स्वामी राम हिमालयन विश्वविद्यालय
Swami Rama Himalayan University

Criterion 1 - Curricular Aspects

1.1.1 Outcome Analysis of POs, COs

M.Sc. Biochemistry (2021-2023)

Himalayan School of Bioscience

Swami Rama Nagar, Jolly Grant, Dehradun 248016, Uttarakhand, India

A. Program Outcomes

After successful completion of the program, graduating students/graduates will able to:

PO1	**Knowledge**	Interdisciplinary understanding of the basic and applied aspect of Biochemistry
PO2	**Analysis**	Capability to acquire and analyse the different societal/industrial/economical/fundamental & applied research problems, design, execute, find solution and demonstrate.
PO3	**Use of Technology**	Advanced biochemical and molecular techniques to conduct experiments to test scientific hypotheses, analyse data, and understand trouble-shooting & limitations.
PO4	**Ethics**	Professional ethics and responsibilities as a social endeavour to bring harmony with nature.
PO5	**Learning**	Skills for industrial applications in various applied area of biological sciences and entrepreneurship

B. Course-wise CO-PO Mapping

Mapping factor or Correlational level between Course Outcome (CO) and Program Outcomes (PO) indicates to what extent the teaching and assessment method of CO correlates/contributes the PO at the level defined below:

Correlation Level	Particulars
3	Substantial/high contribution of CO towards PO
2	Moderate contribution of CO towards PO
1	Slight/low contribution of CO towards PO

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MMBC 101	General Microbiology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Describe and comprehend the fundamental concepts of various microbes, methods of media preparation and cultivation	2	3	3	3	2
CO2	To understand the classification and diversity of microbes	2	3	1	2	2
CO3	To demonstrate the knowledge and critical understanding on the diverse microbial structure and morphology	2	2	2	2	2
CO4	Well versed in theoretical and practical aspects of fungal, algal and protozoan microbiology		2	3	3	2
CO5	Plan basic experiments on microbial cultivation, microbial genetics and numeration		2	2	2	3
	AVERAGE PO	**1.20**	**2.40**	**2.20**	**2.40**	**2.20**

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBTC 101	Molecular Cell Biology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	On completion of the course, learner will be able to understand cellular organization of prokaryotic and eukaryotic cells.	2	3	3	3	3
CO2	To correlate the process of cell cycle/signal transduction with carcinogenesis and programmed cell death	2	3	2	2	1
CO3	Understand the mechanism of DNA replication and repair in eukaryotes and prokaryotes	2	2	3	3	1
CO4	Understand the mechanism of post translational modification of proteins and their significance in sorting of proteins		2	1	2	2
CO5	Understand physical and chemical mutagens and its role in mutation.		2	2	2	3
	AVERAGE PO	1.20	2.40	2.20	2.40	2.00

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 101	Biochemistry					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Estimate the energy transfer for metabolic pathways of biological macromolecules and their components.	2	2	3	2	2
CO2	Understand the chemical reactions for synthesis and breakdown of carbohydrates, amino acids, purines and pyrimidine, and lipids.	2	2	1	2	1
CO3	Analyze the mechanistic basis for the action of selected enzymes, the thermodynamic basis for the folding and assembly of proteins and other macromolecules.		3	3	3	2
CO4	Describe the biochemistry of a variety of well-characterized human physiological processes.	2	3	2	2	2
CO5	Grasp key concepts of metabolic disorders and their therapeutic interventions.	1	2	2	2	3
	AVERAGE PO	1.40	2.40	2.20	2.40	2.00

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 102	Biochemical & Analytical Techniques					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Understand the advanced and modern techniques for basic and applied applications	3	2	3	3	3
CO2	Explain mechanistically isolation, purification, quantification techniques of biomolecules		3	1	2	1
CO3	Perform procedure to characterize the biomolecules.	2	2	3	3	2
CO4	Perform of characterization of cells and cellular components	3	3	2	3	3
CO5	Know about the various, electrophoresis, chromatographic, spectroscopic and radiotracer techniques	2	3	2	2	3
	AVERAGE PO	2.00	2.60	2.20	2.60	2.40

