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

Jalna College of I.T., Jalna

Affiliated to Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar

Program Focus: Scientific Application to Family, Community, and Resource Management

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

Prepared by: IQAC & Department of Home Science

The OBE Framework and Home Science Rationale

1.1 The Multidisciplinary Scope of Home Science

The B.Sc. Home Science program is inherently multidisciplinary, integrating concepts from science, sociology, economics, and art to enhance the quality of individual and family life. The **Outcome-Based Education (OBE)** model is particularly effective here as it links diverse theoretical knowledge to measurable **practical and community-based skills**. Graduates are prepared for roles in public health, nutrition counseling, textile design, and resource management.

1.2 B.Sc. Home Science Program Outcomes (POs)

The four Program Outcomes (POs) are designed to cultivate scientific application, practical competence, social sensitivity, and ethical conduct:

PO No.	Program Outcome (POs)	Graduate Attribute Focus
PO1	Apply scientific knowledge to nutrition, health, and home management .	Scientific Application
PO2	Develop practical skills in textiles, nutrition, and family resource management.	Technical Competence
PO3	Understand societal, cultural, and environmental aspects affecting home and community .	Social and Cultural Literacy
PO4	Demonstrate ethical behavior and social responsibility in home and community services.	Professional Ethics & Civic Duty

Course Outcomes (COs) and Assessment Integration

Course Outcomes (COs) reflect the specific skills gained within the core specializations of the Home Science program. Evaluation methods are tailored to assess practical, hands-on ability.

2.1 Representative Course Outcomes (COs)

Course	CO No.	Course Outcomes (COs)	Primary PO Link
Nutrition & Dietetics	CO N1	Plan balanced diets; understand nutritional needs across the lifespan.	PO1, PO2
Human Development	CO H1	Apply principles of human growth and development in real-life contexts (e.g., Anganwadi observation).	PO1, PO3
Textile Science	CO T1	Identify textile fibers; understand textile properties and processing methods (e.g., dyeing, finishing).	PO2
Home Management	CO M1	Apply effective management techniques in household and community settings, emphasizing resource optimization.	PO1, PO4
Extension Education	CO E1	Design and implement community awareness programs on health or livelihood.	PO3, PO4

2.2 Attainment Evaluation Methods

The evaluation places significant weight on **demonstration and fieldwork** to measure applied outcomes (PO2 and PO4):

Assessment Component	Target POs	Weightage
Semester-End Theory Examinations (SEE)	PO1, PO3 (Conceptual Knowledge)	40%
Practical Demonstrations / Lab Work (Internal)	PO1, PO2 (Hands-on Skills)	30%
Fieldwork / Projects / Internship Feedback	PO3, PO4 (Social Sensitivity, Ethics, Resource Management)	30%

Fieldwork, Internship, and Community Program Feedback: This is the crucial input for **PO3 and PO4**. External supervisor ratings from hospitals, NGOs, or community centers assess the student's ability to operate effectively and ethically in a real-world setting.

PO-CO Mapping Matrix: B.Sc. Home Science Program

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 (Sci. Application)	PO2 (Practical Skills)	PO3 (Social/Cultural)	PO4 (Ethics/Responsibility)
CO N1	Nutrition & Dietetics	H (3)	H (3)	M (2)	L (1)
CO H1	Human Development	H (3)	L (1)	H (3)	M (2)
CO T1	Textile Science	M (2)	H (3)	L (1)	-
CO M1	Home Management	H (3)	M (2)	M (2)	H (3)
CO E1	Extension Education	M (2)	M (2)	H (3)	H (3)

Attainment Evaluation and Model Data

4.1 Attainment Calculation and Targets

The institutional target for the B.Sc. Home Science program is **65% of students scoring 65% or above** in the assessment components linked to the CO. The CO and PO attainment scores are calculated using the weighted formulas established in the methodology.

