

| | | | | | | | | | | | | | | | | | | | |
|--|---------------|------------|---|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | C107.3 | CO3 | Develop Python programs step-wise by defining functions and calling them. | CO3 | 3 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C107.4 | CO4 | Use Python lists, tuples, dictionaries for representing compound data. | CO4 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C107.5 | CO5 | Read and write data from/to files in Python. | CO5 | 1 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Average | 2.20 | 1.80 | 1.80 | 1.20 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| 8 | Subject Name | BS8161 PHYSICS AND CHEMISTRY LABORATORY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|---------------|---|---|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | | | Course Outcomes | | | | | | | | | | | | | | | | |
| | C108.1 | CO1 | apply principles of elasticity, optics and thermal properties for engineering application | CO1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C108.2 | CO2 | Able to understand the working principle of laser components and working of different | CO2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C108.3 | CO3 | The students will be outfitted with hands-on knowledge in the quantitative chemical | CO3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Average | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| | | | | | | | | | | | | | | | | | | | |
|--|--------|-----|--|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | C117.3 | CO3 | Carry out the basic machining operations | CO3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C117.4 | CO4 | Make the models using sheet metal works | CO4 | 3 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C117.5 | CO5 | Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings | CO5 | 3 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C117.6 | CO6 | Carry out basic home electrical works and appliances | CO6 | 2 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 |
| | C117.7 | CO7 | Measure the electrical quantities | CO7 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C117.8 | CO8 | Elaborate on the components, gates, soldering practices | CO8 | 3 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 |
| | | | | Average | 2.57 | 1.71 | 1.75 | 1.00 | 2.40 | 0.00 | 0.00 | 0.00 | 2.50 | 2.50 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 |

| 8 | Subject Name | | BT8261 Biochemistry Laboratory | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C118.1 | CO1 | Understand the chemical basis of life which involves the importance of water, biolog | CO1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | |
| | C118.2 | CO2 | Comprehend the structure and functions of biomolecules | CO2 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | |
| | C118.3 | CO3 | Cognize the action and regulations of enzymes | CO3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 1 | 0 | 3 | 0 | 3 | 3 | 3 | 3 | |
| | C118.4 | CO4 | Relate the interconnection of different metabolic pathways | CO4 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 3 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | |
| | C118.5 | CO5 | Realize the importance of ATP and other high energy compounds | CO5 | 2 | 2 | 0 | 0 | 0 | 3 | 1 | 1 | 3 | 1 | 0 | 3 | 3 | 3 | 3 | |
| | | | | Average | 2.40 | 2.40 | 2.00 | 2.50 | 2.50 | 3.00 | 2.00 | 1.40 | 1.50 | 2.60 | 0.00 | 3.00 | 3.00 | 3.00 | 3.00 | |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Course Outcomes

CO, PO & PSO Mapping for the ODD Semester of Academic Year 2019-2020 for the Batch 2018-2022 for R2017

2019 - 2020 (ODD Semester) II Year / III Semester (2018 - 2022 Batch)

| MADHA ENGINEERING COLLEGE Department of Biotechnology Attainment of Course Outcomes CO, PO & PSO Mapping for the ODD Semester of Academic Year 2019-2020 for the Batch 2018-2022 for R2017 2019 - 2020 (ODD Semester) II Year / III Semester (2018 - 2022 Batch) | | | | | | | | | | | | | | | | | | | | |
|--|-----------------|-----|---|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | Subject Code | | MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | Course Outcomes | | | | | | | | | | | | | | | | | | | |
| | C201.1 | CO1 | Understand how to solve the given standard partial differential equations. | CO1 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 3 | 2 |
| | C201.2 | CO2 | Solve differential equations using Fourier series analysis which plays a vital role in engineering applications | CO2 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 3 | 1 |
| | C201.3 | CO3 | Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations | CO3 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 |
| | C201.4 | CO4 | Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. | CO4 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| | C201.5 | CO5 | Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems | CO5 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| | | | | Average | 3.00 | 3.00 | 2.60 | 2.40 | 2.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.40 | 2.00 | 0.00 | 2.33 | 1.50 |
| 2 | Subject Name | | BT8301 STOICHIOMETRY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | Course Outcomes | | | | | | | | | | | | | | | | | | | |
| | C202.1 | CO1 | Understand basic chemical calculations | CO1 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 1 |
| | C202.2 | CO2 | Solve problems related to units and conversions and fit the given data using the methodologies | CO2 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 2 |
| | C202.3 | CO3 | Solve problems related to material balance concepts & design reactors for biochemical processes | CO3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | C202.4 | CO4 | Solve problems related to energy balance concepts & design reactors for biochemical processes | CO4 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 3 | 0 |
| | C202.5 | CO5 | Apply their knowledge in the field of biochemical engineering from the principles of thermodynamics | CO5 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 |
| | | | | Average | 3.00 | 3.00 | 2.60 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 3.00 | 0.00 | 0.00 | 3.00 | 1.50 |
| 3 | Subject Name | | BT8302 APPLIED THERMODYNAMICS FOR BIOTECHNOLOGISTS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | Course Outcomes | | | | | | | | | | | | | | | | | | | |
| | C203.1 | CO1 | To explain the theoretical concepts of thermodynamics and how it applies to energy conversion in technological applications and biological systems. | CO1 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 |
| | C203.2 | CO2 | To demonstrate the capability to analyze the energy conversion performance in a variety of modern applications in biological systems. | CO2 | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| | C203.3 | CO3 | To design and carry out bioprocess engineering experiments, and analyze and interpret fundamental data to do the design and operation of bioprocesses. | CO3 | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 |
| | C203.4 | CO4 | To describe the criteria when two phases coexist in equilibrium and the vapour liquid equilibrium calculations microbial growth and product formation. | CO4 | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 |
| | C203.5 | CO5 | To understand the thermodynamics of Microbial growth | CO5 | 3 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| | | | | Average | 3.00 | 3.00 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 1.50 |

| 4 | Subject Name | | | BT8303 BASIC INDUSTRIAL BIOTECHNOLOGY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|-----------------|-----|--|---------------------------------------|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C204.1 | CO1 | To explain the steps involved in the production of bioproducts and methods to improve modern biotechnology. | CO1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | | |
| | C204.2 | CO2 | To apply basic biotechnological principles, methods and models to solve biotechnological tasks | CO2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | |
| | C204.3 | CO3 | To produce industrial need medicinal products | CO3 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | |
| | C204.4 | CO4 | To identify and debate the ethical, legal, professional, and social issues in the field of biotechnology | CO4 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | |
| | C204.5 | CO5 | To design and deliver useful modern biotechnology products to the Society.. | CO5 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | | |
| | | | | Average | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | | |
| 5 | | | | | | | | | | | | | | | | | | | | | |
| 5 | Subject Name | | | BT8304 BIOORGANIC CHEMISTRY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C205.1 | CO1 | learn the basics principles of chemical Bonding, Stereochemistry of Bio-organic molecules | CO1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | | |
| | C205.2 | CO2 | To ensure students have a strong foundation in the structure and reactions of Biomolecules. | CO2 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | | |
| | C205.3 | CO3 | To understand the kinetics of Bio-organic molecules | CO3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 1 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | | |
| | C205.4 | CO4 | mechanisms of reactions and catalysis. | CO4 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 3 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | | |
| | C205.5 | CO5 | To gain knowledge onBiochemical rections | CO5 | 2 | 2 | 0 | 3 | 3 | 3 | 1 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | 3 | | |
| | | | | Average | 2.20 | 2.40 | 2.00 | 2.67 | 2.67 | 3.00 | 2.00 | 1.67 | 2.00 | 3.00 | 0.00 | 3.00 | 3.00 | 3.00 | 3.00 | | |
| 6 | | | | | | | | | | | | | | | | | | | | | |
| 6 | Subject Name | | | BT8305 CELL BIOLOGY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C206.1 | CO1 | Would have deeper understanding of cell at structural and functional level. | CO1 | 1 | 0 | 0 | 3 | 3 | 0 | 2 | 0 | 3 | 3 | 0 | 3 | 3 | 2 | 3 | 0 | |
| | C206.2 | CO2 | Would have broad knowledge on the molecular interaction between cells. | CO2 | 2 | 3 | 3 | 3 | 3 | 0 | 2 | 0 | 3 | 3 | 0 | 2 | 3 | 3 | 2 | 0 | |
| | C206.3 | CO3 | Would demonstrate a clear understanding of the signal transduction, s | CO3 | 2 | 2 | 2 | 3 | 3 | 0 | 2 | 0 | 3 | 3 | 0 | 2 | 2 | 3 | 0 | 1 | |
| | C206.4 | CO4 | To understand about the secondary • messengers. | CO4 | 2 | 2 | 2 | 3 | 3 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 3 | 1 | 0 | |
| | C206.5 | CO5 | Would develop skill on working principles of microscopy and identification of cell types. | CO5 | 3 | 3 | 2 | 3 | 2 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 3 | |
| | | | | Average | 2.00 | 2.50 | 2.25 | 3.00 | 2.80 | 0.00 | 2.00 | 0.00 | 3.00 | 3.00 | 0.00 | 2.33 | 2.80 | 2.80 | 2.00 | 2.00 | |
| 7 | | | | | | | | | | | | | | | | | | | | | |
| 7 | Subject Name | | | BT8361 MICROBIOLOGY LABORATORY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C207.1 | CO1 | Understand the advanced technical information pertaining to laboratory bio-safety and preventive measures from pathogenic microorganism. | CO1 | 1 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 2 | 0 | |
| | C207.2 | CO2 | Know the various aseptic techniques and sterilization methods | CO2 | 3 | 2 | 2 | 3 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 2 | 0 | |

| | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------|---|---|------------------------|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | C207.3 | CO3 | Develop the minimum skills to work on several important techniques for the study of microorganisms in the laboratory. | CO3 | 3 | 2 | 3 | 3 | 3 | 0 | 0 | 0 | 1 | 3 | 0 | 3 | 3 | 0 | 2 | 0 |
| | | | | Average | 2.33 | 2.00 | 2.67 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 2.33 | 3.00 | 0.00 | 3.00 | 3.00 | 0.00 | 2.00 | 0.00 |
| | | | | | | | | | | | | | | | | | | | | |
| 8 | Subject Name | BT8311 CELL BIOLOGY LABORATORY | | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C208.1 | CO1 | To understand the basic techniques to work with cells | CO1 | 1 | 1 | 3 | 2 | 3 | 0 | 0 | 0 | 2 | 3 | 0 | 3 | 3 | 0 | 2 | 0 |
| | C208.2 | CO2 | To demonstrate working principles of Microscopy | CO2 | 3 | 2 | 2 | 3 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 0 | 2 | 0 |
| | C208.3 | CO3 | To understand and perform cell staining techniques | CO3 | 3 | 2 | 3 | 3 | 3 | 0 | 0 | 0 | 1 | 3 | 0 | 3 | 3 | 0 | 2 | 0 |
| | C208.4 | CO4 | To identify the various stages of mitosis | CO4 | 2 | 2 | 0 | 2 | 2 | 1 | 0 | 3 | 1 | 3 | 0 | 3 | 3 | 3 | 3 | 3 |
| | | | | Average | 2.25 | 1.75 | 2.67 | 2.50 | 2.75 | 2.00 | 0.00 | 3.00 | 1.75 | 3.00 | 0.00 | 3.00 | 3.00 | 3.00 | 2.25 | 3.00 |
| | | | | | | | | | | | | | | | | | | | | |
| 9 | Subject Name | HS8381 INTERPERSONAL SKILLS/LISTENING AND SPEAKING | | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C209.1 | CO1 | Listen and respond appropriately | CO1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C209.2 | CO2 | Participate in group discussions | CO2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C209.3 | CO3 | Make effective presentations | CO3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C209.4 | CO4 | Participate confidently and appropriately in conversations both formal and informal | CO4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Average | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | | | | | | | | | | | | | | | | | | | |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Course Outcomes

CO, PO & PSO Mapping for the Even Semester of Academic Year 2019-2020 for the Batch 2018-2022 for R2017

2019 - 2020 (Even Semester) II Year / IV Semester (2018 - 2022 Batch)

| 1 | | Subject Code | MA8391 PROBABILITY AND STATISTICS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|--------|-----------------|---|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | Course Outcomes | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C211.1 | CO1 | Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. | CO1 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| | C211.2 | CO2 | Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. | CO2 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 |
| | C211.3 | CO3 | Apply the concept of testing of hypothesis for small and large samples in real life problems. | CO3 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 2 | 0 |
| | C211.4 | CO4 | Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control. | CO4 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 2 | 0 |
| | C211.5 | CO5 | Have the notion of sampling distributions and statistical techniques used in engineering and management problems. | CO5 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 2.60 | 0.00 | 0.00 | 2.33 | 1.00 |
| 2 | | Subject Name | BT8401 FLUID MECHANICS AND HEAT TRANSFER OPERATIONS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | | Course Outcomes | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C212.1 | CO1 | The students will be able to get a basic knowledge of fluids in static, kinematic and dynamic equilibrium | CO1 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | C212.2 | CO2 | The students will be able to understand the flow of fluid | CO2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | C212.3 | CO3 | They gain knowledge about process of heat transfer | CO3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | C212.4 | CO4 | They will also gain the knowledge of the applicability of physical laws in addressing problems in hydraulics. | CO4 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | C212.5 | CO5 | They get basic knowledge on heat transfer equipments | CO5 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 3 | 0 |
| | | | | Average | 3.00 | 3.00 | 2.60 | 2.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 | 3.00 | 0.00 |
| 3 | | Subject Name | BT8402 MOLECULAR BIOLOGY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | | Course Outcomes | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C213.1 | CO1 | Describe the basic structure and biochemistry of nucleic acids and proteins and discriminate between them | CO1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 2 |
| | C213.2 | CO2 | Identify the principles of DNA replication, transcription and translation and explain how they relate to each other | CO2 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 2 | 3 | 1 | 2 |
| | C213.3 | CO3 | Discuss clearly about gene organization and mechanisms of control the gene expression in various organisms | CO3 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 1 | 3 | 2 | 3 |
| | C213.4 | CO4 | Articulate applications of molecular biology in the modern world | CO4 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 2 | 2 | 3 | 0 |
| | C213.5 | CO5 | have the necessary understanding on various gene expression | CO5 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 3 | 2 | 0 |
| | | | | Average | 2.00 | 1.25 | 2.80 | 2.50 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.60 | 1.50 | 2.60 | 2.00 | 2.33 |

