METHODS OF THE ASSESSMENT OF LEARNING OUTCOMES AND GRADUATE ATTRIBUTES

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1. INTRODUCTION

Outcome Based Education

VISTAS ensures that all academic program are equipped with both generic and Program Specific Outcomes, strategically designed to ensure the acquisition of essential graduate attributes aligned with the objectives of Outcome-Based Education (OBE). These overarching Program Outcomes (PO) and Program-Specific Outcomes (PSO) serve as a framework to ensure that students, upon completion of their respective program, possess a well-defined set of attributes contributing to their overall academic and professional development.

The AICTE guidelines for assessment of PO attainment are followed in general with minor variations across the different program. Direct assessments via Continuous Internal assessments, Assignments, Seminars, End Semester Examination etc., and indirect methods of assessment such as course exit survey, program exit survey, alumni feedback etc., are used to understand the attainment of CO, PO and PSO of students.

Learning Outcomes

The Course Outcomes (COs) of each course serve as declarations that delineate the fundamental and enduring disciplinary knowledge and necessary skills for students, as well as the expected level of learning upon course completion. These CO, which contribute to PO, play a significant role in formulating and revising the curriculum. This OBE approach aligns with the Mission and Vision of VISTAS.

The CO for each course are identified to achieve the PO and PSO. All courses relevant to a particular program offered by VISTAS are aligned with PO and PSO. Feedback received from stakeholders through IQAC is utilized in defining the CO, PO and PSO, which are subsequently approved by the Board of Studies (BoS), Academic Council, and the Board of management (BOM).

Assessment Process

The relevance of the assessment process is deliberated upon during the meetings of the BoS and Academic Council, where expert members define the assessment methods for each course. This assessment process is integrated into the curriculum and syllabus, subsequently approved by the BOM.

All departments systematically conduct continuous assessments to identify, collect, analyze, and evaluate data aimed at measuring the attainment of CO. The calculation of CO attainment involves the integration of data from theoretical courses, laboratory courses, and project courses. A standardized approach is employed, with 40% weightage allocated to Continuous Internal Assessment (CIA) and 60% weightage to End Semester Examinations for all courses.

PO, PSO and CO are made aware through the following procedures.

The PO, PSO and CO are conveniently accessible on the Institute's website, providing transparent information for easy reference and are disseminated among various internal and external stakeholders through various modes and occasions such as the Institution Website, classrooms, departments, laboratories, etc.

To enhance visibility and awareness, the Vision, Mission, PEOs, POs, and PSOs are prominently displayed in various locations throughout the campus, including corridors, classrooms, department offices, laboratories, and the department library.

Feedback relevant to POs and PSOs is collected from parents, academic peers, industry experts, and alumni by IQAC. Discussions on CO and evaluation measures take place in class committee meetings.

At the beginning of each unit and upon completion of every course, the methods for assessing Course outcomes are thoroughly reviewed and discussed in class.

2. PROGRAM OUTCOMES (PO) AND PROGRAM SPECIFIC OUTCOMES (PSO)

Program Outcome (POs) is the outcomes that students are expected to know and be able to perform or attain by time of graduation. They reflect the skills, knowledge and abilities of graduates regardless of the field of study and are common for all program. POs give useful guidance at the program level for the curriculum design, delivery and assessment of student learning. However, they represent fairly high-level generic goals that are not directly measurable. POs are designed to equip students with a wide range of essential skills required for professional and personal success. They are generally aligned with national or international educational standards and institutional goals.

Key Aspects of Program Outcomes:

1. **Generic Competencies:** POs emphasize skills that are broadly applicable to various domains of life and work, such as critical thinking, problem-solving, and communication.
2. **Holistic Development:** They focus on the overall development of the learner, including ethical reasoning, environmental awareness, teamwork, and adaptability to change.
3. **Employability and Lifelong Learning:** POs often aim to prepare graduates to succeed in the workforce and engage in lifelong learning, ensuring they remain relevant in a changing professional landscape.

Program Specific Outcomes (PSOs) are tailored outcomes that focus on the specialized knowledge, technical skills, and proficiencies that are specific to a particular program or discipline. They relate directly to the academic and professional requirements of the field, and they are designed to ensure that graduates are capable of applying their learning to real-world scenarios in their chosen field.

Key Aspects of Program Specific Outcomes:

1. **Discipline-Specific Knowledge:** PSOs focus on the core competencies that students need to acquire in their specific field of study (e.g., computer science, engineering, business, arts, etc.).

2. **Technical Proficiency:** These outcomes often include specialized technical or professional skills that are required to solve domain-specific problems.

3. **Professional Readiness:** PSOs are aligned with the expectations of the industry or profession related to the program, ensuring that graduates are job-ready or prepared for further study.

4. **Application of Theory to Practice:** PSOs often include the practical application of theoretical concepts to real-world challenges within the domain.

The PO's and PSO's are defined to be in alignment with the Vision and Mission of the Institution and the Department. The feedback from internal and external Stakeholders are considered when framing the PO and PSO. The statements are endorsed by the IQAC and disseminated. Periodic review of the statements is done by the IQAC and modifications are made as required.