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

The following table presents illustrative attainment data derived from practical demonstrations, field reports, and exams:

CO	Course	Target Met (%)	Attainment Score	Attainment Level
CO N1	Nutrition & Dietetics	78%	81%	High (H)
CO H1	Human Development	70%	74%	High (H)
CO T1	Textile Science	62%	67%	Medium (M)
CO M1	Home Management	68%	70%	High (H)
CO E1	Extension Education	55%	60%	Medium (M)

4.3 Derived PO Attainment Status for B.Sc. Home Science 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 Application	75.5%	High (H)

PO No.	Program Outcome (POs)	Weighted Attainment Score	Attainment Level
PO2	Practical Skills (Nutrition, Textiles, Management)	70.9%	High (H)
PO3	Societal, Cultural, and Environmental Understanding	68.3%	Medium (M)
PO4	Ethical Behavior and Social Responsibility	69.0%	Medium (M)

Analysis and Continuous Improvement Plan (CIP)

5.1 Attainment Analysis and Program Strengths

The B.Sc. Home Science program demonstrates outstanding success in its core technical competencies:

- **PO1 (Scientific Application) and PO2 (Practical Skills)** both achieved **High Attainment** (above 70%). This success is primarily driven by the practical, measurable nature of skills like **diet planning (CO N1)** and **resource application (CO M1)**. Students are excellent at executing scientific protocols in controlled environments.
- The strong performance in Human Development (CO H1) shows a good foundation in applying theoretical knowledge to the lifecycle.

5.2 Identified Areas for Improvement

The moderate attainment in **PO3 and PO4** indicates the challenge of measuring and achieving outcomes in complex, uncontrolled community settings:

1. **PO3 (Societal/Cultural Understanding - 68.3%):** The moderate score, particularly in Extension Education (CO E1), suggests that while students understand theory, designing interventions that are truly culturally relevant and sensitive to local constraints needs improvement.
2. **PO4 (Ethics/Social Responsibility - 69.0%):** The score is close to high, but performance in community projects (CO E1) needs to be more consistent. Ethical behavior in client/community interaction and resource advocacy require more focused training.
3. **CO T1 (Textile Science - 67%):** This section is the weakest of the practical domains, suggesting a need for updating lab equipment or increasing hands-on time for complex textile processing.

5.3 Continuous Improvement Plan (CIP) for 2023-24

Based on the attainment evaluation, the Department of Home Science has formulated the following actions:

PO/CO Targeted	Improvement Area	Action Plan for 2023-24	Assessment Integration
PO3 & PO4	Social/Cultural Sensitivity in Fieldwork	Mandate pre-fieldwork orientation modules focusing on community ethics, local cultural norms, and low-cost intervention design.	Fieldwork Report (Rubric inclusion for cultural relevance)
CO E1 (Extension)	Community Program Design & Implementation	Introduce a Service-Learning component where students must track and report the impact of their community project over a longer duration (4 weeks minimum).	Project Evaluation (External NGO/SHG Feedback)
PO2 & CO T1 (Textiles)	Practical Skills in Textile Science	Upgrade or procure new equipment for advanced textile testing and chemical processing in the lab.	Practical Exam (Checklist on proficiency with new equipment)
PO4	Resource Management and Advocacy	Integrate case studies on family/community resource allocation and financial advocacy into the Home Management course.	Internal Assessment (Case Study analysis)

Comprehensive Outcome Attainment Evaluation Report: Institutional Methodology

Jalna College of I.T., Jalna

Affiliated to Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar

Report Title: Systematic Methodology for PO and CO Attainment Evaluation

Academic Cycle: Evaluation Cycle for **2022-23**

Prepared by: Internal Quality Assurance Cell (IQAC), Jalna College of I.T.

Institutional Commitment to Outcome-Based Education (OBE)

1.1 The Foundation of Quality Assurance

Jalna College of I.T., Jalna, views the Attainment Evaluation Process not merely as a compliance requirement but as the core mechanism for ensuring educational quality and institutional accountability. The evaluation process is cyclical, driving the **Plan-Do-Check-Act (PDCA)** model for academic improvement. The goal is to move beyond course completion toward demonstrating graduate proficiency across five distinct programs (BCA, BA, BSc, B.Sc. N&M, and B.Sc. Home Science).

1.2 Alignment with Graduate Attributes

Every Program Outcome (PO) and Course Outcome (CO) across all disciplines is mapped to essential graduate attributes, ensuring holistic development. The evaluation process systematically checks if the student has acquired not just knowledge but also the requisite **professional skills, ethical values, and communication competence**.

1.3 Overview of the Attainment Evaluation Process

The evaluation process is bifurcated into two essential categories to capture both academic performance and holistic skill acquisition :

1. **Direct Assessment:** Quantifiable data derived from academic performance (exams, labs, projects).
2. **Indirect Assessment:** Perceptual data gathered from stakeholders (students, alumni, employers) regarding professional competence and curriculum relevance.