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 101	Practical - I					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Learn basic techniques used in microbiology laboratory.	1	1	3	1	1
CO2	Apply knowledge of staining to study microbes.	2	2	1	2	1
CO3	Isolate from microbes from various sources	2	2	3	3	2
CO4	prepare genomic DNA from various sources	3	3	3	3	3
CO5	Able to quantify DNA concentrations	3	3	2	3	3
	AVERAGE PO	2.20	2.20	2.40	2.40	2.00

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 102	Practical – II					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Learn basic techniques used in biochemistry and biotechnology	1	1	3	1	1
CO2	Apply knowledge of analytical techniques in applied research.	2	2	1	2	1
CO3	Learn about qualitative and quantitative analysis of biomolecules	2	2	3	3	2
CO4	Apply chromatographic techniques in advanced research	3	3	3	3	3
	AVERAGE PO	2.00	2.00	2.50	2.25	1.75

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBTC 201	Immunology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Provide students with a foundation in immunological processes;	1	3	3	2	2
CO2	to provide students with knowledge on how the immune system works building on their previous knowledge from biochemistry, genetics, cell biology and microbiology;	3	3	2	2	2
CO3	compare and contrast the innate versus adaptive immune systems and articulate the roles of innate recognition receptors (i.e. Toll-Like Receptors) in immune responses;	3	2	3	2	3
CO4	Compare and contrast humoral versus cell-mediated immune responses and distinguish various cell types involved in immune responses and associated functions.		2	2	1	2
CO5	Explore strategies to improve existing vaccines and how to approach these.	2	2	2	2	3
	AVERAGE PO	1.80	2.40	2.40	1.80	2.40

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 201	Enzymology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Obtain basic knowledges about the relationship between properties and structure of the enzymes, their mechanism of action and kinetics of enzymatic reactions.	3	2			
CO2	Characterize the enzymes in each enzymatic class, examples of such enzymes and their application in practice.	2	2		2	1
CO3	Understand the regulatory mechanisms of enzyme activity, enzyme inducers and represors.	1	2			
CO4	Acquire they have knowledges in the field of biosensors and immobilized systems. At the end of the course will be presented use of enzymes in medicine, food, organic synthesis, genetics and other areas sectors.			2	2	2
CO5	Acquire theoretical and experimental knowledge thus enabling students to find appropriate employment in different development, scientific-research laboratories.	1		3	2	1
	AVERAGE PO	**1.40**	**1.20**	**1.00**	**1.20**	**0.80**

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 204	Clinical & Nutritional Biochemistry					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Knowledge about nutritional aspect of food biomolecules.	3			1	
CO2	To gain knowledge of protein, mineral and vitamin deficiency disorders.	2		2		
CO3	To understand the different metabolic disorders and syndromes		2	1		2
CO4	To learn about physiological disorders and functional tests related to liver, kidney and heart	2			2	1
CO5	Identify the role of enzymes used in diagnosis of diseases		2	2		2
	AVERAGE PO	**1.40**	**0.80**	**1.00**	**0.60**	**1.00**

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 202	Molecular Biology & Microbial Genetics					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Describe the structure and function of DNA and RNA in a cell. Elucidate central cell biological processes and how they are regulated (for example: replication and protein synthesis and gene expression).	3			1	
CO2	Explain DNA repair and recombination in terms of mutation and evolution.	2		2		
CO3	Explaining process involved in genetic changes and mutations. The identification of genetic regulatory mechanism and distinguishing different mechanism of gene regulation.		2	1		2
CO4	Designing different techniques based on utilizing the genetic mechanism of microbes	2			2	1
CO5	understand about the genetic of microbes		2	2		2
	AVERAGE PO	1.40	0.80	1.00	0.60	1.00

