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society

- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms	III (Analyse)
CO2	Discover the current and future trends of applying enzyme technology for the commercialization purpose of biotechnological products.	IV (Apply)
CO3	Compare methods for production, purification, characterization and immobilization of enzymes	III (Analyse)
CO4	Discuss various application of enzymes that can benefit human life	IV (Apply)
CO5	Understanding the role of enzymes used in Molecular biology and application of biosensors.	II (Understand)

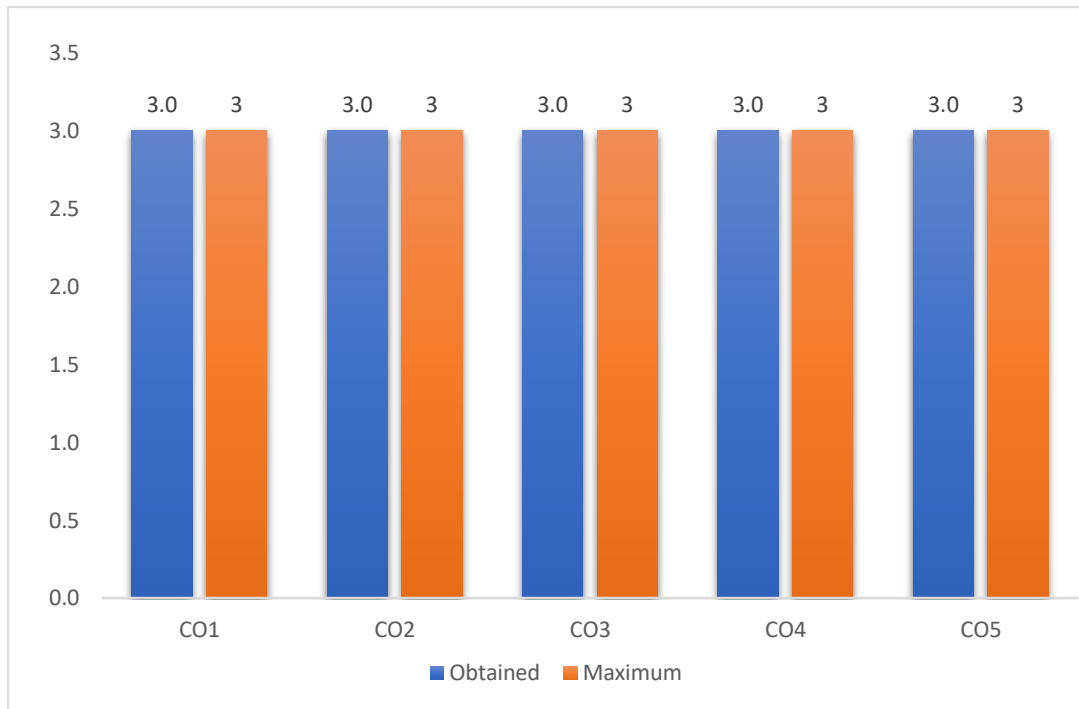
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		
2	H	H	H	H		H	H	H	H	H	
3	H			H	H			H	H	H	
4	H		H		H	H	H	H	H		
5	H	H	H		H			H	H		H

H: Highly Supportive

S: Supportive

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	75.8	2.0	2.8	100.0	3.0	3.0	2.9
CO2	100.0	3.0			100.0	3.0			100.0	3.0	75.8	2.0	2.8	100.0	3.0	3.0	2.9
CO3	100.0	3.0	100.0	3.0	100.0	3.0			100.0	3.0	75.8	2.0	2.8	100.0	3.0	3.0	2.9
CO4			100.0	3.0	100.0	3.0			100.0	3.0	75.8	2.0	2.8	100.0	3.0	3.0	2.9
CO5			100.0	3.0	100.0	3.0			100.0	3.0	75.8	2.0	2.8	100.0	3.0	3.0	2.9

AVERAGE	AVERAGE
3	3

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3		3	3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING
MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : IPR, BIOETHICS&BIOSAFETY (DSE-4)

COURSE CODE : BT 21602 A

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering& Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3.Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4.Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6.Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME:Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.**design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