Direct Assessment: Quantifying Academic Performance

Direct assessment forms the primary quantitative evidence for CO attainment, establishing a direct link between the assessment tool and the CO being measured.

2.1 Mapping Course Outcomes (COs) to Assessment Tools

For every subject, the faculty defines how specific COs are tested by specific questions or tasks within the assessment structure.

Assessment Tool	Focus and Alignment	POs Primarily Addressed
Theory/Practical Exams (SEE)	Evaluates 60–70% of the CO: Conceptual knowledge and final application skills.	PO1 (Knowledge), PO2 (Application)
Assignments and Quizzes (CIA)	Evaluates 15–20% of the CO: Continuous learning and foundational understanding.	PO1, PO5 (Lifelong Learning)
Lab Work and Practical Files	Evaluates 10–15% of the CO: Hands-on skills, safety compliance (BSc, B.Sc. N&M, B.Sc. Home Science).	PO2, PO4 (Ethics/Safety)
Projects and Seminars	Evaluates 10–15% of the CO: Complex problem-solving, teamwork, and presentation (BCA, BA, B.Sc. N&M).	PO2, PO3 (Ethics/Communication)

2.2 CO Attainment Calculation Methodology

The college employs a uniform, weighted formula to calculate the final CO Attainment score, combining Internal Assessment (CIA) and Semester-End Examination (SEE) performance.

Institutional Attainment Target: 60% of enrolled students must score 60% or above in the assessment components linked to a specific CO.

1. Defining Success Thresholds:

- **Internal Assessment (CIA):** Success is achieved if $\geq 70\%$ of students score $\geq 70\%$ of the maximum CIA marks for the mapped CO.
- **External Assessment (SEE):** Success is achieved if $\geq 60\%$ of students score $\geq 60\%$ of the maximum SEE marks for the mapped CO.

2. Weighted Formula: The two components are weighted to reflect their relative academic importance:

$$\text{CO Attainment Score} = (0.4 \times \text{CIA Performance}) + (0.6 \times \text{SEE Performance})$$

2.3 PO-CO Mapping Matrix and Weighting

The **PO-CO Matrix** is critical for translating CO achievement into PO achievement. It defines the intensity of the relationship between each CO and its corresponding PO.

Mapping Level	Description	Numerical Weight (Used in PO calculation)
H (High)	Strong correlation; CO is central to achieving the PO.	3
M (Medium)	Moderate correlation; CO contributes significantly to the PO.	2

Mapping Level	Description	Numerical Weight (Used in PO calculation)
L (Low)	Slight correlation; CO provides foundational support to the PO.	1
- (None)	No relationship between the outcomes.	0

PO Attainment Calculation and Measurement

The attainment of a Program Outcome (PO) is a holistic measure derived from the cumulative attainment of all relevant COs, weighted by their contribution as defined in the PO-CO matrix.

3.1 The PO Attainment Formula

The final PO Attainment score (PO Attainment $_{j}$) is calculated as the weighted average of the Attainment Scores of all Course Outcomes (CO Attainment $_{i}$) that are mapped to that PO, where the weight is the Mapping Level ($\text{Mapping Level}_{i,j}$).

$$\text{PO Attainment}_j = \frac{\sum \text{Mapping Level}_{i,j} (\text{CO Attainment}_i \times \text{Mapping Level}_{i,j})}{\sum \text{Mapping Level}_{i,j}}$$

3.2 Outcome Measurement Scale

The college uses a standardized 3-level scale to categorize and interpret the final Attainment Scores for both COs and POs.

Attainment Percentage	Attainment Level	Pedagogical Interpretation
$\geq 70\%$	High (H)	Outcome is fully achieved; practices are highly effective. Maintain and disseminate best practices.
50%–69%	Medium (M)	Outcome is substantially achieved; requires moderate pedagogical adjustment or targeted reinforcement.
$< 50\%$	Low (L)	Outcome is not achieved; requires major curriculum or assessment redesign.

3.3 Illustrative PO Attainment Summary (Across all Programs)

This aggregated summary provides an institutional snapshot of outcomes achievement:

PO Focus (Example)	Program	Illustrative Attainment Score	Attainment Level
Computational Theory	BCA	70.8%	High (H)
Critical Thinking	BA	75.5%	High (H)
Scientific Methods	BSc	65.1%	Medium (M)
Professional Ethics	B.Sc. N&M	68.3%	Medium (M)
Social Responsibility	B.Sc. Home Science	69.0%	Medium (M)

Analysis reveals strong core knowledge acquisition (PO1) but moderate performance in complex application skills (PO2, PO3) and ethical conduct (PO4), necessitating targeted improvements.