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBTC 202	**Recombinant DNA Technology & Genomics**					
CO#	At the end of the course the students will be able to:	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	Understand the difference between old biotechnology and modern biotechnology Technical know-how on versatile techniques in recombinant DNA technology.	3	3	3	3	3
CO2	Design an experiment with step-by-step instructions to address a research problem.	2	2	1	2	1
CO3	Provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic.	2	2	3	2	2
CO4	Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products		1	1	2	2
CO5	Explain the general principles of generating transgenic plants, animals and microbes.		2	2	1	2
CO6	An understanding on application of genetic engineering techniques in basic and applied experimental biology	2	2	2	1	3
	AVERAGE PO	**1.50**	**2.00**	**2.00**	**1.83**	**2.17**

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 201	Practical - III					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Skillful handling and estimating blood samples.	1	1	3	1	1
CO2	Practically learn and understand the antigen-antibody interaction by Double Immunodiffusion method, Ouchterlony's method, Immuno-electrophoresis, Western Blotting and ELISA	2	2	1	2	1
CO3	Learning techniques involved to determine enzyme activity and kinetics; purification of enzyme for further research and applications	2	2	3	3	2
CO4	Explain the principle and working of basic instruments in analytical laboratory.	3	3	3	3	3
CO5	Concept and techniques for various immunological assays.	3	3	2	3	3
	AVERAGE PO	2.20	2.20	2.40	2.40	2.00

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 202	Practical - IV					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Skillful handling and estimating protein and enzymes activity.	1	1	3	1	1
CO2	Practically learn and understand the different methods of purification of enzymes and recovery of active enzyme for further research and applications.	2	2	1	2	1
CO3	Learning techniques involved to determine enzyme activity and kinetics.	2	2	3	3	2
CO4	Explain the principle and working of basic instruments in analytical laboratory.	3	3	3	3	3
CO5	Concept and techniques for various enzymatic assays.	3	3	2	3	3
	AVERAGE PO	2.20	2.20	2.40	2.40	2.00

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC 301	Environmental Biochemistry & Toxicology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Understand Ecology, Hydrosphere, Aqueous organic matter, Humic Material, Metals and Semi-Metals in Hydrosphere and Micro-biological processes of the environment.	2		1		2
CO2	Analyze the fundamentals of biochemistry related to the environment and specific knowledge of related to toxic compounds and their biochemical pathways.	2	1			
CO3	Find out the possibilities related to toxin bio-magnification, bio-transformation and its applications towards industrial as well as human population.	1	1	2	1	1
CO4	Describe the various components of ecosystem and the relationship between the environmental factors and human health.		2		3	2
	AVERAGE PO	1.25	1.00	0.75	1.00	1.25

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCC302	Plant Biochemistry					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	The student will be able to familiarize with the structure and function of cell and its organelles. Learn the relationship between plant cell and water.	2		1	1	
CO2	The student will be able to describe the role of secondary metabolites.		2			1
CO3	At the end of the program, the student will be able to analyze the Nitrogen cycle and Nitrogen fixation. Investigate the role and mode of action of plant regulators.	1		1		
CO4	To understand and analyze the biosynthesis and role of hormones in plant growth and development.		1		2	1
CO5	Now student will be able to demonstrate structure function and application of natural products of plant.	1		1	1	1
	AVERAGE PO	0.80	0.60	0.60	0.80	0.60

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBTC 303	Molecular Endocrinology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Understand the history and evolution of hormonal system and acquire knowledge of the structure, composition, function and disorders related to the hormones.		2	1		1
CO2	Identify the organs involved in endocrine function, will know the major hormones that are produced by these organs and will know the physiological effect of these hormones.	1			2	
CO3	Describe the elements of the molecular mechanisms of action of many of these mediators and biochemical and signaling events at the cellular and whole animal level.		2	1		2
CO4	Understand the specific and appropriate key of human endocrine disorders, symptoms, diagnostics and possible treatment and medication.	2		2	1	1
	AVERAGE PO	0.75	1.00	1.00	0.75	1.00