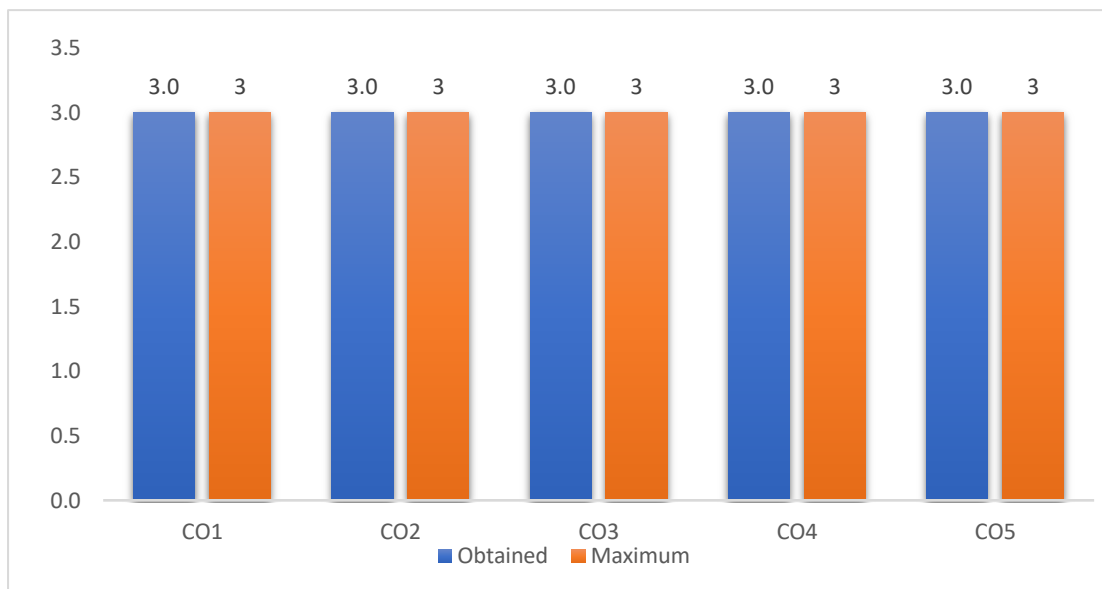
	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	Understand Biosafety for human health and environment	II (Understand)
CO2	Understand Necessity of Bioethics and Causes of unethical acts.	II (Understand)
CO3	Understand Intellectual property rights and plant breeders rights	II (Understand)
CO4	Understand different aspects involved in carrying out research.	II (Understand)
CO5	Understand Entrepreneurship, Nature and importance of Entrepreneurs	II (Understand)

TABLE 1: CO, PO, PSO MAPPING

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H				H			H	H		
2	H	H			H			H	H		
3	H	H						H	H	H	
4	H				H			H	H	H	H
5	H	H			H	H		H	H		H

H: Highly Supportive**S: Supportive**

TABLE:2 COURSE OUTCOME ATTAINMENT



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	71.9	1.0	2.6	100.0	3.0	3.0	2.8
CO2	100.0	3.0			100.0	3.0			100.0	3.0	71.9	1.0	2.5	100.0	3.0	3.0	2.8
CO3	100.0	3.0	96.9	3.0	100.0	3.0			100.0	3.0	71.9	1.0	2.6	100.0	3.0	3.0	2.8
CO4			96.9	3.0	100.0	3.0			100.0	3.0	71.9	1.0	2.5	100.0	3.0	3.0	2.8
CO5			96.9	3.0	100.0	3.0			100.0	3.0	71.9	1.0	2.5	100.0	3.0	3.0	2.8

AVERAGE	AVERAGE
3	3

Table 3: PROGRAMME OUTCOME MAPPING

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3		3	3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							

COURSE OUTCOME MAPPING

MAPPING COURSE OUTCOMES LEADING TO THE ATTAINMENT OF PROGRAM OUTCOMES:

COURSE TITLE : FUNDAMENTALS OF ENTREPRENEURSHIP (DSE 4)

COURSE CODE : BT21602 B

CREDITS: 4

DEPARTMENT: B.Sc. BIOTECHNOLOGY, GENETICS & CHEMISTRY

PROGRAMME OUTCOMES: B.Sc.

- **PO1. Scientific Knowledge.** Apply the knowledge of Science, Mathematics, Engineering & Technology fundamentals to solve the complex problems.
- **PO2. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO3. Problem analysis:** Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO4. Modern tool usage:** Create, select and apply appropriate techniques, resources, modern technology and IT tools to complex science and technological activities.
- **PO5. Environment and sustainability:** Understand the impact of professional science and technological solutions in societal and environmental contexts and for sustainable development.
- **PO6. Individual and team work:** Function objectively as an individual and as a member in diverse teams.
- **PO7. Communication:** Communicate effectively on complex science & technology activities with society at large and able to write effective reports and documentation.
- **PO8. Life-long learning:** Recognise the need and ability to engage in independent and lifelong learning in the context of technological change.

