Manual for

CO-PO-PSO

Attainment and Assessment Process

DAV UNIVERSITY

Empowering Students with 21st Century Skills

INTRODUCTION

DAV University follows a blended learning model, ensuring that the teaching-learning process aligns with the latest guidelines issued by UGC, NAAC, and other regulatory bodies. Faculty members are encouraged and supported to remain updated with recent advancements in pedagogy and subject-specific developments. The Internal Quality Assurance Cell (IQAC) plays a pivotal role in steering the academic community towards adopting and effectively implementing outcome-based education. DAV University adheres to internal academic regulations while also aligning with national educational standards. The IQAC ensures the clear articulation of Programme Outcomes (POs), Programme Specific Outcomes (PSOs), and Course Outcomes (COs) for all undergraduate and postgraduate programmes. Furthermore, it promotes the use of innovative methods for outcome mapping and attainment, thereby fostering continuous improvement in academic delivery and student learning.

PROCESS OF ESTABLISHING THE PO-PSO-CO

The university has implemented outcome-based education from 2022 and the POs and COs are listed in the syllabus for each program. A committee comprising of Coordinators, faculty and IQAC members prepares a final version by compiling the data given in syllabus.

STATEMENTS OF PO

Program outcomes: Describe what students are expected to know and would be able to do by after the completion of degree. These relate to the skills, knowledge, and behaviours that students acquire as they progress through the program.

Engineering Degree	
PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.

PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Management Program	
PO1	**Business Environment and Domain Knowledge:** Economic, legal, and social environment of Indian business. Graduates can improve their awareness and knowledge about the functioning of the local and global business environment and society. This helps in recognizing the functioning of businesses, identifying potential business opportunities, evolving business enterprises and exploring entrepreneurial opportunities.
PO2	**Critical thinking, Business Analysis, Problem Solving and Innovative Solutions:** Competencies in quantitative and qualitative techniques. Graduates are expected to develop skills on analyzing the business data, application of relevant analysis, and problem solving in other functional areas such as marketing, business strategy and human resources.
PO3	**Global Exposure and Cross-Cultural Understanding:** Demonstrate a global outlook with the ability to identify aspects of the global business and Cross-Cultural Understanding.
PO4	**Social Responsiveness and Ethics:** Developing responsiveness to contextual social issues / problems and exploring solutions, understanding business ethics and resolving ethical dilemmas. Graduates are expected to identify contemporary social problems, explore the opportunities for social entrepreneurship, design business solutions and demonstrate ethical standards in organizational decision making.

	Demonstrate awareness of ethical issues and can distinguish ethical and unethical behaviours.
PO5	**Effective Communication:** Usage of various forms of business communication, supported by effective use of appropriate technology, logical reasoning, articulation of ideas. Graduates are expected to develop effective oral and written communication especially in business applications, with the use of appropriate technology (business presentations, digital communication, social network platforms and so on).
PO6	**Leadership and Teamwork:** Understanding leadership roles at various levels of the organization and leading teams. Graduates are expected to collaborate and lead teams across organizational boundaries and demonstrate leadership qualities, maximizing the usage of diverse skills of team members in the related context.

UG/PG Programs in Sciences/Education/Humanities/Law & Legal Studies	
PO1	**Critical Thinking:** Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
PO2	**Effective Communication:** Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
PO3	**Social Interaction:** Elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO4	**Effective Citizenship:** Demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.
PO5	**Ethics:** Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PO6	**Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development.
PO7	**Self-directed and Life-long Learning:** Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

STATEMENTS OF PSO

Program Specific Outcomes (PSOs) are statements that describe what students are expected to **know, understand, and be able to do** upon the successful completion of a specific academic program. These outcomes are more **focused and discipline-specific** than general Program Outcomes (POs), and they align with the **core competencies** of the subject or field of study.

Key Features:

- Derived from **Program Educational Objectives (PEOs)**.
- Aligned with **Course Outcomes (COs)** and **Program Outcomes (POs)**.
- Designed to be **measurable and assessable**.
- Reflect **theoretical knowledge**, **practical skills**, and **professional competencies** in the specific domain.