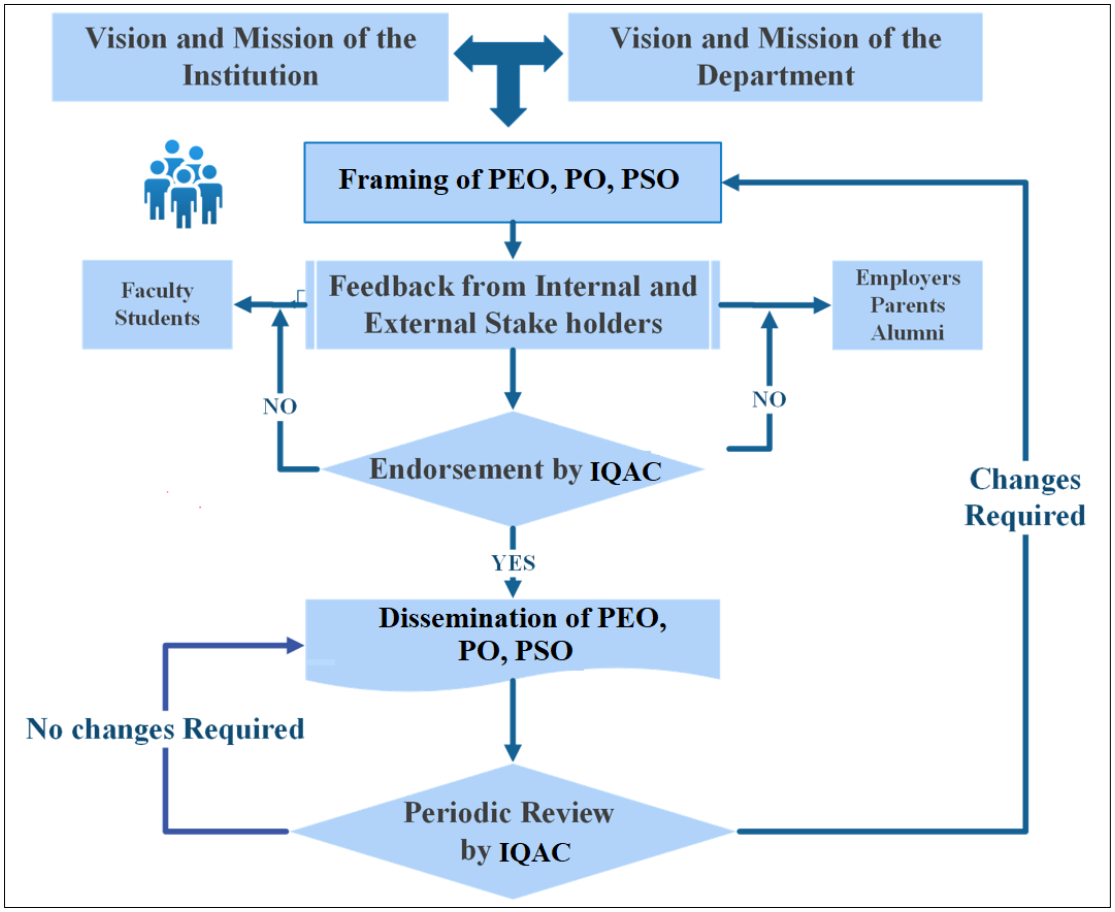


Figure 1: Process of defining PO and PSO

Table 1: PO for MBBS

POs	PO Statements
PO1	Medical Knowledge and Skills: Demonstrate comprehensive knowledge of clinical sciences, perform accurate clinical assessments, analyses clinical problems critically and develop appropriate treatment plans
PO2	Professionalism and Responsibilities: Exhibit ethical conduct, integrity, and adherence to legal standards in medical practice, research, and interactions with patients and colleagues. Respect patients' autonomy, privacy, and confidentiality.
PO3	Patient Care: Provide compassionate, patient-centered care, address the physical, psychological, and social needs of patients
PO4	Lifelong Learning and Professional Development: engage in continuous learning and self-improvement to maintain competence. Stay updated with advances in medical knowledge, technology, and healthcare practices.
PO5	Leadership and Advocacy : Demonstrate leadership skills and advocate for the health needs of patients and communities

Table 2: POs for B. Pharm

POs	**PO Statements**
PO1	**Pharmacy Knowledge**: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.
PO2	**Pharmacy Knowledge**: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.
PO3	**Problem analysis**: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
PO4	**Modern tool usage**: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

PO5	**Leadership skills**: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
PO6	**Professional Identity**: Understand, analyse, and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
PO7	**Pharmaceutical Ethics**: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PO8	**Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
PO9	**The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
PO10	**Environment and sustainability**: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO11	**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. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

Table 3: PO for all programmes in Engineering

POs	PO Statements
PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identity, 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 the public health and safety, and the 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 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.

Table 4: PO's for B. Sc Biochemistry

POs	PO Statements
PO1	**Scientific knowledge:** Graduates will acquire biochemistry/biotechnology / bioinformatics/ microbiology specific knowledge, including recent techniques in the respective fields coupled with hands-on skills and leadership skills for a successful career.
PO2	**Problem analysis:** Graduates will be able to analyse, solve and troubleshoot problems in implementation of biochemistry/biotechnology/ microbiological protocols.
PO3	**Design/development of solutions:** Graduates will develop creative thinking and cooperate with each other to solve problems in the field of biochemistry/biotechnology/bioinformatics/ microbiology.
PO4	**Conduct investigations of complex problems:** Graduates will acquire practical skills – which help in planning and designing protocols to validate hypothesis and execute experimental techniques independently as well as assimilate, analyse and interpret subsequent data.
PO5	**Modern tool usage and communication:** Graduates will effectively be able to manage resources and time using ICT and computer enabled devices and accomplish ability to understand and communicate all ideas effectively.
PO6	**Environment sustainability and Ethics:** Graduates will get adequate knowledge to use information and implement solutions for environmental protection and remediation. Graduates will be aware of their role and responsibility in handling and use of microbes including genetically modified microorganisms.
PO7	**Lifelong learning:** Graduates will carry on to learn and adapt in a world of constantly evolving technology.