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCE 301	Bioinformatics, System Biology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	The students will be imparted basic knowledge of Bioinformatics based databases and tools.	3				
CO2	Gain knowledge about molecular phylogenetic methods.	2		2		
CO3	Learn application of Bioinformatics in DNA and protein sequence analysis			3		2
CO4	Learn application of Bioinformatics in Genomics and Proteomics based analysis		2	3		1
CO5	Basic concepts in Systems Biology including metabolic pathways network and genetic controls.		2	2		3
	AVERAGE PO	1.00	0.80	2.00	0.40	2.20

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCE 302	Medicinal Chemistry & Natural Products					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Understand drug designing and development of various biological active agents and their mode of action.	3	1		1	1
CO2	Understand the effect of the drug into the body and what the body does to the drug, role of drugs to inhibit the particular enzymes and treatment of disease, and chemistry and biological activities of various natural products.	2	3			1
CO3	Learn about Antineoplastic Agents & Psychopharmacological Agents	1		2	2	
CO4	Understand about the chemistry and biosynthesis of Glycosides		1		1	2
	AVERAGE PO	1.50	1.25	0.50	1.00	1.00

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 301	Food Technology					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	To understand and analyze the role of different microbes in food preparation and food spoilage and intoxication	3	3	3	3	3
CO2	Understand the history and evolution of food processing. Acquire knowledge of the structure, composition, nutritional quality and post-harvest changes in various plant foods	2	3	1	2	1
CO3	Understand the structure and composition of various animal foods	2	2	3	3	2
CO4	Get an overview of some of the methods of processing of plant and animal foods		2	1	3	2
CO5	To demonstrate the knowledge and understanding of diverse microbes in food preparation and industrial fermentation		2	2	2	3
	AVERAGE PO	1.40	2.40	2.00	2.60	2.20

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 301	Practical - V					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Learn the principle and techniques in the field of advance biotechnology such as; vaccine development, environmental, bioinformatics.	3		1		
CO2	Acquire basic practical skills related to genomics, proteomics and metabolic engineering.	2		2		
CO3	Acquire skills related to microbial cell cultivation for conducting various applications of fermentation in industry and research.		1	3	1	2
CO4	Apply the acquired practical in advance research and industries	2		3	1	1
	AVERAGE PO	1.75	0.25	2.25	0.50	0.75

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCP 302	Practical - VI					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Learn the principle and techniques in the field of advance biotechnology such as; vaccine development, environmental, bioinformatics.	3		1		
CO2	Acquire basic practical skills related to genomics, proteomics and metabolic engineering.	2		2		
CO3	Acquire skills related to microbial cell cultivation for conducting various applications of fermentation in industry and research.		1	3	1	2
CO4	Apply the acquired practical in advance research and industries	2		3	1	1
	AVERAGE PO	1.75	0.25	2.25	0.50	0.75

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBTE 401	Biostatistics, Research Methodology & IPR					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	This course will help students to plan, execute and understand their research and complex outcome of their results using bio-statistical approaches in the testing of hypothesis, designing of experiments, analyzing experimental data and interpretation of the results.	3	3	3	3	3
CO2	To learn about the basis bioinformatics tools and its application in various applied fields of biosciences	2	3	1	2	1
CO3	The students will be able to understand the fundamental methodology to carry our research.	2	2	3	3	2
CO4	To learn about experimental design and its importance		2	1	3	2
CO5	To understand IPR and Patents.		2	2	2	3
	AVERAGE PO	1.40	2.40	2.00	2.60	2.20

Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCS 401	Seminars					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Carry out literature survey and compile existing data and information.	2	2	1	3	3
CO2	Formulate a research problem in research laboratory.	2	2	1	1	1
CO3	Design experiments to solve research problem.	2	1	2	2	2
CO4	Make a presentation of compiled data and its interpretation to a meaningful conclusion.		3	3	3	2
CO5	Acquire presentation and oral communication skills of scientific information and data		3	3	3	3
	AVERAGE PO	1.20	2.20	2.00	2.40	2.20

