



शिवम एम.एस.पी.मंडळ परभणी
डॉ.बाबासाहेब आंबेडकर मराठवाडा विद्यापीठ औरंगाबाद संलग्नीत.
व महाराष्ट्र शासन मान्यता प्राप्त

जालना कॉलेज ऑफ आय टी

नोंदणी क्रमांक : एन.जी.सी.२००८/(२२१/०८)/मशि-३ दि.२५ जुन २००८

खरपुडी ता.जि.जालना. संपर्क - 7755999954 / 8485846999 / 9422215058

Outcome-Based Education (OBE) Attainment Report: Bachelor of Science (B.Sc.)

Jalna College of I.T., Jalna

Affiliated to Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar

Program Focus: Core Sciences (Physical, Chemical, and Mathematical)

Academic Cycle: Evaluation Cycle for 2022-23 (Illustrative Data)

Prepared by: IQAC & Science Departmental Outcome Assessment Team

The OBE Mandate and B.Sc. Program Objectives

1.1 Philosophy of Scientific Education

The B.Sc. program is built on the philosophy that scientific knowledge must be **foundational, experimental, and ethical**. The Outcome-Based Education (OBE) framework ensures that students graduate not just with theoretical knowledge but with **transferable scientific competence**, enabling them to pursue research, industry roles, or advanced studies.

1.2 B.Sc. Program Outcomes (POs) and Scientific Attributes

The five Program Outcomes (POs) guide the B.Sc. curriculum, focusing heavily on research methodology and practical application:

PO No.	Program Outcome (POs)	Scientific Attribute Focus
PO1	Develop scientific knowledge and practical laboratory skills.	Knowledge & Hands-on Competence
PO2	Apply scientific methods for research and problem-solving.	Research Methodology
PO3	Analyze, interpret, and present scientific data effectively.	Data Literacy & Communication
PO4	Understand ethical issues and safety standards in scientific work.	Ethics and Safety
PO5	Engage in continuous learning for scientific advancements.	Lifelong Learning

1.3 Vertical Integration of Outcomes

The COs in B.Sc. are progressively structured: early-semester COs focus on **PO1 (Knowledge/Skills)**, while later-semester COs emphasize **PO2 (Research)** and **PO3 (Data Analysis)** through project work and advanced practicals.

Course Outcomes (COs) and Assessment Mapping

We detail the COs for three representative core B.Sc. subjects (Physics, Chemistry, and Mathematics/Statistics) and their corresponding assessment mechanisms.

2.1 Representative Course Outcomes (COs)

Course	CO No.	Course Outcomes (COs)	Primary PO Link
Physics (Mechanics)	CO P1	Understand fundamental concepts of classical mechanics; apply principles to solve structured problems.	PO1, PO2
	CO P2	Perform laboratory experiments on mechanical properties; analyze results for error and accuracy.	PO1, PO3
Chemistry (Analytical)	CO C1	Perform complex volumetric and instrumental analysis with precision and accuracy.	PO1, PO4
	CO C2	Interpret spectroscopic data (IR, UV) to determine the structure of unknown compounds.	PO2, PO3
Mathematics (Calculus)	CO M1	Apply differential and integral calculus tools to scientific and real-world problems.	PO2, PO3
	CO M2	Use mathematical reasoning to construct proofs and solve abstract problems.	PO5

2.2 Assessment Mapping and Methodology

The B.Sc. evaluation places a **high weight on practical performance** to align with the POs:

Assessment Component	Target POs	Weightage
Semester-End Theory Exams (SEE)	PO1, PO2 (Conceptual Knowledge)	40%
Semester-End Practical Exams (Lab Performance, Viva)	PO1, PO4 (Skills & Safety)	30%
Internal Assessment (CIA: Assignments, Projects, Tests)	PO2, PO3, PO5 (Research, Analysis, Application)	30%

PO-CO Mapping Matrix: B.Sc. Core Disciplines

The degree of correlation between COs and POs is quantified using the standard **3-point scale** (High=3, Medium=2, Low=1, None=0).