Table 5: PO for MBA

POs	PO Statements
PO1	Apply knowledge of management theories and practices to solve business p roblems.
PO2	Foster analytical and critical thinking abilities for data-based decision making.
PO3	Ability to develop value based leadership ability.
PO4	Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business

PO5	Ability to lead themselves and others in the achievement of organizational goal, contributing effectively to a team environment

Table 6: PO for M.P.T (Neurology)

POs	PO Statements
PO1	Graduates of the Master of Physiotherapy program will demonstrate communication skills to Work creatively and effectively to uphold the professional standards and relationships with a range of stakeholders like patients, care takers, family members and other clients.
PO2	Graduates of the Master of Physiotherapy program will demonstrate cognitive and creative skills to Critically evaluate and apply physiotherapy approaches, paradigms and techniques and utilise appropriate, evidence-based skills, techniques and practice in managing and treating people with injury, disability or illness in a range of health care and/or rehabilitation settings.
PO3	Graduates of the Master of Physiotherapy program will demonstrate technical skills to Integrate the core areas of physiotherapy practice with emphasis on demonstrated mastery of evidence-based practice, clinical skills, clinical reasoning and decision making in order to apply creativity and initiative to new situations in professional practice.
PO4	Graduates of the Master of Physiotherapy program will demonstrate the broad application of knowledge and skills to solve problems individually and independently justify diagnostic decisions and management strategies on basic of clinical assessment findings.
PO5	Graduates of the Master of Physiotherapy program will demonstrate technical skills to apply treatment methods and techniques, to address client needs, safely and with appropriate regard to professional and legislative guidelines, standards and requirements.

Table 7: PSO Statements for B. Pharm

PSO	PSO Statements
PSO1	To develop the knowledge in technical or professional careers in various pharmaceutical industry and/ or institute and /or Health care system through excellent real time exposure to rigorous education.
PSO2	To apply the skills of manufacturing, formulation/preparation and quality control of various pharmaceutical preparations.

PSO3	To design the modern tools to integrate health care systems, design an effective product with commercial advantage and societal benefit, perform risk analysis and become entrepreneur

Table 8: PSO for B.Tech ECE

PSO	PSO Statements
PSO1	Design and analyze the concepts and applications in the field of Communication, Cognitive Networks, Signal & Image processing, Embedded systems, Data Science and Artificial Intelligence to find solutions to the real-world problems.
PSO2	Demonstrate the acquired professional and competitive skills for successful Carrier, demonstrating the practice of Professional Ethics and the concerns for Social and Environmental impact technologies.

Table 9: PSO for B.Tech CSE

PSO	PSO Statements
PSO1	An expert with an aptitude and competence to analyze, design, model, develop, test and manage information systems to offer customized solutions.
PSO2	A professional with learning abilities to face upcoming challenges in the field of Information Technology.

Table 10: PSO for MBA

PSO	PSO Statements
PSO1	Develop aptitude for creativity, innovation and entrepreneurship.
PSO2	Adapt life-long learning and professional development to enrich competencies so as to match global opportunities & challenges.

PSO3	Conduct systematic inquiry in current issues like diversity, equity & sustainability in business and management.

Table 11: PSO for M.P.T (Neurology)

PSO	PSO Statements
PSO1	To demonstrate critical, analyse of relevant published literature in neurological physiotherapy.
PSO2	To demonstrate evidence-based practice methods in clinical decision-making skills in neurological research
PSO3	To plan relevant advanced therapeutic methods in treating neurological patients.

3. COURSE OUTCOMES (CO)

Course Outcomes (COs) are specific, measurable statements that describe what students should know, understand, and be able to do after completing a particular course. They are used to assess the effectiveness of teaching and learning, and they align with the broader Program Outcomes (POs) and Program Specific Outcomes (PSOs).

All the courses have well defined Course Outcomes that are written such that they are,

- Declarative Sentences that describe the expected knowledge, skills and competencies of students
- Articulate the levels of learning that the students will demonstrate in the course using verbs from Blooms Taxonomy.
- Specific, Measurable, Achievable, Relevant and Time Bound (SMART)

Each CO should Begin with an action verb (based on Bloom's Taxonomy) that indicates the level of learning and contain a knowledge element that can be measured and evaluated.

Sample Course Outcomes as follows,

Course: Anatomy, MBBS

At the end of the course students should be able to,

CO1: Demonstrate a thorough understanding of the anatomical structures of all major systems of the human body, including the skeletal, muscular, nervous, cardiovascular, respiratory, digestive, urinary, and reproductive systems.

CO2: Understand histology, including the microscopic structure of tissues and organs, and be able to correlate histological features with their anatomical counterparts.

CO3: Discuss the basic principles of embryology, including the development of organ systems from embryonic germ layers and the formation of anatomical structures during fetal development.

CO4: Identify anatomical structures on medical imaging studies, such as X-rays, CT scans, MRI scans, and ultrasound, and understand how anatomical variations and pathologies are visualized on these images.

CO5: Understand the clinical relevance of anatomical knowledge and be able to apply anatomical principles to clinical scenarios, such as diagnosing diseases, interpreting medical imaging, and performing surgical procedures.

Course: Applied Anatomy, Nursing

CO1: Describe anatomical terms

CO2: Explain the general and microscopic structure of each system of the body.

CO3: Identify relative positions of the major body organs as well as their general anatomic locations.

CO4: Explore the effect of alterations in structure.

CO5: Apply knowledge of anatomic structures to analyse clinical situations and therapeutic applications.

Course: Human Anatomy and Physiology I, Pharmacy

CO1: Recognize the basic terminologies, various homeostatic mechanisms, Cell and tissue organization of human body.

CO2: Analyze the structure and functions of Skeletal system, Joints, integumentary system, hemopoietic & lymphatic system.

CO3: Examine the gross anatomy and physiology of special senses and peripheral nervous system.

CO4: Focus on the gross anatomy and physiology of cardiovascular system along with disorders.

Course: Pharmaceutical Analysis, Pharmacy

CO1: Discuss the basic concepts used in analytical skills and principles of acid base and non aqueous titrations for analysis of pharmaceuticals.

CO2: Analyze the principles and various techniques of redox titration and gravimetric analysis along with its applications in analysis.

CO3: Develop the fundamental concepts and significance of precipitation and complex metric titrations in the analysis of pharmaceuticals.

CO4: Discuss about the various principles of Diazotization titration and electrometrical methods of analysis along with its applications**.**

Course: Signals and Systems, B.Tech (ECE)

CO1: Classify and differentiate different types of signals and systems.