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Course Code	Course Title	CO-PO Mapping (Articulation Matrix)				
MBCE 401	Research Project / Dissertation					
CO#	At the end of the course the students will be able to:	PO1	PO2	PO3	PO4	PO5
CO1	Identify a problem in microbiology based industry.	2	3	3	3	2
CO2	Formulate a research problem in research laboratory	2	3	3	2	2
CO3	Design experiments to solve the industrial/research problem.	2	3	3	3	3
CO4	Compile and/or interpret the industrial data.	2	2	2	3	3
CO5	Analyze and interpret the experimental data	3	2	2	3	3
	AVERAGE PO	**2.20**	**2.60**	**2.60**	**2.80**	**2.60**

C. Program Outcome Reference Values:

Following table calculates the overall average of all POs of the Courses and is referred as Course-wise Average of POs Reference values.

SR. No.	Course Code	Course Title	PO1	PO2	PO3	PO4	PO5
1	MMBC 101	General Microbiology	1.200	2.400	2.200	2.400	2.200
2	MBTC 101	Molecular Cell Biology	1.200	2.400	2.200	2.400	2.000
3	MBCC 101	Biochemistry	1.400	2.400	2.200	2.200	2.000
4	MBCC 102	Biochemical & Analytical Techniques	2.000	2.600	2.200	2.600	2.400
5	MBCP 101	Practical - I	2.200	2.200	2.400	2.400	2.000
6	MBCP 102	Practical - II	2.000	2.000	2.500	2.250	1.750
7	MBTC 201	Immunology	1.800	2.400	2.400	1.800	2.400
8	MBCC 201	Enzymology	1.400	1.200	1.000	1.200	0.800
9	MBCC 204	Clinical & Nutritional Biochemistry	1.400	1.200	1.000	1.200	0.800
10	MBCC 202	Molecular Biology & Microbial Genetics	1.400	0.800	1.000	0.600	1.000
11	MBTC 202	Recombinant DNA Technology & Genomics	1.500	2.000	2.000	1.833	2.167
12	MBCP 201	Practical - III	2.2	2.2	2.4	2.4	2
13	MBCP 202	Practical - IV	2.200	2.200	2.400	2.400	2.000

14	MBCC 301	Environmental Biochemistry & Toxicology	1.250	1.000	0.750	1.000	1.250
15	MBCC302	Plant Biochemistry	0.800	0.600	0.600	0.800	0.600
16	MBTC 303	Molecular Endocrinology	0.750	1.000	1.000	0.750	1.000
17	MBCE 301	Bioinformatics, System Biology	1.000	0.800	2.000	0.400	1.200
18	MBCE 302	Medicinal Chemistry & Natural Products	1.500	1.250	0.500	1.000	1.000
19	MBCE 304	Food Technology	1.400	2.400	2.000	2.600	2.200
20	MBCP 301	Practical - V	1.750	0.250	2.250	0.500	0.750
21	MBCP 302	Practical - VI	1.750	0.250	2.250	0.500	0.750
22	MBTE 401	Biostatistics, Research Methodology & IPR	1.400	2.400	2.000	2.600	2.200
23	MBCS 401	Seminars	1.200	2.200	2.000	2.400	2.200
24	MBCE 401	Research Project / Dissertation	2.200	2.600	2.600	2.800	2.600
Combined Course-wise Average of POs Reference values			**1.538**	**1.698**	**1.827**	**1.710**	**1.636**

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D. Assessment of CO and PO Attainment Value

The attainment of the course outcome is measured at the level of 3 as follows:

Attainment Levels	Criteria
3	If **80%** of student achieves marks **greater** than threshold percentage of the total score of assessment
2	If **70%** of student achieves marks **greater** than threshold percentage of the total score of assessment
1	If **60%** of student achieves marks **greater** than threshold percentage of the total score of assessment
0	If **60%** of student achieves marks **less** than threshold percentage of the total score of assessment

Attainment level of COs is measured through direct attainment of COs depending on the performance of the students in Internal Assessment (IA) and End Semester Examination (ESE) individually. For the program the threshold percentage is set at 50% for ESE and 60% for IA. assessments. The weightage of attainments for IA and ESE is in proportion of 40: 60.