| 4 | Subject Name | | BT8403 ENZYME TECHNOLOGY AND BIO-TRANSFORMATIONS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C214.1 | CO1 | The knowledge on enzyme and enzyme reactions will be the key step in to proceed towards | CO1 | 2 | 1 | 2 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 3 | 1 | |
| | C214.2 | CO2 | The theoretical and practical aspects of kinetics will provide the importance and utility of enz | CO2 | 3 | 3 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 3 | 2 | |
| | C214.3 | CO3 | The process of immobilization has been increased steadily in food, pharmaceutical and chem | CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 2 | |
| | C214.4 | CO4 | Ideas on Processing, Production and Purification of enzymes at an industrial scale will be hel | CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 1 | 2 | |
| | C214.5 | CO5 | The understanding of applications of enzymes | CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 2 | 1 | |
| | | | | Average | 2.80 | 2.60 | 2.60 | 3.00 | 2.40 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 2.80 | 1.60 | 2.40 | 1.60 |
| 5 | Subject Name | | BT8404 BIOPROCESS PRINCIPLES | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C215.1 | CO1 | To understand the basics of fermentation | CO1 | 3 | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 2 | 1 | 3 |
| | C215.2 | CO2 | to gain knowledge about the principles of bioprocess | CO2 | 3 | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 2 | 1 | 3 |
| | C215.3 | CO3 | Apply engineering principles to systems containing biological catalysts to meet the needs of | CO3 | 3 | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 1 | 1 | 2 |
| | C215.4 | CO4 | Examine the metabolic process of microbes | CO4 | 3 | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 2 | 2 | 1 |
| | C215.5 | CO5 | Convert the promises of molecular biology and genetic engineering into new processes to m | CO5 | 3 | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 2 | 0 | 0 |
| | | | | Average | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 3.00 | 0.00 | 1.80 | 1.25 | 2.25 |
| 6 | Subject Name | | GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C216.1 | CO1 | To understand the ecosystem | CO1 | 2 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C216.2 | CO2 | Environmental Pollution or problems cannot be solved by mere laws. Public participation is d | CO2 | 3 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C216.3 | CO3 | Public awareness of environmental is at infant stage. | CO3 | 3 | 1 | 2 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C216.4 | CO4 | Ignorance and incomplete knowledge has lead to misconceptions | CO4 | 2 | 2 | 2 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C216.5 | CO5 | Development and improvement in std. of living has lead to serious environmental disasters | CO5 | 2 | 2 | 2 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | | | | Average | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | |
| 7 | Subject Name | | BT8411 CHEMICAL ENGINEERING LABORATORY FOR BIOTECHNOLOGISTS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C217.1 | CO1 | Have knowledge on the basic principles of chemical engineering | CO1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | |
| | C217.2 | CO2 | Be able to apply the skill of material balance and energy balance in unit operations unit proc | CO2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | |

| 4 | Subject Name | | BT8503 PROTEIN ENGINEERING | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
|---|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C304.1 | CO1 | To analyze the various interactions in protein makeup | CO1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | |
| | C304.2 | CO2 | To be familiar with different levels of protein structure. | CO2 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | |
| | C304.3 | CO3 | To know the role of functional proteins in various field of study | CO3 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | |
| | C304.4 | CO4 | To practice the latest application of protein science in their research. | CO4 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | |
| | C304.5 | CO5 | To gain knowledge about proteomics | CO5 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | |
| | | | | Average | 1.20 | 1.40 | 1.00 | 1.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 1.00 | 1.00 | 1.50 | 1.00 | |
| 5 | Subject Name | | BT8003 Principles of Food Processing | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C305.1 | CO1 | Different constituents present in food and microorganism involved in processing of food. | CO1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | |
| | C305.2 | CO2 | To gain knowledge of food additives | CO2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | |
| | C305.3 | CO3 | Principles and different preservations techniques of food can also be known. | CO3 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | |
| | C305.4 | CO4 | To know the concept of food infection | CO4 | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | | |
| | C305.5 | CO5 | Unit operations in modern food processing and impact of the process on food quality | CO5 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | | |
| | | | | Average | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | | |
| 6 | Subject Name | | Environmental and Agricultural | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C306.1 | CO1 | Students will appreciate the role of environment in the current practice of agriculture and concerns of sustainability, especially in the context of climate change and emerging global issues | CO1 | 2 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C306.2 | CO2 | Ecological context of agriculture and its concerns will be understood | CO2 | 3 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C306.3 | CO3 | To understand about climate change | CO3 | 3 | 1 | 2 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C306.4 | CO4 | To gain knowledge about ecological diversity | CO4 | 2 | 2 | 2 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | C306.5 | CO5 | To understand and analyze the environmental issues. | CO5 | 2 | 2 | 2 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| | | | | Average | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | |
| 7 | Subject Name | | BT8511 - BIOPROCESS LABORATORY I | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C307.1 | CO1 | Explain about Enzyme kinetics and characterization and how to use them for practical applications | CO1 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 3 | 0 |
| | C307.2 | CO2 | Evaluate the growth kinetics of microorganisms and become adept with medium optimization techniques. | CO2 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 2 | 0 |

MADHA ENGINEERING COLLEGE
Department of Biotechnology
Attainment of Course Outcomes
CO, PO & PSO Mapping for the Even Semester of Academic Year 2020-2021 for the Batch 2018-2022 for R2017
2020 - 2021(Even Semester) III Year / VI Semester (2018 - 2022 Batch)

| 1 | Subject Code | | BT8651 BIOINFORMATICS | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|-----------------|-----|---|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C311.1 | CO1 | Develop bioinformatics tools with programming skills | CO1 | 3 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 1 |
| | C311.2 | CO2 | Apply computational based solutions for biological perspectives | CO2 | 3 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 2 | 2 |
| | C311.3 | CO3 | Pursue higher education in this field. | CO3 | 3 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 3 |
| | C311.4 | CO4 | Practice life-long learning of applied biological science. | CO4 | 3 | 3 | 3 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 |
| | C311.5 | CO5 | To gain knowledge on programming | CO5 | 3 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 3 | 2 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 1.80 | 1.40 | 2.20 | 2.00 |
| 2 | Subject Name | | BT8601 GENETIC ENGINEERING | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C312.1 | CO1 | The students after completing this course would be aware of how to clone commercially important genes | CO1 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 3 | 3 | 3 | 3 |
| | C312.2 | CO2 | The students would be aware of how to produce the commercially important recombinant proteins. | CO2 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 3 | 3 | 3 | 1 |
| | C312.3 | CO3 | The students would be aware of gene and genome sequencing techniques. | CO3 | 0 | 3 | 0 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 3 | 3 |
| | C312.4 | CO4 | The students would be aware of microarrays, Analysis of Gene expression and proteomics | CO4 | 0 | 3 | 0 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 3 | 3 | 2 | 3 |
| | C312.5 | CO5 | The students gain knowledge on genome sequencing | CO5 | 0 | 3 | 0 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 3 | 3 | 3 | 3 |
| | | | | Average | 0.00 | 3.00 | 0.00 | 2.40 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | 2.00 | 3.00 | 2.80 | 3.00 | 2.80 | 2.60 |
| 3 | Subject Name | | BT8691 APPLIED CHEMICAL REACTION ENGINEERING | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C313.1 | CO1 | Write the rate equation for any type of reaction. | CO1 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 0 | 2 | 3 | 0 |
| | C313.2 | CO2 | Design reactors for heterogeneous reactions and optimize operating conditions. | CO2 | 3 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 |
| | C313.3 | CO3 | Relate and calculate the conversions, concentrations and rates in a reaction | CO3 | 3 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 0 | 0 | 2 | 0 |
| | C313.4 | CO4 | Identify, formulate and solve chemical engineering problems | CO4 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 3 |
| | C313.5 | CO5 | To gain knowledge on various reactors | CO5 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 3 | 0 | 0 | 0 | 0 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 | 2.25 | 0.00 | 3.00 | 3.00 | 0.00 | 2.00 | 2.50 | 3.00 |