CO2: Apply Fourier Transform and Laplace Transform along with their properties and analyze continuous time signals.

CO3: Analyse Z transform and its variants like Unilateral and Bilateral Z transform,inverse Z-transform, their Region of convergence and properties.

CO4: Simplify Linear Time Invariant Continuous Time (LTI CT) system in terms of differential equation and understand its impulse and frequency response

CO5: Evaluate discrete time systems using state variable equations and matrix representation**.**

Course: Management Principles and Organizational Behaviour, MBA

CO 1: Assess the fundamentals of organizational behavior and OB Model

CO 2: Analyze the behavior of individuals and groups in organizations

CO 3: Describe the concept of leadership, communication, power and conflict resolution

CO 4: Demonstrate the dynamics of organizational change.

CO 5: Identify the major issues in business ethics and corporate social responsibility

Course: Management Principles and Organizational Behaviour, MBA

CO 1: List about basic cell biology, developmental biology principles and biomembarne and its functions

CO 2: Explain about the various cell organelles and nucleic acid structure and functions.

CO 3:Summarize on cell cycles of mitosis and meiosis with cell signaling and communications

CO 4: Explain about cancer biology and oncogeness

CO 5: Analyze on different aspects of embryo development and study about Gametogenesis of Male and female.

4. MAPPING OF COURSE OUTCOME TO PROGRAM OUTCOME AND PROGRAM SPECIFIC OUTCOME

To connect high-level learning outcomes (POs) with course content, Course Outcomes (CO) and assessment, there is a necessity to bring further clarity and specificity to the program outcomes. The mapping of CO's with PO's of all the program except engineering is identified by the course expert committee and the Program Articulation Matrix has formed.

The mapping of CO's with POs for Engineering Program is done by a two steps process,

i. Defining Competencies for the PO and PSO

ii. Defining Measurable Performance Indicators for the Competencies

CO's are mapped to PO's by identifying the competencies and performance indicators that correlate with the CO and PO.

The Subject Expert Committee of the departments carefully analyses the CO's and PO's to derive the mapping constants for the given course based on the correlation between the CO's and PO's. The mapping constants are given as follows,

- Mapping Constant is 3 if the correlation between the CO and PO is high
- Mapping Constant is 2 if the correlation between the CO and PO is medium
- Mapping Constant is 1 if the correlation between the CO and PO is low

The subject expert committee should also justify the mapping and correlation done to develop the CO-PO Mapping matrix or CO Articulation Matrix.

In the case of Engineering Programs, the mapping constants are derived based on the Competencies and Performance Indicators recommended by the AICTE Examination Reforms Policy. The CO-PO Mapping matrix or CO Articulation Matrix has developed based on the competencies and PIs.

The CO Articulation Matrix based on the above formulae is as shown below,

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	1	3	-	-	-	-	1	-	-	2	1
CO2	3	1	-	2	3	-	-	-	-	1	-	-	2	-
CO3	2	2	-	2	3	-	-	-	-	1	-	-	3	-
CO4	3	3	-	2	3	-	-	-	-	2	-	-	3	2
CO5	3	3	1	3	3	-	1	-	-	2	-	-	3	2
	2.6	**2.2**	**1**	**2**	**3**	-	**1**	-	-	**1.4**	-	-	**2.6**	**1.67**

Figure 2:CO Articulation Matrix

a. Competencies and Performance Indicators

Competencies indicate the different abilities that are implied by PO statement and would generally require different assessment measures. This helps us to create a shared understanding of the competencies we want students to achieve. They serve as an intermediate step to the creation of measurable indicators.

Competencies are written such that they,

- Demonstrate an ability to define a complex, open-ended problem in engineering terms.
- Demonstrate an ability to generate a diverse set of alternative design solutions.
- Demonstrate an ability to select the optimal design scheme for further development.
- Demonstrate an ability to advance an engineering design to the defined end state.

Performance Indicators are explicit statements of expectations of the student learning. They can act as measuring tools in assessment to understand the extent of attainment of outcomes. They can also be designed to determine the appropriate achievement level or competency of each indicator so that instructors can target and students can achieve the acceptable level of proficiency.