For Example:

B.Tech. Civil Engineering

PSO1: Understanding: Graduates shall demonstrate sound knowledge in analysis, design, laboratory investigations and construction aspects of civil engineering infrastructure, along with good foundation in mathematics, basic sciences and technical communication.

PSO2: Broadness and Diversity: Graduates will have a broad understanding of economical, environmental, societal, health and safety factors involved in infrastructural development, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.

PSO3: Self-Learning and Service: Graduates will be motivated for continuous self-learning in engineering practice and/or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.

Master of Business Administration (MBA)

PSO1: To impart students with leadership skills and critical thinking for developing divergent thinking so they can create solutions to real: world problems

PSO2: To create mindful managers who take care of the environment and society while making business decisions

PSO3: To impart domain: specific and functional area knowledge through theory and practice

PSO4: To facilitate students to become entrepreneurs through Entrepreneurship Development Activities

STATEMENTS OF CO

Course Outcomes (COs) are clear, specific statements that describe what a student is expected to **learn, achieve, or demonstrate** after successfully completing a particular **course** within a program.

The keywords used to define **COs** are based on **Bloom's Taxonomy.**

Bloom's Taxonomy

Sample CO statements

Programme Name: BBA

Course Name: Principles and Practices of Management
Course Code: MGN101
Course Outcomes:

CO1 Understand various functions and functional areas of management and preview the contributions made by different contributors in the management.
CO2 Evaluate and analyse business environment for planning, organizing as well as formulating organization structures.
CO3 Examine the functions of staffing and tools of directing, and controlling.
CO4 Understand emerging issue of management in the changing business environment

Course Name: Micro Economics
Course Code: ECN101
Course Outcomes:

CO1 Apply the basic concepts of scarcity and opportunity cost and manipulate the basic demand and supply model to determine an equilibrium price and quantity, changes to equilibrium price and quantity, and their impact on resource allocation.
CO2 Explain the theory of consumer behaviour.
CO3 Apply theory of the production and cost in real market situation.
CO4 Evaluate the pricing decisions under different market structures and use basic cost-benefit calculations as a means of decision making (i.e., thinking like an economist)

Programme Name: BAJMC

Course Name: History of the Media
Course Code: MCJ101
Course Outcomes:

CO1 Demonstrate an understanding of the origins of different media.
CO2 Analyse the different ages of Indian Cinema.

CO3 Discuss the role of newspapers and radio during the fight for India's independence.
CO4 Know about the history of print & electronic media.

Programme: B.Sc. (Hons.) Zoology

Course Code: ZOO135
Course Name: Diversity of Non-Chordates
Course Outcomes

CO1 develop understanding on the diversity of life with regard to non-chordates.
CO2 group animals on the basis of their morphological characteristics/ structures.
CO3 develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.
CO4 research to find the process involved in studying biodiversity and taxonomy besides improving their writing skills. It will further enable the students to think and interpret individually due to different animal species chosen.

Programme: BTech-Mechanical

Course Code: MEC101A
Course Name: Engineering Drawing
Course Outcomes

CO1 At the end of the course a student will be able to understand the concepts of Engineering Drawing, understanding plain scale and diagonal scale and projection of point in different quadrants.
CO2 The student will have the basic understanding projection of Lines, Planes and Solids placed in 1st or 3rd quadrant
CO3 The student will be able to understand & draw the section of solids, and development of surfaces and learn about their physical significance.
CO4 The student will have a working knowledge of isometric projections and orthographic projection and will have exposed to basic commands of Auto CAD software.

PUBLISHING THE PO-PSO-CO

The PO-PSO-CO statements are published and disseminated using the following methods.