| 4 | Subject Name | | BT8005 Animal Biotechnology | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | |
|---|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| | C314.1 | CO1 | Understand the animal cell culture, animal diseases and its diagnosis | CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 3 | 0 | 3 | 3 | 3 | 3 |
| | C314.2 | CO2 | Gain the knowledge for therapy of animal infections | CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 3 | 3 |
| | C314.3 | CO3 | Understand the diagnostic methods of diseases | CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 2 | 3 | 0 | 3 | 3 | 3 | 3 |
| | C314.4 | CO4 | Know the concepts of micromanipulation technology and transgenic animal technology | CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 3 | 0 | 3 | 3 | 3 | 3 |
| | C314.5 | CO5 | Use the knowledge gained in this section to apply in the field of clinical research | CO5 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 2 | 3 | 0 | 3 | 3 | 3 | 3 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 2.50 | 3.00 | 0.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| 5 | Subject Name | | BT8007 Cancer Biology | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| | C315.1 | CO1 | To appreciate the role of immune system in cancer | CO1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 |
| | C315.2 | CO2 | To describe self – tolerance machinery and immune surveillance | CO2 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| | C315.3 | CO3 | To understand the cancer microenvironment and its influence on immune cell | CO3 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| | C315.4 | CO4 | To have awareness on medical applications of cytokines and immune cells against cancer | CO4 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 1 | |
| | C315.5 | CO5 | To understand the therapeutic process | CO5 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | | | | Average | 2.00 | 2.25 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.50 | 3.00 | 1.50 |
| 6 | Subject Name | | BT8012 Bioethics | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| | C316.1 | CO1 | The students will acquire knowledge in all aspect of clinical trials, | CO1 | 2 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | C316.2 | CO2 | To understand the regulations | CO2 | 3 | 2 | 2 | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | C316.3 | CO3 | management and ethical standards required to conduct clinical trials | CO3 | 3 | 1 | 2 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | C316.4 | CO4 | To analyze the data protection | CO4 | 2 | 2 | 2 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | C316.5 | CO5 | To perform quality control analyze | CO5 | 2 | 2 | 2 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| | | | | Average | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 7 | Subject Name | | BT8611 BIOPROCESS LABORATORY II | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| | C317.1 | CO1 | Graduates gain ability to investigate, design and conduct experiments, analyze and interpret data, and apply the laboratory skills to solve complex bioprocess engineering problems. | CO1 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 3 |
| | C317.2 | CO2 | Graduates become creative, innovative and adaptable engineers as leaders or team members in their organizations and society. | CO2 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 2 |

| | | | | | | | | | | | | | | | | | | | | |
|--|--------|-----|--|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | C317.3 | CO3 | Graduates perform competently in chemical and bioprocess industries and become important contributors to national development. | CO3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | |
| | C317.4 | CO4 | Graduates will demonstrate advancement in their careers through increasing professional responsibility and continued life-long learning. | CO4 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | | | Average | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.50 | 1.50 | 0.00 | 1.50 | 2.50 | 0.00 |

| 8 | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-----|---|--|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Subject Name | | BT8612 GENETIC ENGINEERING LABORATORY | | | Course Outcomes | Program Outcomes | | | | | | | | | | | PSOs | | | | |
| Course Outcomes | | | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| C318.1 | CO1 | Describe the main principles, methods for preparation and cloning of DNA in various organisms. | | | CO1 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 3 | 3 | |
| C318.2 | CO2 | Express clearly about the gene amplification and methods for analysis of DNA, such as hybridization, restriction analysis and gene expressions. | | | CO2 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 3 | 2 | 1 |
| C318.3 | CO3 | Use genetic and biotechnological techniques to manipulate genetic materials and develops new and improved living organisms. | | | CO3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 3 | 3 | 2 |
| C318.4 | CO4 | Students will be aware of the hazardous chemicals and safety precautions in case of emergency. | | | CO4 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 3 | 2 | 0 |
| | | | | | Average | 2.25 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 3.00 | 0.00 | 3.00 | 2.50 | 2.00 |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Course Outcomes

CO, PO & PSO Mapping for the ODD Semester of Academic Year 2021-2022 for the Batch 2018-2022 for R2017

2021 - 2022 (ODD Semester) IV Year / VII Semester (2018 - 2022 Batch)

| 1 | Subject Code | | GE8077 TOTAL QUALITY MANAGEMENT | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
|---|-----------------|-----|---|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C401.1 | CO1 | To understand the Concept of TQm | CO1 | 0 | 2 | 3 | 0 | 0 | 2 | 2 | 0 | 2 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| | C401.2 | CO2 | To learn the principles of TQM | CO2 | 0 | 1 | 2 | 0 | 0 | 3 | 1 | 0 | 3 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| | C401.3 | CO3 | The student would be able to apply the tools and techniques of quality management to manufacturing and services processes. | CO3 | 0 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| | C401.4 | CO4 | To analyze the tools for quality management | CO4 | 0 | 1 | 2 | 0 | 0 | 3 | 1 | 0 | 3 | 0 | 3 | 3 | 0 | 0 | 0 | 0 |
| | C401.5 | CO5 | To understand the application of quality management system | CO5 | 0 | 2 | 3 | 0 | 0 | 3 | 1 | 0 | 3 | 0 | 3 | 3 | 0 | 0 | 0 | 0 |
| | | | | Average | 0.00 | 1.60 | 2.20 | 0.00 | 0.00 | 2.60 | 1.20 | 0.00 | 2.80 | 0.00 | 2.40 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2 | Subject Name | | BT8751 DOWNSTREAM PROCESSING | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C402.1 | CO1 | Define the fundamentals of downstream processing for product recovery | CO1 | 2 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | C402.2 | CO2 | Understand the requirements for successful operations of downstream processing | CO2 | 3 | 3 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| | C402.3 | CO3 | Describe the components of downstream equipment and explain the purpose of each | CO3 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| | C402.4 | CO4 | Apply principles of various unit operations used in downstream processing and enhance problem solving techniques | CO4 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | C402.5 | CO5 | To learn the final formulation of product | CO5 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | Average | 2.80 | 2.50 | 2.00 | 1.75 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 2.00 |
| 3 | Subject Name | | BT8791 IMMUNOLOGY | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C403.1 | CO1 | The students after completing the course would be aware of immune system structure and functions. | CO1 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 2 |
| | C403.2 | CO2 | The students would be aware of immunity to various pathogens | CO2 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 2 |
| | C403.3 | CO3 | The students would be aware of the principles behind the production of therapeutic/ diagnostic molecules. | CO3 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 2 |
| | C403.4 | CO4 | The students would be aware of the concepts and mechanism behind tumour development, allergy and hypersensitivity reactions | CO4 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 2 |
| | C403.5 | CO5 | To understand the applied immunology | CO5 | 3 | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 3 | 3 | 2 |
| | | | | Average | 3.00 | 3.00 | 2.80 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 2.00 |