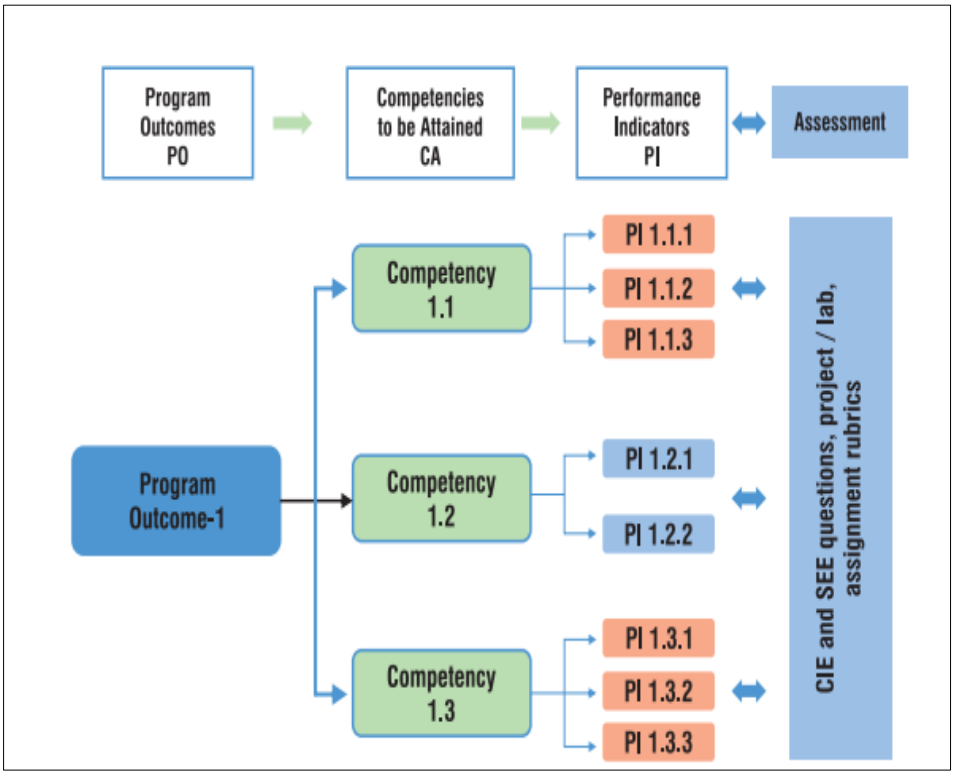


Figure 3: Relationship between PO, CO, Competencies and Performance Indicators

Performance Indicators are written such that,

- Apply formal idea generation tools to develop multiple engineering design solutions
- Build models, prototypes, algorithms to develop a diverse set of design solutions
- Identify the functional and non-functional criteria for evaluation of alternate design solutions.

More details can be referred to in the AICTE Examination Reforms Policy

https://www.aicte-india.org/sites/default/files/ExaminationReforms.pdf

Table 12: Competencies and Performance Indicators defined for PO1 for B.Tech (ECE)

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.			
1.1	Demonstrate competence in mathematical modelling	1.1.1	Apply mathematical techniques such as Calculus, Linear Algebra, Probability theory and Random process, Fourier series, Fourier Transform, Laplace Transform, and Z-Transform to solve problems.
		1.1.2	Apply advanced mathematical techniques to model and solve Electronics and Communication engineering problems.
1.2	Demonstrate competence in basic sciences	1.2.1	Apply laws of natural science to an engineering problem.
1.3	Demonstrate competence in engineering fundamentals	1.3.1	Apply fundamental engineering concepts to solve engineering problems
1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply Electronics and Communication engineering concepts to solve engineering problems.

The percentages of PI's that map with the CO's are analysed to calculate the mapping constants using the formulae below,

$$Percentage\ of\ PI\ that\ are\ measurable \geq \{70\ \ mapping\ consta$$
$$= 3\ 40, mapping\ constant = 2\ 10, mapping\ constant = 1$$

- Mapping Constant is 3 if percentage of PI that maps with CO is greater than or equal to 70 (≥60)
- Mapping Constant is 2 if percentage of PI that maps with CO is between 40 and 69 (40 ≤ marks ≤ 69)
- Mapping Constant is 1 if percentage of PI that maps with CO is between 10 and 39 (10 ≤ marks ≤ 39)

5. COMPUTATION OF CO ATTAINMENT

The attainment of CO, PO and PSO is calculated based on the performance of Students in the assessments and the feedback obtained from the students. CO Attainment comprises of two components namely Direct CO Attainment and Indirect CO Attainment.

Direct CO Attainment is based on the marks scored by students in the Internal Assessment (Continuous Assessment Exams, Assignments etc.,) and the End Semester Exams.

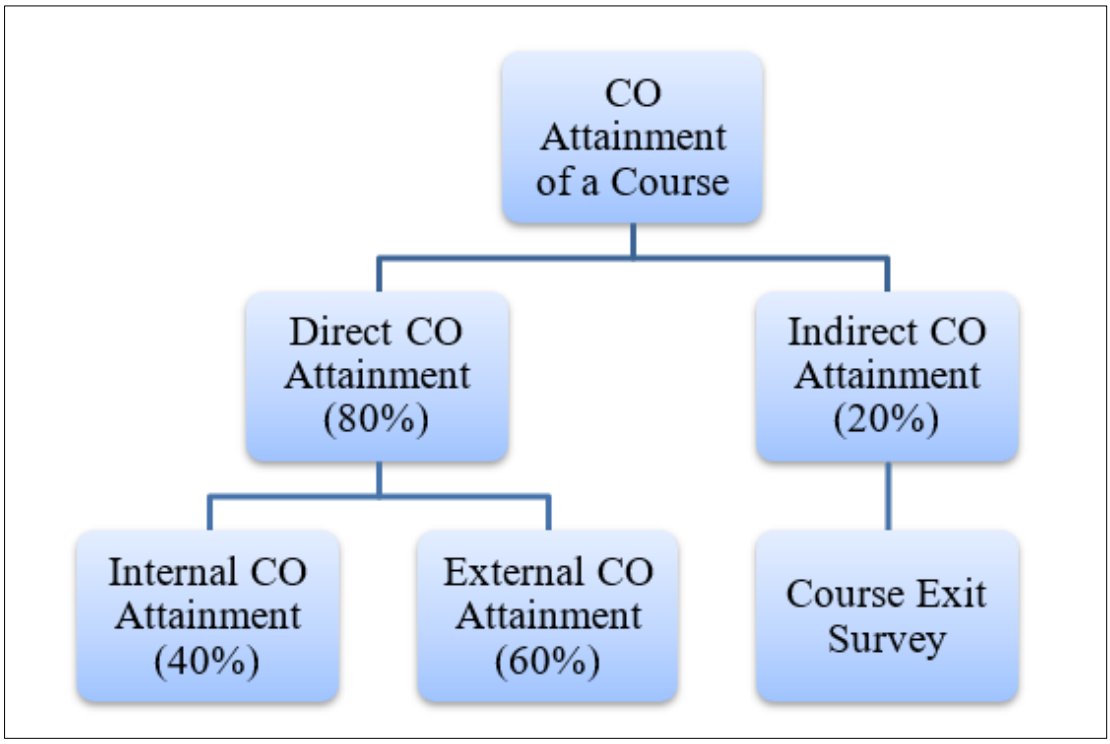


Figure 4: Computation of CO Attainment

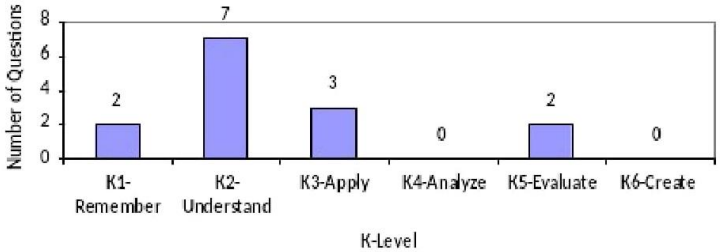
Internal attainment of CO is based on the marks scored by the student in the Continuous Internal Assessment and Assignments. All the assessment questions, prepared in accordance to the Blooms Taxonomy, should be mapped with the CO's for computation of attainment.