- Distributed along with syllabus
- Explanations to students during orientation sessions
- Displayed on Department notice boards
- Displayed at various locations in the respective Departments on Sun Boards
- Published in Academic Regulations
- Displayed on university website for example Department of Computer Science and Engineering Programme Outcomes (POs)

CO-PO & CO-PSO MAPPING OF COURSES

After the Course Outcomes (COs) are formulated for each course, they are systematically mapped to the relevant Program Outcomes (POs) and Program Specific Outcomes (PSOs).

This mapping ensures alignment between course-level learning and the overarching goals of the academic program.

The **faculty in-charge of the course** is responsible for preparing the initial **CO-PO & CO-PSO matrices**, identifying the degree of correlation between each CO and the corresponding POs and PSOs using defined correlation levels (e.g., Low – 1, Medium – 2, High – 3). These mappings are reviewed and validated by the **Department Coordinator**, who plays a key role in consolidating the COs for the respective semester or academic year.

This consolidated data is periodically submitted to the **IQAC** to facilitate the evaluation of **PO & PSO attainment** at both the course and program levels. The entire process is conducted under the **guidance and supervision of the IQAC**, which ensures adherence to quality benchmarks and outcome-based education (OBE) practices.

It is essential that **all the courses across the program collectively address and contribute to the attainment of all defined POs and PSOs**. The use of CO-PO and CO-PSO matrices ensures transparency and traceability in curriculum delivery and outcome assessment, thereby promoting continuous improvement in academic standards.

SAMPLE CO-PO AND CO-PSO MAPPING

DAV University, Jalandhar									
Faculty Name	**Dr. Ashish Sharma**								
Course Name	Scientific Writing and Research Methodology						**Course Code**	BOT621	
	Program Outcomes (POs)/Program Special Outcome (PSO's)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	1	1	-	-	3	1
CO2	3	3	-	2	-	1	-	3	1
CO3	3	1	2	3	1	-	1	3	1
CO4	3	-	2	-	-	1	-	3	1
AVG.	3	1.5	1.25	1.5	0.5	0.5	0.25	3	1

PROCESS IN CO-PO MAPPING

Step 1: Obtain Course Outcome.

Step 2: Mapping of Course Outcome with Program Outcome by the course instructor.

Step 3: Head of the department review the CO statement and CO-PO mapping.

Step 4: The documentation for the CO attainment target level prepared by course instructor.

Step 5: CO measurement through assessment by course instructor.

Step 6: Obtain CO attainment table through direct assessment methods.

Step 7: Obtain PO attainment table through direct assessment methods.

Step 8: Submit CO PO attainment report to HOD.

Step 9: HOD would consolidate the CO and PO attainment of the programme and submit report to IQAC.

Step 10: IQAC will list out the steps to be taken to bridge the curricular gap. Content beyond the syllabus may be delivered to the students through teaching, arranging guest lectures, providing online videos courses, external training, online quiz etc.