| 4 | Subject Name | | BT8018 Plant Biotechnology | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
|-----------------|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C404.1 | CO1 | To understand the fundamentals of plant cells, structure and functions | CO1 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2 | 2 |
| | C404.2 | CO2 | To learn the nitrogen fixation mechanism and significance of viral vectors | CO2 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2 | 2 |
| | C404.3 | CO3 | To gain the knowledge about the plant tissue culture and transgenic plants | CO3 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2 | 2 |
| | C404.4 | CO4 | To use of the gained knowledge for the development of therapeutic products | CO4 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2 | 2 |
| | C404.5 | CO5 | To understand the various applications of plant biotechnology | CO5 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 0 | 2 | 3 | 2 | 3 | 2 | 2 |
| | | | | Average | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | 2.00 | 3.00 | 2.00 | 3.00 | 2.00 | 2.00 |
| 5 | Subject Name | | BT8023 Tissue Engineering | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| Course Outcomes | | | PO1 | | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | |
| | C405.1 | CO1 | Ability to understand the components of the tissue architecture | CO1 | 2 | 2 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| | C405.2 | CO2 | Opportunity to get familiarized with the stem cell characteristics and their relevance in medicine | CO2 | 3 | 0 | 2 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 3 | 0 |
| | C405.3 | CO3 | Awareness about the properties and broad applications of biomaterials | CO3 | 2 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 1 | 0 | 2 |
| | C405.4 | CO4 | Overall exposure to the role of tissue engineering and stem cell therapy in Organogenesis | CO4 | 3 | 3 | 2 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 2 | 0 | 0 |
| | C405.5 | CO5 | To learn about the clinical application | CO5 | 2 | 3 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | |
| | | | | Average | 2.40 | 2.50 | 1.60 | 0.00 | 1.40 | 2.00 | 0.00 | 0.00 | 2.25 | 0.00 | 0.00 | 2.60 | 0.00 | 1.50 | 3.00 | 2.00 |
| 6 | Subject Name | | OBM752 Hospital Mangement | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| Course Outcomes | | | PO1 | | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | |
| | C406.1 | CO1 | Explain the principles of Hospital administration | CO1 | 0 | 2 | 2 | 0 | 0 | 3 | 3 | 2 | 1 | 0 | 3 | 2 | 0 | 0 | 0 | 0 |
| | C406.2 | CO2 | Identify the importance of Human resource management | CO2 | 0 | 2 | 2 | 0 | 0 | 3 | 2 | 2 | 3 | 0 | 2 | 3 | 0 | 0 | 0 | 0 |
| | C406.3 | CO3 | List various marketing research techniques | CO3 | 0 | 2 | 2 | 0 | 0 | 3 | 3 | 2 | 2 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| | C406.4 | CO4 | Identify Information management systems and its uses. | CO4 | 0 | 2 | 2 | 0 | 0 | 3 | 2 | 2 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| | C406.5 | CO5 | Understand safety procedures followed in hospitals | CO5 | 0 | 2 | 2 | 0 | 0 | 3 | 1 | 2 | 2 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| | | | | Average | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 3.00 | 2.20 | 2.00 | 2.20 | 0.00 | 2.60 | 1.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| 7 | Subject Name | | BT8711 DOWNSTREAM PROCESSING LABORATORY | Course Outcomes | Program Outcomes | | | | | | | | | | PSOs | | | | | |
| Course Outcomes | | | PO1 | | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 | |
| | C407.1 | CO1 | Acquired knowledge for the separation of whole cells and other insoluble ingredients from the culture broth. | CO1 | 3 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 3 | 2 | 3 | 2 |
| | C407.2 | CO2 | Learned cell disruption techniques to release intracellular products | CO2 | 3 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 3 | 2 | 3 | 2 |

| | | | | | | | | | | | | | | | | | | | | |
|----------|------------------------|-------------------------------------|---|------------------------|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | C407.3 | CO3 | Learned various techniques like evaporation, extraction, precipitation, membrane separation for concentrating biological products | CO3 | 3 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 3 | 3 | 3 | 2 | 3 | 2 |
| | | | | Average | 3.00 | 2.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 2.00 |
| | | | | | | | | | | | | | | | | | | | | |
| 8 | Subject Name | BT8712 IMMUNOLOGY LABORATORY | | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C408.1 | CO1 | The students would be aware of immune system cells and tissues | CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 3 | 3 |
| | C408.2 | CO2 | The students would have knowledge on immunological /clinical tests. | CO2 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 3 | 3 |
| | C408.3 | CO3 | The students would be able to isolate lymphocytes and monocytes , Immune systems | CO3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 3 | 0 | 0 | 3 | 3 | 3 | 3 | 3 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| | | | | | | | | | | | | | | | | | | | | |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Course Outcomes

CO, PO & PSO Mapping for the Even Semester of Academic Year 2021-2022 for the Batch 2018-2022 for R2017

2021 - 2022(Even Semester) IV Year / VIII Semester (2018 - 2022 Batch)

| MADHA ENGINEERING COLLEGE | | | | | | | | | | | | | | | | | | | | |
|---|-----------------|-----|--|-----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Department of Biotechnology | | | | | | | | | | | | | | | | | | | | |
| Attainment of Course Outcomes | | | | | | | | | | | | | | | | | | | | |
| CO, PO & PSO Mapping for the Even Semester of Academic Year 2021-2022 for the Batch 2018-2022 for R2017 | | | | | | | | | | | | | | | | | | | | |
| 2021 - 2022(Even Semester) IV Year / VIII Semester (2018 - 2022 Batch) | | | | | | | | | | | | | | | | | | | | |
| 1 | Subject Code | | | Course Outcomes | Program Outcomes | | | | | | | | | | | | PSOs | | | |
| | Course Outcomes | | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| | C411.I | CO1 | To apply the knowledge gained in to the project work | CO1 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 2 |
| | | | | Average | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 1.00 | 2.00 | 2.00 | 3.00 | 2.00 | 2.00 | 3.00 | 2.00 | 2.00 | 3.00 | 2.00 |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Mapping of Programme Outcomes

Mapping of PO for the the Batch 2018-2022 (Regulations 2017)

| Course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|
| C101 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 |
| C102 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C103 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C104 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C105 | 2.20 | 1.20 | 1.20 | 1.00 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C106 | 2.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C107 | 2.20 | 1.80 | 1.80 | 1.20 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C108 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C111 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 2.20 | 0.00 | 2.80 |
| C112 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C113 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C114 | 3.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| C115 | 1.80 | 1.40 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 | 1.50 | 2.60 |
| C116 | 2.40 | 2.40 | 2.00 | 2.67 | 2.67 | 3.00 | 2.00 | 1.67 | 2.00 | 3.00 | 0.00 | 3.00 |
| C117 | 2.57 | 1.71 | 1.75 | 1.00 | 2.40 | 0.00 | 0.00 | 0.00 | 2.50 | 2.50 | 2.50 | 0.00 |
| C118 | 2.40 | 2.40 | 2.00 | 2.50 | 2.50 | 3.00 | 2.00 | 1.40 | 1.50 | 2.60 | 0.00 | 3.00 |
| C201 | 3.00 | 3.00 | 2.60 | 2.40 | 2.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.40 |
| C202 | 3.00 | 3.00 | 2.60 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.50 | 3.00 |
| C203 | 3.00 | 3.00 | 1.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 |
| C204 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C205 | 2.20 | 2.40 | 2.00 | 2.67 | 2.67 | 3.00 | 2.00 | 1.67 | 2.00 | 3.00 | 0.00 | 3.00 |
| C206 | 2.00 | 2.50 | 2.25 | 3.00 | 2.80 | 0.00 | 2.00 | 0.00 | 3.00 | 3.00 | 0.00 | 2.33 |
| C207 | 2.33 | 2.00 | 2.67 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 2.33 | 3.00 | 0.00 | 3.00 |
| C208 | 2.25 | 1.75 | 2.67 | 2.50 | 2.75 | 2.00 | 0.00 | 3.00 | 1.75 | 3.00 | 0.00 | 3.00 |
| C209 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 |
| C211 | 3.00 | 3.00 | 3.00 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 2.60 |
| C212 | 3.00 | 3.00 | 2.60 | 2.75 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 |
| C213 | 2.00 | 1.25 | 2.80 | 2.50 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.60 |
| C214 | 2.80 | 2.60 | 2.60 | 3.00 | 2.40 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 |
| C215 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 3.00 |

| | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| C216 | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| C217 | 2.25 | 1.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 |
| C218 | 2.25 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 3.00 |
| C219 | 1.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 |
| C301 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 |
| C302 | 3.00 | 3.00 | 2.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.00 | 2.00 | 3.00 |
| C303 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 |
| C304 | 1.20 | 1.40 | 1.00 | 1.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 |
| C305 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C306 | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| C307 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.50 | 1.50 |
| C308 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 |
| C309 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 |
| C311 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 |
| C312 | 0.00 | 3.00 | 0.00 | 2.40 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | 2.00 | 3.00 |
| C313 | 3.00 | 3.00 | 3.00 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 | 2.25 | 0.00 | 3.00 | 3.00 |
| C314 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 2.50 | 3.00 | 0.00 | 3.00 |
| C315 | 2.00 | 2.25 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C316 | 2.40 | 1.80 | 2.00 | 0.00 | 0.00 | 2.20 | 2.80 | 2.60 | 0.00 | 0.00 | 0.00 | 0.00 |
| C317 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 1.50 | 1.50 |
| C318 | 2.25 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.50 | 0.00 | 3.00 |
| C401 | 0.00 | 1.60 | 2.20 | 0.00 | 0.00 | 2.60 | 1.20 | 0.00 | 2.80 | 0.00 | 2.40 | 3.00 |
| C402 | 2.80 | 2.50 | 2.00 | 1.75 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C403 | 3.00 | 3.00 | 2.80 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 3.00 |
| C404 | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 | 3.00 | 3.00 | 0.00 | 2.00 | 3.00 |
| C405 | 2.40 | 2.50 | 1.60 | 0.00 | 1.40 | 2.00 | 0.00 | 0.00 | 2.25 | 0.00 | 0.00 | 2.60 |
| C406 | 0.00 | 2.00 | 2.00 | 0.00 | 0.00 | 3.00 | 2.20 | 2.00 | 2.20 | 0.00 | 2.60 | 1.60 |
| C407 | 3.00 | 2.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 3.00 | 3.00 |
| C408 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 3.00 |
| C411 | 3.00 | 3.00 | 3.00 | 2.00 | 3.00 | 1.00 | 2.00 | 2.00 | 3.00 | 2.00 | 2.00 | 3.00 |