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES
SCHOOL OF ENGINEERING
Department of Electrical and Electronics Engineering
Jan 2024 to May 2024

SUBJECT TITLE: Digital Electronics **Maximum Marks:50**

SUBJECT CODE: 18CBEE43 **YEAR/SEM:II/IV**

Registration No:				**Invigilator Name & Signature:**				
CAT	**I**	**Date:16.02.2024**	**Duration : 90 min**					
Q. No	**PART-A (Answer ALL the questions)**			**Marks**	**CO**	**Unit**	**Knowledge Level**	**Marks awarded**
1	Explain Demorgn's theorem.			2	1	1	K2	
2	Show how to connect NAND gates to get an AND gate and OR gate			2	1	1	K2	
3	Show how to Convert $(22.64)_{10}$ to octal number			2	1	1	K2	
4	List the absorption properties of Boolean algebra			2	1	1	K1	
5	Apply 2's complement and subtract $(1010100)_2$ from $(1010100)_2$			2	1	1	K3	
6	What is Karunaugh Map			2	2	2	K1	
7	Compare Encoder and Decoder			2	2	2	K2	
8	Explain half subtractor with truth table.			2	2	2	K2	
9	Show how to Convert gray code into binary code: 100101			2	2	2	K2	
10	Classify Multiplexer and Demultiplexer			2	2	2	K2	
PART – B (Answer all the Questions)								
11a	a)Simplify the Boolean function $Y = \sum_m (7,9,10,11,12,13,14,15)$ using the K-map method b) Simplify the Boolean function $Y = \sum_m (0,2,3,6,7) + \sum_d (8,10,11,15)$			15	1	1	K3	
(or)								
11 b	Explain the basic laws of Boolean algebra and logic gates in detail			15	1	1	K5	
12 a	a) Construct a full adder. b) Model 8 to 1 demultiplexer.			15	2	2	K3	
(or)								
12 b	Explain the working of Multiplexer and Demultiplexer circuits with a neat block diagram.			15	2	2	K5	
Marks Obtained for the CO's								
CO1:	**CO2:**	**CO3:**	**CO4:**	**CO5:**		**Total Marks:**		



Distribution of Questions based on Bloom's Taxonomy-Knowledge Level

Figure 5: CAT II Question Paper indicating CO1 and CO2 (Engineering)

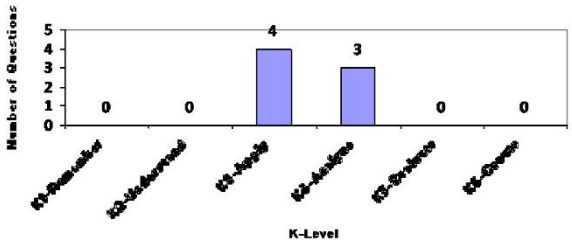
The procedure for computation of Internal CO Attainment is follows,

1. Preparation of all Internal Assessments according to the CO's (CAT1, CAT 2, Model Exam, Assignment etc.,)
2. Obtaining the CO wise marks and finding the CO wise attainments for all the assessments
3. Averaging the CO Attainments from all the assessments.

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES
SCHOOL OF PHARMACEUTICAL STUDIES
Department of Pharmacology
July 2023 to May 2024

SUBJECT NAME: Pharmacology I — **Maximum Marks: 30**
SUBJECT CODE: 17CPHDD2 — **YEAR: II**

Registration No:				**Subject In charge Name & Signature:**			
Sessional	**I**	**Date: 19/10/2023**	**Duration : 90 min/ 01.20 – 02.50 PM**				
Q.No	**PART-A (Objective type) (Answer all the questions)**			**Marks**	**CO**	**Knowledge Level**	**Marks awarded**
1	Relate the term "Therapeutic Index" to the drug safety.			2	1	3	
2	Employ the knowledge of Blood brain barrier in the drug distribution.			2	1	3	
3	List out the parameters used to measure bioavailability.			2	1	3	
4	Examine the terminology "Vasomotor Reversal of Dale".			2	2	4	
5	Classify Sympathomimetics with examples.			2	2	4	
PART-B (Short Answers) (Answer the following)							
6	Illustrate the importance of toxicological studies in Pharmacology.			5	1	3	
PART -C (Long Answers) (Answer the following)							
7	Analyze the Pharmacology of Adrenaline in detail.			15	2	4	
Marks Obtained for the CO's							
CO1:	**CO2:**	**CO3:**	**CO4:**	**CO5:**	**Total Marks:**		



Distribution of Questions based on Bloom's Taxonomy-Knowledge Level

Figure 6: CAT II Question Paper indicating CO3 and CO4 (Pharmacy)

The marks obtained by the students for the various questions are segregated CO wise to compute the attainment of CO in that particular assessment. The percentage of marks is then computed for each CO and the attainment is calculated based on the formulae below,

- Attainment level is 3 if percentage of marks is greater than or equal to 60 (≥60)
- Attainment Level is 2 if percentage of marks is between 50 and 59 (50 ≤ marks ≤59)
- Attainment Level is 1 if percentage of marks is between 40 and 49 (40 ≤ marks ≤49)
- Attainment Level is 0 if percentage of marks is less than 40 (< 40)