SAMPLE CO-PO AND CO-PSO ATTAINMENT

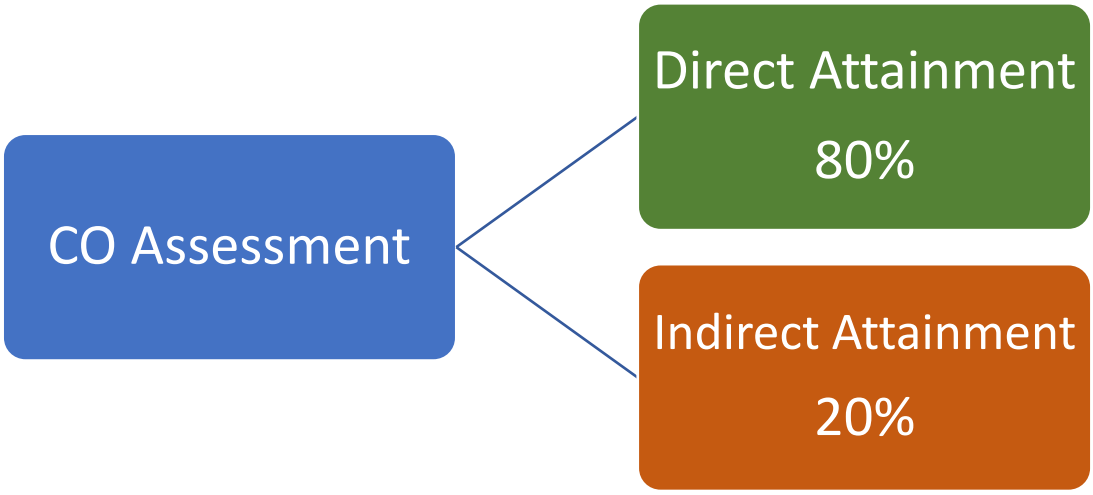
DAV University, Jalandhar									
Faculty Name	**Dr. Ashish Sharma**								
Course Name	Scientific Writing and Research Methodology						**Course Code**	BOT621	
	Program Outcomes (POs)/Program Special Outcome (PSO's)								
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	3	2	1	1	1	-	-	3	1
CO2	3	3	-	2	-	1	-	3	1
CO3	3	1	2	3	1	-	1	3	1
CO4	3	-	2	-	-	1	-	3	1
	3	1.5	1.25	1.5	0.5	0.5	0.25	3	1
PO/PSO ATTAINMENT= (CO-PO-PSO AVERAGE/3)*CO ATTAINMENT									
Direct PO/PSO Att	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
	3.0	1.5	1.2	1.5	0.5	0.5	0.2	3.0	1.0

SAMPLE ARTICULATION MATRIX FOR THE PROGRAM

DAV UNIVERSITY, JALANDHAR												
DEPARTMENT OF BOTANY AND ENVIRONMENT SCIENCE												
PO ATTAINMENT SHEET (M.Sc. Botany)												
BATCH 2023-2025												
			PO ATTAINMENT LEVEL									
SESSION	COURSE CODE	SUBJECT NAME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
23241	BOT521	Algae, Fungi and Phytopathology	2.7	2.3	0.8	0.9	1.3	2.9	2.9	2.9	2.5	2.7
	BOT522	Algae, Fungi and Phytopathology Laboratory	2.7	2.3	0.8	0.9	1.3	2.9	2.9	2.9	2.5	2.7
	BOT529	Genetics and Cytogenetics	2.6	2.4	2.5	2.2	2.3	1.5	1.5	2.4	2.3	2.4
	BOT530	Genetics and Cytogenetics Laboratory	1.6	1.5	1.5	2.1	2.2	2.6	2.7	1.5	2.5	2.5
	BOT531	Archegoniate Biology	2.9	1.5	1	1.5	1.5	1.9	0.5	2.9	1.3	1.8
	BOT532	Archegoniate Biology Laboratory	1.6	1.5	1.5	2.2	2.2	2.6	2.7	1.5	2.4	3
	BOT539	Plant Cell Biology and Biochemistry	1.8	1.7	1.6	2.7	2.6	2	2.4	1.6	2	2.1
23242	BOT533	Plant Physiology	2.8	1.9	0.7	0.9	0.5	2.8	0.9	1.6	1.6	2.1
	BOT534	Plant Physiology Laboratory	1.6	1.6	1.5	2.4	2.3	2.6	2.7	1.6	2.5	2.5
	BOT535	Conservation of Natural Resources	1.5	1.5	1	1.3	1.3	1.5	2.3	1.3	1.2	2.4
	BOT536	Conservation of Natural Resources Laboratory	3	3	2.5	3	2	3	1	1	3	1.5
	BOT540	Evolutionary Biology of plants	2.3	1.5	2.3	1.1	0.8	1.9	2	1.3	1.5	1.3
	BOT541	Agricultural Botany	2.3	2.1	2	2.5	2.6	2.2	2.3	2	2.2	2.3
	BOT542	Agricultural Botany Laboratory	1.7	1.6	1.5	2.6	2.5	2.3	2.4	1.6	2.2	2.2

ASSESSMENT PROCESS FOR CO ATTAINMENT

Course Outcome is evaluated based on the performance of students in continuous assessment and in university examination of a course which combine to contribute as "direct attainment". Direct attainment contributes 80% and course exit survey conducted by IQAC contributes 20% to the total attainment of a CO.