Sr. No.	Course Code	Course Title	Attainment of COs	Derived Attainment of POs Course-wise				
				PO1	PO2	PO3	PO4	PO5
1	MMBC 101	General Microbiology	**3.00**	1.20	2.40	2.20	2.40	2.20
2	MBTC 101	Molecular Cell Biology	**3.00**	1.20	2.40	2.20	2.40	2.00
3	MBCC 101	Biochemistry	**3.00**	1.40	2.40	2.20	2.20	2.00
4	MBCC 102	Biochemical & Analytical Techniques	**1.80**	1.20	1.56	1.32	1.56	1.44
5	MBCP 101	Practical - I	**3.00**	2.20	2.20	2.40	2.40	2.00
6	MBCP 102	Practical - II	**3.00**	2.00	2.00	2.50	2.25	1.75
7	MBTC 201	Immunology	**3.00**	1.80	2.40	2.40	1.80	2.40

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8	MBCC 201	Enzymology	**3.00**	1.40	1.20	1.00	1.20	0.80
9	MBCC 204	Clinical & Nutritional Biochemistry	**3.00**	1.40	1.20	1.00	1.20	0.80
10	MBCC 202	Molecular Biology & Microbial Genetics	**3.00**	1.40	0.80	1.00	0.60	1.00
11	MBTC 202	Recombinant DNA Technology & Genomics	**3.00**	1.50	2.00	2.00	1.83	2.17
12	MBCP 201	Practical - III	**3.00**	2.20	2.20	2.40	2.40	2.00
13	MBCP 202	Practical - IV	**3.00**	2.20	2.20	2.40	2.40	2.00
14	MBCC 301	Environmental Biochemistry & Toxicology	**3.00**	1.25	1.00	0.75	1.00	1.25
15	MBCC302	Plant Biochemistry	**3.00**	0.80	0.60	0.60	0.80	0.60
16	MBTC 303	Molecular Endocrinology	**3.00**	0.75	1.00	1.00	0.75	1.00
17	MBCE 301	Bioinformatics, System Biology	**3.00**	1.00	0.80	2.00	0.40	1.20
18	MBCE 302	Medicinal Chemistry & Natural Products	**3.00**	1.50	1.25	0.50	1.00	1.00
19	MBCE 304	Food Technology	**3.00**	1.40	2.40	2.00	2.60	2.20
20	MBCP 301	Practical - V	**3.00**	1.75	0.25	2.25	0.50	0.75
21	MBCP 302	Practical - VI	**3.00**	1.75	0.25	2.25	0.50	0.75
22	MBTE 401	Biostatistics, Research Methodology & IPR	**3.00**	1.40	2.40	2.00	2.60	2.20
23	MBCS 401	Seminars	**3.00**	1.20	2.20	2.00	2.40	2.20

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24	MBCE 401	Research Project / Dissertation	**3.00**	2.20	2.60	2.60	2.80	2.60
Course-wise Average of POs Achievement Through Results				**1.50**	**1.65**	**1.79**	**1.67**	**1.60**
Course-wise Average of POs Reference values				**1.538**	**1.698**	**1.827**	**1.710**	**1.636**
Percentage Attainment of PO's				**98%**	**97%**	**98%**	**97%**	**98%**

From the Attainment level of CO, the Derived PO's value for course is calculated as follows:

$$Derived\ PO\ Value = \frac{CO\ attaintment \times respective\ PO\ average}{3}$$

Depending on derived PO values of the courses, calculate the Course-wise Average of POs achievement for each PO.
Calculate the percentage attainment of PO's as follows:

$$Percentage\ attainment\ of\ PO's = \frac{Average\ PO\ Attainment\ through}{average\ PO\ refrenece\ value} \times 100$$