			CO1			CO2		
S. No	NAME	Marks Obtained (Total : 100)	CO1 Marks	CO1 Marks (in %)	CO1 Attainment	CO2 Marks	CO2 Marks (in %)	CO2 Attainment
1	AKASH S	70	35	67.31	3	35	72.92	3
2	AKSHALIN A	20	20	38.46	0	0	0.00	0
3	ARUN K P	20	20	38.46	0	0	0.00	0
4	BALAHARIHARAN P	48	32	61.54	3	16	33.33	0
5	DIKSHA PARASHAR	74	40	76.92	3	34	70.83	3
6	GIRISH KHANNA D	68	24	46.15	1	44	91.67	3
7	H ESHWAR	66	31	59.62	2	35	72.92	3
8	JAHEEN SHA R	46	11	21.15	0	35	72.92	3
9	MANIRATHINAM K	62	45	86.54	3	17	35.42	0
10	NITHISH MR	42	11	21.15	0	31	64.58	3
11	OMANA R	62	42	80.77	3	20	41.67	1

Figure 7: CO Attainment for CIA 1

Similarly, the attainments for the CO's are calculated from CIA2 and Model Exams. Similar to CIA exams, the assignments given to students are also mapped to the various CO's. The marks scored for the CO's are then used to compute the attainment similar to the marks scored by students in the CAT Exams.

		CO1			CO2			CO3			CO4			CO5		
Assignment		Assignment 1						Assignment 2						Assignment 3		
		Total Marks		15	Total Marks		15	Total Marks		20	Total Marks		20	Total Marks		10
S. No	NAME	Marks	%	Attainment	Marks	%	Attainment	Marks	%	Attainment	Marks	%	Attainment	Marks	%	Assignment
1	AKASH S	13	87	3	12	80	3	19	95	3	15	75	3	9	90	3
2	AKSHALIN A	12	80	3	10	67	3	17	85	3	17	85	3	4	40	1
3	ARUN K P	10	67	3	14	93	3	18	90	3	10	50	2	5	50	2
4	BALAHARIHARAN P	13	87	3	13	87	3	14	70	3	15	75	3	8	80	3
5	DIKSHA PARASHAR	14	93	3	13	87	3	16	80	3	12	60	3	7	70	3
6	GIRISH KHANNA D	12	80	3	12	80	3	15	75	3	11	55	2	8	80	3
7	H ESHWAR	12	80	3	12	80	3	16	80	3	17	85	3	8	80	3
8	JAHEEN SHA R	12	80	3	11	73	3	18	90	3	18	90	3	7	70	3
9	MANIRATHINAM K	15	100	3	12	80	3	15	75	3	13	65	3	8	80	3
10	NITHISH MR	14	93	3	10	67	3	10	50	2	10	50	2	7	70	3
11	OMANA R	13	87	3	14	93	3	12	60	3	12	60	3	9	90	3
12	POORNIKA B	15	100	3	12	80	3	14	70	3	11	55	2	9	90	3

Figure 8: Computation of CO Attainment from Assignments

In practice, CIA1 exams are mapped to CO1 and CO2, CIA 2 Exams are mapped to CO3 and CO4 and Model exams are mapped to CO1, CO2, CO3, CO4 and CO5.

Table 13: Mapping of Internal Assessments to CO

Assessment	CO's Involved
CIA1	CO1 and CO2
CIA 2	CO3 and CO4
Model Exam	CO1, CO2, CO3, CO4 and CO5
Assignment	CO1, CO2, CO3, CO4 and CO5
Quiz (MCQ)	CO1, CO2, CO3, CO4 and CO5
Seminar	CO1, CO2, CO3, CO4 and CO5

The CO wise marks scored by the student in all the attainments are average to compute the CO wise attainment for the student. A sample is as indicated in Figure 7.

Name of the Course : DIGITAL SIGNAL PROCESSING

COURSE CODE : 18EBEC54

CO Attainment

			CO1 Attainment						CO2 Attainment						CO3 Attainment					
S.No	Register Number	Name	CAT1	Model	Assignment	MCQ	Seminar	Average	CAT1	Model	Assignment	MCQ	Seminar	Average	CAT2	Model	Assignment	MCQ	Seminar	Average
1	20603101	AAKAS RAM A S	1.00	3.00	3.00	3.00	3.00	2.60	3.00	2.00	3.00	3.00	3.00	2.80	3.00	3.00	3.00	3.00	3.00	3.00
2	20603102	ANISHA S	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	2.80	3.00	3.00	3.00	3.00	3.00	3.00
3	20603103	CHETTIPALLI SAISUJITH	0.00	2.00	3.00	3.00	3.00	2.20	1.00	3.00	3.00	3.00	3.00	2.60	-	1.00	3.00	3.00	3.00	2.50
4	20603104	GOWTHAMSAI P	3.00	3.00	3.00	3.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00	2.80	3.00	2.00	3.00	3.00	3.00	2.80

Figure 9: Internal CO Attainment Computation from all the assessments

The average of all the CO attainments obtained by the students is the Internal CO attainment of the class.

The marks scored by the students in the External examination are used to find the External CO attainment of the students. Though the questions are mapped to the CO's, it is not possible to map the CO's to the answers written by the students. Hence, the total marks are used to the compute the External CO Attainment by the student.

The attainment formulae used is same as that of Internal attainment calculation.

- Attainment level is 3 if percentage of marks is greater than or equal to 60 (≥60)
- Attainment Level is 2 if percentage of marks is between 50 and 59 (50 ≤ marks ≤59)
- Attainment Level is 1 if percentage of marks is between 40 and 49 (40 ≤ marks ≤49)
- Attainment Level is 0 if percentage of marks is less than 40 (< 40)

The marks for end semester or end year examination may be downloaded from the ERP after the results are published. The average CO Attainment for all the students is considered as the External CO1 through CO5 Attainment of the Course. External Attainment is same for all the CO's.