MADHA ENGINEERING COLLEGE
Department of Biotechnology
Mapping of Programme Specific Outcomes

Mapping of PSO for the the Batch 2018-2022 (Regulations 2017)

| Course | PSO1 | PSO2 | PSO3 | PSO4 |
|--------|------|------|------|------|
| C101 | 0.00 | 0.00 | 0.00 | 0.00 |
| C102 | 0.00 | 0.00 | 0.00 | 0.00 |
| C103 | 0.00 | 0.00 | 0.00 | 0.00 |
| C104 | 0.00 | 0.00 | 0.00 | 0.00 |
| C105 | 1.60 | 0.00 | 0.00 | 0.00 |
| C106 | 0.00 | 0.00 | 0.00 | 0.00 |
| C107 | 0.00 | 0.00 | 0.00 | 0.00 |
| C108 | 0.00 | 0.00 | 0.00 | 0.00 |
| C111 | 0.00 | 0.00 | 0.00 | 0.00 |
| C112 | 0.00 | 0.00 | 0.00 | 0.00 |
| C113 | 0.00 | 0.00 | 0.00 | 0.00 |
| C114 | 0.00 | 0.00 | 0.00 | 0.00 |
| C115 | 3.00 | 2.00 | 2.00 | 0.00 |
| C116 | 3.00 | 3.00 | 3.00 | 3.00 |
| C117 | 0.00 | 0.00 | 0.00 | 0.00 |
| C118 | 3.00 | 3.00 | 3.00 | 3.00 |
| C201 | 2.00 | 0.00 | 2.33 | 1.50 |
| C202 | 0.00 | 0.00 | 3.00 | 1.50 |
| C203 | 0.00 | 0.00 | 3.00 | 1.50 |
| C204 | 3.00 | 3.00 | 3.00 | 0.00 |
| C205 | 3.00 | 3.00 | 3.00 | 3.00 |
| C206 | 2.80 | 2.80 | 2.00 | 2.00 |
| C207 | 3.00 | 0.00 | 2.00 | 0.00 |
| C208 | 3.00 | 3.00 | 2.25 | 3.00 |
| C209 | 0.00 | 0.00 | 0.00 | 0.00 |
| C209 | 1.00 | 2.00 | 3.00 | 4.00 |
| C211 | 0.00 | 0.00 | 2.33 | 1.00 |
| C212 | 0.00 | 0.00 | 3.00 | 0.00 |
| C213 | 1.50 | 2.60 | 2.00 | 2.33 |
| C214 | 2.80 | 1.60 | 2.40 | 1.60 |
| C215 | 0.00 | 1.80 | 1.25 | 2.25 |
| C216 | 0.00 | 0.00 | 2.00 | 0.00 |
| C217 | 2.50 | 1.00 | 2.00 | 0.00 |
| C218 | 0.00 | 3.00 | 2.50 | 2.00 |
| C219 | 0.00 | 0.00 | 0.00 | 0.00 |
| C301 | 0.00 | 0.00 | 2.00 | 3.00 |
| C302 | 0.00 | 1.80 | 1.25 | 2.25 |
| C303 | 3.00 | 3.00 | 3.00 | 3.00 |
| C304 | 1.00 | 1.00 | 1.50 | 1.00 |
| C305 | 3.00 | 3.00 | 3.00 | 0.00 |
| C306 | 0.00 | 0.00 | 2.00 | 0.00 |
| C307 | 0.00 | 1.50 | 2.50 | 0.00 |
| C308 | 3.00 | 3.00 | 3.00 | 3.00 |

| | | | | |
|------|------|------|------|------|
| C309 | 0.00 | 0.00 | 0.00 | 0.00 |
| C311 | 1.80 | 1.40 | 2.20 | 2.00 |
| C312 | 2.80 | 3.00 | 2.80 | 2.60 |
| C313 | 0.00 | 2.00 | 2.50 | 3.00 |
| C314 | 3.00 | 3.00 | 3.00 | 3.00 |
| C315 | 2.00 | 2.50 | 3.00 | 1.50 |
| C316 | 0.00 | 0.00 | 2.00 | 0.00 |
| C317 | 0.00 | 1.50 | 2.50 | 0.00 |
| C318 | 0.00 | 3.00 | 2.50 | 2.00 |
| C401 | 0.00 | 0.00 | 0.00 | 0.00 |
| C402 | 0.00 | 0.00 | 1.00 | 2.00 |
| C403 | 2.00 | 3.00 | 3.00 | 2.00 |
| C404 | 2.00 | 3.00 | 2.00 | 2.00 |
| C405 | 0.00 | 1.50 | 3.00 | 2.00 |
| C406 | 0.00 | 0.00 | 0.00 | 0.00 |
| C407 | 3.00 | 2.00 | 3.00 | 2.00 |
| C408 | 3.00 | 3.00 | 3.00 | 3.00 |
| C411 | 2.00 | 2.00 | 3.00 | 2.00 |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Course Outcomes

| Batch 2018-2022 (Regulations 2017) | | | | |
|------------------------------------|--|---|------------|------------|
| Course Code | Attainment through Internal Assessment | Attainment through University Examination | Total | % of |
| | | | Attainment | Attainment |
| C101 | 2.78 | 3 | 2.89 | 96 |
| C102 | 2.76 | 2 | 2.38 | 79 |
| C103 | 3 | 3 | 3 | 100 |
| C104 | 2.8 | 3 | 2.9 | 97 |
| C105 | 2.92 | 2 | 2.46 | 82 |
| C106 | 2.84 | 3 | 2.92 | 97 |
| C107 | 2.68 | 3 | 2.84 | 95 |
| C108 | 2.8 | 3 | 2.9 | 97 |
| C111 | 2 | 3 | 2.5 | 83 |
| C112 | 2.8 | 3 | 2.9 | 97 |
| C113 | 2.2 | 2 | 2.1 | 70 |
| C114 | 2.3 | 3 | 2.65 | 88 |
| C115 | 3 | 2 | 2.5 | 83 |
| C116 | 2.2 | 2 | 2.1 | 70 |
| C117 | 2.6 | 2 | 2.3 | 77 |
| C118 | 3 | 3 | 3 | 100 |
| C201 | 2.8 | 3 | 2.9 | 97 |
| C202 | 1.8 | 3 | 2.4 | 80 |
| C203 | 2.2 | 2 | 2.1 | 70 |
| C204 | 1.8 | 3 | 2.4 | 80 |
| C205 | 2.6 | 2 | 2.3 | 77 |
| C206 | 2.6 | 2 | 2.3 | 77 |
| C207 | 2.8 | 3 | 2.9 | 97 |
| C208 | 2.4 | 2 | 2.2 | 73 |
| C209 | 2.8 | 3 | 2.9 | 97 |
| C211 | 2.82 | 2 | 2.41 | 80 |
| C212 | 2.4 | 2 | 2.2 | 73 |
| C213 | 2.2 | 3 | 2.6 | 87 |
| C214 | 2.58 | 3 | 2.79 | 93 |
| C215 | 1.4 | 3 | 2.2 | 73 |
| C216 | 2.2 | 2 | 2.1 | 70 |
| C217 | 1.4 | 3 | 2.2 | 73 |
| C218 | 3 | 2 | 2.5 | 83 |
| C219 | 2 | 3 | 2.5 | 83 |
| C301 | 3 | 3 | 3 | 100 |
| C302 | 2 | 3 | 2.5 | 83 |
| C303 | 1.2 | 3 | 2.1 | 70 |