PROGRAMME SPECIFIC OUTCOME: Students will be able to:

- **PSO1.** Understand the nature and basic concepts of Biotechnology, Genetics, and Chemistry and apply knowledge to identify, analyze and understand concepts to solve problems related to field of Biotechnology and engineering
- **PSO2.** design to perform experiments and interpret data for investigating complex problems and to develop solution to Biotechnology problems by applying appropriate tools while keeping in mind safety factor for environmental & society
- **PSO3.** develop oral and written communication skills to justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices

	COURSE OUTCOMES	BLOOM'S TAXONOMY LEVEL
CO1	students will be able to gain basic knowledge on Entrepreneurship, its characteristics features and importance.	I (Knowledge)
CO2	students will acquire knowledge on setting up a start up, developing Entrepreneurial plan & project selection.	II (Understand)
CO3	students will gain an in depth understanding on project classification ,report & marketing methods	II (Understand)
CO4	students will be able to gain knowledge on importance of finance in business ,loans & repayments.	I (Knowledge)
CO5	students will be able to gain basic knowledge on international business, export of products	I (Knowledge)

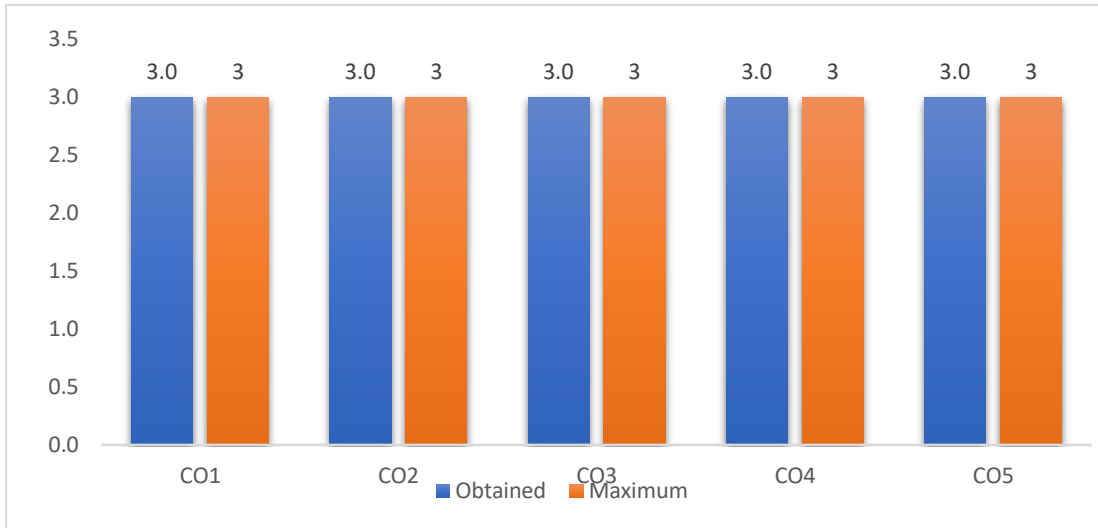
TABLE 1: CO, PO, PSO MAPPING:

Course outcomes	Programme Outcomes								Program Specific outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
1	H							H	H		H
2	H				H	H	H	H	H		
3	H		H					H	H		
4	H		H			H		H	H	H	
5	H				H			H	H		H

H: Highly Supportive

S: Supportive

Table 2: COURSE OUTCOME ATTAINMENT:



co	WEEKLY TEST		MID SEM		PREFINAL		ASSIGNMENT		VIVA-VOCE		ATTENDANCE		co wise internal average	External Exam			
	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level	pass%	Attainment level		co wise external average	co wise total average		
CO1	100.0	3.0			100.0	3.0	100.0	3.0	100.0	3.0	94.1	3.0	3.0	100.0	3.0	3.0	3.0
CO2	100.0	3.0			100.0	3.0			100.0	3.0	94.1	3.0	3.0	100.0	3.0	3.0	3.0
CO3	100.0	3.0	88.2	3.0	100.0	3.0			100.0	3.0	94.1	3.0	3.0	100.0	3.0	3.0	3.0
CO4			88.2	3.0	100.0	3.0			100.0	3.0	94.1	3.0	3.0	100.0	3.0	3.0	3.0
CO5			88.2	3.0	100.0	3.0			100.0	3.0	94.1	3.0	3.0	100.0	3.0	3.0	3.0

AVERAGE	AVERAGE
3	3

Table 3: PROGRAMME OUTCOME MAPPING:

OUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	3				3		3	3
CO2	3				3			3
CO3	3	0	3		3	3	3	3
CO4	3		3	0	3		3	3
CO5	3		3		3			3
AVERAGE OF COS FOR POS	3	0	3	0	3	3	3	3
AVERAGE OF POS	3	3	3	3	3	3	3	3
AVERAGE	3							