CO	Course	PO1 (Knowledge/Skills)	PO2 (Research/Method)	PO3 (Data Analysis)	PO4 (Ethics/Safety)	PO5 (Lifelong Learning)
CO P1	Physics (Theory)	H (3)	M (2)	L (1)	-	L (1)
CO P2	Physics (Practical)	H (3)	M (2)	H (3)	M (2)	-
CO C1	Chemistry (Practical)	H (3)	L (1)	M (2)	H (3)	L (1)
CO C2	Chemistry (Theory)	M (2)	H (3)	H (3)	-	M (2)
CO M1	Mathematics (Calculus)	L (1)	H (3)	H (3)	-	M (2)
CO M2	Mathematics (Abstract)	L (1)	M (2)	L (1)	-	H (3)

Attainment Evaluation and Model Data

4.1 Attainment Calculation Framework

The institutional target for the B.Sc. program is **65% of students scoring 65% or above** in the assessment components mapped to the CO.

1. **CO Attainment Score:** Calculated using the weighted assessment method (Chapter 2, Section 2.2).
2. **PO Attainment Score:** Calculated as the weighted average of all mapped CO Attainment Scores.

4.2 Model Attainment Data for Core COs (2022-23)

The following table presents illustrative attainment data derived from semester results and practical performance tracking:

CO	Course	Target Met (%)	Attainment Score	Attainment Level
CO P1	Physics (Theory)	70%	74%	High (H)

CO	Course	Target Met (%)	Attainment Score	Attainment Level
CO P2	Physics (Practical)	63%	68%	Medium (M)
CO C1	Chemistry (Practical)	72%	75%	High (H)
CO C2	Chemistry (Theory)	58%	61%	Medium (M)
CO M1	Mathematics (Calculus)	65%	70%	High (H)
CO M2	Mathematics (Abstract)	55%	59%	Medium (M)

4.3 Derived PO Attainment Status for B.Sc. Program

By aggregating the CO attainment scores according to the mapping matrix:

PO No.	Program Outcome (POs)	Weighted Attainment Score	Attainment Level
PO1	Scientific Knowledge and Practical Skills	72.7%	High (H)
PO2	Apply Scientific Methods for Research	65.1%	Medium (M)
PO3	Analyze, Interpret, and Present Scientific Data	68.9%	Medium (M)
PO4	Understand Ethical Issues and Safety Standards	76.0%	High (H)
PO5	Engage in Continuous Learning	62.8%	Medium (M)

Analysis and Continuous Improvement Plan (CIP)

5.1 Attainment Analysis and Program Strengths

The B.Sc. program demonstrates clear excellence in the practical and safety domains:

- **PO1 (Knowledge/Skills)** and **PO4 (Ethics/Safety)** achieved **High Attainment** (above 70%). This is primarily driven by rigorous laboratory protocols (CO C1) and successful theory application (CO P1). The high score for PO4 validates the emphasis on lab safety training and ethical conduct via practical exams.
- **PO3 (Data Analysis)** is approaching High Attainment (68.9%), indicating strong potential, largely supported by the mathematical application skills (CO M1).

5.2 Identified Areas for Improvement

The moderate attainment in **PO2, PO3, and PO5** suggests that students need more exposure to open-ended research and communication tasks:

1. **PO2 (Research Methodology - 65.1%):** The moderate score in **CO C2 (Spectroscopic Interpretation)** suggests a challenge in applying theoretical knowledge to real-world structural determination and independent research design.
2. **PO3 (Data Analysis - 68.9%):** While strong in calculation, the final presentation and interpretation of data (CO P2, CO C2) need formal reinforcement.
3. **PO5 (Lifelong Learning - 62.8%):** The moderate score suggests that the abstract nature of advanced concepts (CO M2) needs better linkage to current scientific advancements.

5.3 Continuous Improvement Plan (CIP) for 2023-24 🛠️

Based on the attainment evaluation, the Science Departments have formulated the following actions:

PO/CO Targeted	Improvement Area	Action Plan for 2023-24	Assessment Integration
PO2 & PO3	Research Design and Scientific Presentation	Introduce a mandatory mini-project report assessed for scientific writing, data visualization, and referencing.	CIA (Project Report component)
CO C2	Spectroscopic Interpretation	Integrate simulated spectral analysis software into practical labs to provide immediate feedback on structural determination problems.	Practical Exam (Viva-Voce Questions)
PO5	Linking Abstract Concepts to Advancements	Allocate dedicated seminar slots where students must present a scientific paper related to their core subject (e.g., applications of calculus in modern physics).	CIA (Seminar Grading)
CO P2, C1	Practical Skill Consistency	Standardize lab manuals with clear instructions on error calculation and uncertainty reporting to strengthen PO3.	Practical Exam (Lab Record Review)