| | | | | |
|------|------|---|------|-----|
| C304 | 2.2 | 2 | 2.1 | 70 |
| C305 | 1.6 | 3 | 2.3 | 77 |
| C306 | 2.2 | 2 | 2.1 | 70 |
| C307 | 2.82 | 2 | 2.41 | 80 |
| C308 | 3 | 3 | 3 | 100 |
| C309 | 2.92 | 2 | 2.46 | 82 |
| C311 | 3 | 3 | 3 | 100 |
| C312 | 2 | 3 | 2.5 | 83 |
| C313 | 2.6 | 2 | 2.3 | 77 |
| C314 | 1.98 | 3 | 2.49 | 83 |
| C315 | 2 | 2 | 2 | 67 |
| C316 | 2 | 3 | 2.5 | 83 |
| C317 | 2.98 | 3 | 2.99 | 100 |
| C318 | 3 | 3 | 3 | 100 |
| C401 | 2.4 | 3 | 2.7 | 90 |
| C402 | 2.8 | 3 | 2.9 | 97 |
| C403 | 2.74 | 2 | 2.37 | 79 |
| C404 | 2 | 2 | 2 | 67 |
| C405 | 2.56 | 3 | 2.78 | 93 |
| C406 | 2.24 | 2 | 2.12 | 71 |
| C407 | 2.6 | 3 | 2.8 | 93 |
| C408 | 2.98 | 3 | 2.99 | 100 |
| C411 | 3 | 3 | 3 | 100 |

MADHA ENGINEERING COLLEGE

Department of Biotechnology

Attainment of Program Outcomes

Batch 2018-2022 (Regulations 2017)

| Course Code | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|
| C101 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.76 | 2.63 | 0.00 | 0.00 |
| C102 | 1.73 | 0.87 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C103 | 2.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C104 | 1.78 | 0.89 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.78 | 0.00 | 0.00 |
| C105 | 2.10 | 1.15 | 1.15 | 0.96 | 2.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C106 | 1.82 | 0.00 | 1.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.82 | 0.00 | 0.00 |
| C107 | 2.98 | 2.96 | 2.96 | 1.62 | 2.98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C108 | 1.96 | 0.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C111 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 | 0.00 | 1.98 |
| C112 | 1.22 | 0.72 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C113 | 1.80 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 |
| C114 | 2.92 | 0.00 | 1.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| C115 | 0.84 | 2.70 | 0.00 | 2.78 | 2.84 | 0.00 | 0.00 | 0.00 | 2.94 | 3.00 | 1.92 | 2.98 |
| C116 | 3.00 | 2.88 | 0.68 | 2.94 | 2.92 | 3.00 | 3.00 | 1.00 | 0.00 | 0.00 | 0.00 | 3.00 |
| C117 | 2.00 | 1.00 | 0.00 | 0.98 | 1.64 | 0.00 | 0.00 | 0.00 | 1.90 | 1.98 | 1.98 | 0.00 |
| C118 | 3.00 | 3.00 | 1.00 | 2.66 | 2.96 | 3.00 | 2.88 | 1.00 | 0.00 | 2.24 | 0.00 | 2.54 |
| C201 | 2.58 | 2.58 | 3.00 | 1.68 | 1.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| C202 | 2.92 | 2.90 | 2.94 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.84 |
| C203 | 2.44 | 2.42 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.96 |
| C204 | 0.00 | 2.52 | 2.82 | 2.84 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C205 | 2.20 | 2.68 | 1.00 | 2.20 | 2.68 | 2.64 | 2.82 | 1.00 | 0.00 | 0.00 | 0.00 | 2.70 |
| C206 | 1.64 | 1.82 | 2.00 | 3.00 | 2.76 | 0.00 | 1.82 | 0.00 | 2.82 | 2.96 | 0.00 | 1.98 |
| C207 | 0.40 | 0.00 | 2.42 | 2.80 | 2.00 | 0.00 | 0.00 | 0.00 | 2.32 | 3.00 | 0.00 | 2.98 |
| C208 | 2.20 | 1.62 | 1.28 | 2.98 | 2.98 | 2.28 | 0.00 | 0.00 | 2.68 | 2.48 | 0.00 | 2.32 |
| C209 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.82 | 2.84 | 0.00 | 0.00 |
| C211 | 2.96 | 2.22 | 2.88 | 2.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.62 | 2.28 |
| C212 | 2.92 | 2.92 | 2.98 | 2.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.88 |
| C213 | 1.96 | 0.88 | 2.88 | 0.00 | 0.00 | 0.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 2.84 |
| C214 | 2.72 | 2.24 | 2.92 | 2.96 | 2.84 | 2.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.92 |
| C215 | 2.62 | 2.94 | 1.46 | 2.54 | 2.86 | 0.00 | 0.00 | 0.00 | 1.96 | 1.72 | 1.28 | 2.64 |
| C216 | 3.00 | 0.94 | 1.64 | 0.00 | 0.00 | 1.28 | 1.98 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | | | |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| C217 | 2.00 | 1.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 |
| C218 | 2.84 | 1.94 | 1.56 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.94 | 0.00 | 2.64 |
| C219 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 2.98 | 0.00 | 0.00 |
| C301 | 2.34 | 2.98 | 2.90 | 2.88 | 2.84 | 0.00 | 0.00 | 0.00 | 2.00 | 1.98 | 0.00 | 0.00 |
| C302 | 2.98 | 2.36 | 1.28 | 1.68 | 2.98 | 0.00 | 0.00 | 0.00 | 1.68 | 1.86 | 1.88 | 2.98 |
| C303 | 2.30 | 2.28 | 2.96 | 2.96 | 3.00 | 2.98 | 0.00 | 0.00 | 0.00 | 0.00 | 2.84 | 3.00 |
| C304 | 0.90 | 1.80 | 1.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.86 |
| C305 | 0.00 | 2.90 | 2.90 | 2.92 | 2.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C306 | 2.76 | 0.80 | 1.18 | 0.00 | 0.00 | 1.86 | 1.48 | 2.98 | 0.00 | 0.00 | 0.00 | 0.00 |
| C307 | 3.00 | 3.00 | 2.98 | 3.00 | 2.98 | 0.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 |
| C308 | 3.00 | 2.96 | 3.00 | 1.68 | 3.00 | 2.64 | 0.00 | 0.00 | 0.00 | 0.00 | 2.92 | 3.00 |
| C309 | 1.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 3.00 | 0.00 | 0.00 |
| C311 | 2.96 | 2.94 | 2.68 | 1.28 | 2.84 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.68 |
| C312 | 0.00 | 2.98 | 0.00 | 1.88 | 0.00 | 0.00 | 2.82 | 2.98 | 2.64 | 0.00 | 1.94 | 2.96 |
| C313 | 2.96 | 3.00 | 3.00 | 1.64 | 0.00 | 0.00 | 0.00 | 0.00 | 1.24 | 0.00 | 2.84 | 2.98 |
| C314 | 2.34 | 2.96 | 2.98 | 2.98 | 3.00 | 3.00 | 0.00 | 0.00 | 1.28 | 2.86 | 0.00 | 2.96 |
| C315 | 2.98 | 3.00 | 1.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C316 | 3.00 | 0.84 | 1.98 | 0.00 | 0.00 | 1.96 | 1.64 | 2.98 | 0.00 | 0.00 | 0.00 | 0.00 |
| C317 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 0.00 | 0.00 | 0.00 | 1.64 | 0.00 | 0.84 | 0.88 |
| C318 | 3.00 | 2.98 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.64 | 0.00 | 2.98 |
| C401 | 0.00 | 1.32 | 0.62 | 0.00 | 0.00 | 1.62 | 0.38 | 0.00 | 2.28 | 0.00 | 1.64 | 2.84 |
| C402 | 2.92 | 1.98 | 1.98 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C403 | 2.38 | 3.00 | 3.00 | 1.28 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.98 | 2.94 |
| C404 | 0.00 | 3.00 | 0.00 | 2.48 | 0.00 | 0.00 | 2.90 | 2.82 | 3.00 | 0.00 | 1.96 | 2.82 |
| C405 | 1.90 | 2.00 | 2.00 | 0.00 | 2.00 | 1.60 | 0.00 | 0.00 | 1.64 | 0.00 | 0.00 | 2.24 |
| C406 | 0.00 | 1.86 | 1.98 | 0.00 | 0.00 | 2.64 | 3.00 | 2.00 | 2.00 | 0.00 | 2.80 | 0.90 |
| C407 | 2.96 | 2.00 | 0.00 | 0.00 | 2.98 | 0.00 | 0.00 | 0.00 | 1.90 | 0.00 | 3.00 | 3.00 |
| C408 | 2.98 | 3.00 | 2.94 | 2.34 | 2.72 | 2.64 | 0.00 | 0.00 | 2.94 | 0.00 | 0.00 | 2.98 |
| C411 | 2.98 | 3.00 | 3.00 | 2.00 | 2.96 | 1.00 | 2.00 | 1.94 | 3.00 | 1.98 | 2.00 | 3.00 |
| Direct Attainment | 2.39 | 2.16 | 2.19 | 2.29 | 2.68 | 2.23 | 2.23 | 2.25 | 2.14 | 2.29 | 2.14 | 2.49 |
| Indirect Attainment | 2.5 | 2.84 | 2.91 | 2.8 | 2.84 | 2.7 | 2.6 | 2.45 | 2.45 | 2.87 | 2.98 | 2.8 |
| Attainment levels of POs | 2.45 | 2.50 | 2.55 | 2.55 | 2.76 | 2.47 | 2.41 | 2.35 | 2.30 | 2.58 | 2.56 | 2.64 |
| Percentage of attainment | 82 | 83 | 85 | 85 | 92 | 82 | 80 | 78 | 77 | 86 | 85 | 88 |