Assessment Parameters: The performance of a student in each semester shall be evaluated course-wise with a maximum of 100 marks.

(i) Pattern for Assessment:

Assessment:	Mid Semester Exam (MSE) – 25 Marks Written Quiz (MCQs) – 10 Marks Assignment (written) – 10 Marks End Semester Examination (ESE) – 50 Marks Attendance – 5 Marks
Model Question Paper: MSE	Q.1 Comprises of 5 parts having 1 mark each with all questions compulsory. Q.2 to Q.4 carries 4 marks each, with each question having an internal choice. Q.5 carries 8 marks with an internal choice.
Model Question Paper: ESE	Q.1 Comprises of 10 parts having 1 mark each with all questions compulsory. Q.2 to Q.7 carries 4 marks each, with each question having an internal choice. Q.8 and Q.9 carries 8 marks each, with each question having an internal choice.

(ii) CO-wise assessment Rubrics: Every exam question is mapped to a specific CO. Thereafter, a CO -wise cutoff value is taken based on the following rubrics:

Marks scored between	Rating on 3 point scale
50.1% to 60%	1
60.1% to 70%	2
70.1% and above	3
50% and Less	0

Overall Attainment: The Final CO attainment is calculated by combining the direct attainment and indirect attainment in a ratio of 80:20.

For example:

CO ATTAINMENT		
Particulars	**Direct Attainment**	**Indirect Attainment**
CO		
CO1	2.89	
CO2	3	
CO3	3	
CO4	3	
AVERAGE	2.972222222	2.90
Weightage	80%	20.00%
Att	2.377777778	0.58
Final att	2.96	

SAMPLE CALCULATION OF CO-ATTAINMENT FOR A COURSE

DAV University, Jalandhar
Department of Botany and Environment Science
CO Attainment Cumulative
Faculty Name: Dr. Ashish Sharma

Course Name: SWRM | Course Code:BOT621 | Program : M.Sc. BOT | Semester:3

		CO's	CO1	CO1	CO1	CO2	CO2	CO1	CO1	CO2	CO2							
		PO's																
			MSE												Total	Assignmen	Quiz	
		Questions	Q.1					Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8				
			i.	ii.	iii	iv	v.						a.	a.				
		50% of Marks Allocated	0.5	0.5	0.5	0.5	0.5	2	2	2	4	2	2	2.5		5	5	
		Marks allotted	1	1	1	1	1	4	4	4	8	4	4	5	25	10	10	
	StudentName	RegdNo																
1	LOVELEEN KAUR	12300585	1	1	1	1	1		1		5				11	8	5	
2	TAJPREET KAUR	12300734	1	1	1	1	1	4	4	4	8				25	9	9	
3	OSHEEN GULERIA	12300781	1	1	1	1	0	4	4	2	4				18	9	8	
4	PRIYANKA KUMARI	12300784	1	1	1	1	1	4	4	2	8				23	9	9	
5	SARGAM BALA	12300810	1	0	1	1	0	4	2	0	5				14	9	8	
6	DEEPANSHU	12300962	1	1	1	1	1	4	4	4	8				25	8	9	
7	PRIYANKA	12301029	1		1	1		2	3	1	5				14	9	8	
8	SHREYA	12301095	1	1	1	1	1	4	3	4	6				22	9	10	
9	KANIKA KATWAL	12301168	0	1	1	0	1	4	4	4	8				23	9	9	
10	SAKSHI KATOCH	12301211	0	1	1	1	1	4	4	4	8				24	9	9	
11	AKANKSHA SHARM	12301284	0	1	1	1	1	2	4	4	7				21	9	10	
12	POOJA KUMARI	12301603	0	1	1	1	0	4							7	9	9	

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