Indirect Assessment: Gauging Perception and Relevance

While Direct Assessment measures *what* students learned, Indirect Assessment measures *how* well they apply those skills in real-world contexts and *how* satisfied they are with the learning process.

4.1 Stakeholder Feedback Mechanisms

The college systematically collects feedback from three key stakeholders using structured surveys :

Stakeholder Group	Primary Tool	POs Targeted	Measurement Focus
Students (Exit Survey)	Final-year satisfaction and self-assessment survey.	PO3, PO5 (Ethics, Lifelong Learning, Communication)	Perceived skill acquisition and confidence.
Alumni	Post-graduation survey (1 and 3 years).	PO4, PO5 (Adaptability, Research, Curriculum Relevance)	Impact of curriculum on career progression.
Employers (Internship/Placement)	Structured feedback form during internships.	PO3 (Teamwork, Professionalism, Ethics)	On-the-job performance and behavioral attributes.

4.2 Incorporating Indirect Assessment into PO Attainment

To ensure indirect data influences the evaluation, a structured approach is used:

1. **Scoring:** Survey responses (typically on a Likert scale) are converted to a percentage score (e.g., 4.0/5.0=80%).
2. **Weighting:** Indirect attainment is used as an additive factor, contributing **10%** to the final PO Attainment score, with Direct Assessment retaining 90% of the weight.
3. **PO Attainment Final:**

$$\text{PO AttainmentFinal} = (0.9 \times \text{PO AttainmentDirect}) + (0.1 \times \text{PO AttainmentIndirect})$$

This mechanism ensures that the professional and ethical outcomes (PO3, PO4) are rigorously verified by external industry standards, making the overall assessment robust and industry-aligned.

Continuous Improvement and Quality Assurance

The Attainment Evaluation Process culminates in the annual review by the IQAC, leading directly to the formulation of the **Continuous Improvement Plan (CIP)**.

5.1 Annual Review and Action Planning

Every year, the IQAC holds a dedicated review meeting where Departmental Outcome Assessment Teams present the following:

1. **PO Attainment Status:** Summary of High, Medium, and Low outcomes.
2. **Root Cause Analysis:** Identification of the specific academic or pedagogical factors contributing to Medium/Low scores (e.g., inadequate lab resources, outdated curriculum topics, weak assessment design).
3. **Corrective Actions:** Formulation of specific, measurable, achievable, relevant, and time-bound (SMART) targets for improvement.

5.2 Implementation of Corrective Actions (Example)

Program	PO with Medium Attainment	Root Cause Identified	Corrective Action (CIP)
BCA	PO3 (Ethics & Communication)	Lack of structured feedback on presentations.	Introduce mandatory soft-skills lab with 20% weight on structured communication rubrics.
BSc	PO2 (Scientific Methods)	Insufficient exposure to independent research design.	Mandate a Guided Research Proposal assignment in the third semester.
B.Sc. N&M	PO3 (Professionalism)	Low score in Cyber Security (CO C1) due to theory focus.	Integrate live firewall configuration/secure coding practical modules into 50% of lab time.

5.3 Documentation and Publicity

Transparency is key to the OBE process. The attainment results and improvement plans are rigorously documented and disseminated:

1. **NAAC Reporting:** Detailed PO-CO matrices and attainment reports are submitted to the National Assessment and Accreditation Council (NAAC) and other regulatory bodies.
2. **Public Disclosure:** The COs, POs, and the *summary* of attainment results are uploaded on the college website and displayed in departmental notice boards. This informs students and stakeholders about the program's effectiveness and areas of focus.
3. **Faculty Development:** Low attainment scores trigger mandatory Faculty Development Programs (FDPs) focused on enhancing pedagogical skills or domain expertise related to the underperforming COs.

Conclusion and Future Outlook

The Attainment Evaluation Process at Jalna College of I.T., Jalna, is a comprehensive, cyclical, and data-driven system that successfully ensures alignment between the institution's vision and student learning outcomes. By giving appropriate weight to both direct academic performance and indirect professional validation, the college maintains a high standard of education, fulfilling its commitment to producing knowledgeable, skilled, and ethically sound graduates prepared for the evolving demands of their respective industries. The annual review guarantees that the curriculum remains dynamic and responsive, driving continuous quality enhancement.