MADHA ENGINEERING COLLEGE
Department of Biotechnology
Attainment of Program Specific Outcomes
Batch 2018-2022 (Regulations 2017)

| Course Code | PSO1 | PSO2 | PSO3 | PSO4 |
|-------------|------|------|------|------|
| C101 | 0.00 | 0.00 | 0.00 | 0.00 |
| C102 | 0.00 | 0.00 | 0.00 | 0.00 |
| C103 | 0.00 | 0.00 | 0.00 | 0.00 |
| C104 | 0.00 | 0.00 | 0.00 | 0.00 |
| C105 | 1.53 | 0.00 | 0.00 | 0.00 |
| C106 | 0.00 | 0.00 | 0.00 | 0.00 |
| C107 | 0.00 | 0.00 | 0.00 | 0.00 |
| C108 | 0.00 | 0.00 | 0.00 | 0.00 |
| C111 | 0.00 | 0.00 | 0.00 | 0.00 |
| C112 | 0.00 | 0.00 | 0.00 | 0.00 |
| C113 | 0.00 | 0.00 | 0.00 | 0.00 |
| C114 | 0.00 | 0.00 | 0.00 | 0.00 |
| C115 | 3.00 | 2.00 | 2.00 | 0.00 |
| C116 | 3.00 | 3.00 | 3.00 | 3.00 |
| C117 | 0.00 | 0.00 | 0.00 | 0.00 |
| C118 | 3.00 | 3.00 | 3.00 | 3.00 |
| C201 | 1.00 | 0.00 | 0.00 | 0.00 |
| C202 | 0.00 | 0.00 | 3.00 | 0.00 |
| C203 | 0.00 | 0.00 | 0.00 | 1.00 |
| C204 | 0.00 | 3.00 | 0.00 | 0.00 |
| C205 | 3.00 | 3.00 | 3.00 | 3.00 |
| C206 | 3.00 | 3.00 | 1.00 | 0.00 |
| C207 | 3.00 | 0.00 | 2.00 | 0.00 |
| C208 | 3.00 | 0.00 | 2.00 | 0.00 |
| C209 | 0.00 | 0.00 | 0.00 | 0.00 |
| C209 | 1.00 | 2.00 | 3.00 | 4.00 |
| C211 | 0.00 | 0.00 | 2.00 | 0.00 |
| C212 | 0.00 | 0.00 | 3.00 | 0.00 |
| C213 | 2.00 | 2.00 | 3.00 | 0.00 |
| C214 | 3.00 | 2.00 | 1.00 | 2.00 |
| C215 | 0.00 | 2.00 | 2.00 | 1.00 |
| C216 | 0.00 | 0.00 | 2.00 | 0.00 |
| C217 | 0.00 | 1.00 | 2.00 | 0.00 |
| C218 | 0.00 | 3.00 | 3.00 | 2.00 |
| C219 | 0.00 | 0.00 | 0.00 | 0.00 |
| C301 | 0.00 | 0.00 | 2.00 | 3.00 |
| C302 | 0.00 | 2.00 | 2.00 | 1.00 |
| C303 | 3.00 | 3.00 | 3.00 | 3.00 |
| C304 | 0.00 | 0.00 | 2.00 | 0.00 |
| C305 | 0.00 | 3.00 | 0.00 | 0.00 |
| C306 | 0.00 | 0.00 | 2.00 | 0.00 |
| C307 | 0.00 | 1.00 | 2.00 | 0.00 |
| C308 | 3.00 | 3.00 | 3.00 | 3.00 |
| C309 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | |
|--------------------------------------|-------------|-------------|-------------|-------------|
| C311 | 2.00 | 2.00 | 2.00 | 2.00 |
| C312 | 3.00 | 3.00 | 2.00 | 3.00 |
| C313 | 0.00 | 0.00 | 0.00 | 3.00 |
| C314 | 3.00 | 3.00 | 3.00 | 3.00 |
| C315 | 2.00 | 0.00 | 3.00 | 1.00 |
| C316 | 0.00 | 0.00 | 2.00 | 0.00 |
| C317 | 0.00 | 0.00 | 0.00 | 0.00 |
| C318 | 0.00 | 3.00 | 3.00 | 2.00 |
| C401 | 0.00 | 0.00 | 0.00 | 0.00 |
| C402 | 0.00 | 0.00 | 0.00 | 0.00 |
| C403 | 2.00 | 3.00 | 3.00 | 2.00 |
| C404 | 2.00 | 3.00 | 2.00 | 2.00 |
| C405 | 0.00 | 2.00 | 0.00 | 0.00 |
| C406 | 0.00 | 0.00 | 0.00 | 0.00 |
| C407 | 3.00 | 2.00 | 3.00 | 2.00 |
| C408 | 3.00 | 3.00 | 3.00 | 3.00 |
| C411 | 2.00 | 2.00 | 3.00 | 2.00 |
| Direct Attainment | 2.50 | 2.48 | 2.43 | 2.35 |
| Indirect Attainment | 2.61 | 2.72 | 2.46 | 2.8 |
| Attainment levels of PSOs | 2.56 | 2.60 | 2.44 | 2.57 |