S. No	NAME	External Marks (60)	Marks Obtained (Total : 100)	CO Attainment
1	AKASH S	40	66.67	3
2	AKSHALIN A	44	73.33	3
3	ARUN K P	49	81.67	3
4	BALAHARIHARAN P	43	71.67	3
5	DIKSHA PARASHAR	45	75.00	3
6	GIRISH KHANNA D	34	56.67	2
7	H ESHWAR	26	43.33	1
8	JAHEEN SHA R	48	80.00	3
9	MANIRATHINAM K	35	58.33	2
10	NITHISH MR	40	66.67	3
11	OMANA R	38	63.33	3
12	POORNIKA B	42	70.00	3
13	RAJARAJAN N G	35	58.33	2

Figure 10: CO Attainment Computed from End Semester Examinations

The direct attainment of CO1 to CO5 for the course is computed by considering 40% of the internal CO attainment and 60% of the external CO Attainment.

TOTAL CO Attainment = 40% of Internal Attainment + 60% External Attainment

- CO1 Attainment = (0.4*Internal CO1 Attainment) + (0.6* External CO1 Attainment)
- CO2 Attainment = (0.4*Internal CO2 Attainment) + (0.6* External CO2 Attainment)
- CO3 Attainment = (0.4*Internal CO3 Attainment) + (0.6* External CO3 Attainment)
- CO4 Attainment = (0.4*Internal CO4 Attainment) + (0.6* External CO4 Attainment)
- CO5 Attainment = (0.4*Internal CO5 Attainment) + (0.6* External CO5 Attainment)

	CO1	CO2	CO3	CO4	CO5	Average
Internal CO Attainment	2.29	2.28	2.28	2.19	2.38	2.29
External CO Atteainment	2.43	2.43	2.43	2.43	2.43	2.43
Direct CO Attainment	**2.34**	**2.34**	**2.34**	**2.30**	**2.37**	2.37

Figure 11: Direct CO Attainment of a Course

Indirect attainment (Optional) is done by means of course exit survey that is conducted by course handling faculty at the end of the semester to understand the learning by the students. The questions in the survey are mapped to the CO's.

Table 14: Mapping of Course Exit Survey to CO

Course Outcomes	CO1	CO2	CO3	CO4	CO5
Questions	Q1, Q2	Q3, Q4	Q5, Q6	Q7,Q8	Q9, Q10

Students respond to the mapping on a five point scale and the attainment is computed as follow,

- Attainment level is 3 if the students responds as Strongly Agree
- Attainment Level is 2 if the students responds as Agree
- Attainment Level is 1 if the students responds as Neutral
- Attainment Level is 0 if the students responds as Disagree or Strongly disagree

The average of all the CO1 through CO5 attainments is the Indirect CO Attainment of the Course.

The overall CO attainment of a Course is calculated using both the direct and indirect CO attainment. 80% of direct attainment and 20% of indirect attainment is used to calculate the CO attainment as specified below,

$$CO\ Attainment\ of\ a\ Course$$
$$= 80\%\ Direct\ CO\ Attainment + 20\%\ Indirect\ CO\ Attainment$$

6. COMPUTATION OF PO AND PSO ATTAINMENT OF A COURSE

The PO and PSO attainments are calculated based on the CO attainment and the CO-PO mapping constants using the formulae,

$$PO\ Attainment = \frac{CO\ Attainment\ x\ Mapping\ Constant\ of\ COPO\ Mapping\ Matrix}{3}$$

			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1 Attainment/3	x	CO1	3	2	-	1	-	-	-	-	-	-	-	-	-	3
CO2 Attainment/3	x	CO2	2	3	2	2	-	1	-	-	-	-	-	-	3	2
CO3 Attainment/3	x	CO3	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO4 Attainment/3	x	CO4	2	3	3	2	-	-	-	-	-	-	-	-	-	3
CO5 Attainment/3	x	CO5	2	3	2	3	-	-	-	-	-	-	-	-	3	-
		Average														

Figure 12: Computation of PO Attainment

The CO1 Attainment values are multiplied with the mapping constants in first row of the CO-PO Mapping matrix, where the CO1 is mapped with all the PO. The same process is repeated for all the CO's as in the Figure 10. The following formulae describe the computation of PO attainment for CO1 through CO5.

$$PO/PSO\ Attainment\ of\ CO1 = \frac{CO1\ Attainment\ x\ Mapping\ Constants\ of\ CO1\ with\ PO}{3}$$

$$PO/PSO\ \ Attainment\ of\ CO2 = \frac{CO2\ Attainment\ x\ Mapping\ Constants\ of\ CO2\ with\ PO}{3}$$

$$PO/PSO\ \ \ Attainment\ of\ CO3 = \frac{CO3\ Attainment\ x\ Mapping\ Constants\ of\ CO3\ with\ PO}{3}$$

$$PO/PSO\ \ Attainment\ of\ CO4 = \frac{CO4\ Attainment\ x\ Mapping\ Constants\ of\ CO4\ with\ PO}{3}$$

$$PO/PSO\ \ Attainment\ of\ CO5 = \frac{CO5\ Attainment\ x\ Mapping\ Constants\ of\ CO5\ with\ PO}{3}$$

The average of all the columns in the PO attainment matrix is considered as the PO attainment of the Course.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2.31	1.54	1.54	0.77	-	-	-	-	-	-	-	-	1.54	2.31
CO2	1.54	2.31	2.31	1.54	-	-	-	-	-	-	-	-	2.31	2.31
CO3	2.20	1.47	2.20	2.20	-	-	-	-	-	-	-	-	1.47	1.47
CO4	2.20	2.20	2.20	2.20	-	-	-	-	-	-	-	-	2.20	1.47
CO5	1.47	1.47	1.47	1.47	-	-	-	-	-	-	-	-	2.20	0.73
Avg	1.94	1.80	1.94	1.64	-	-	-	-	-	-	-	-	1.94	1.66

Figure 13: PO Attainment Matrix

7. EVALUATION OF PO/PSO ATTAINMENT OF A COURSE

The attainment of PO's for the various courses is analysed with the targets set by the Department Advisory Committee or Departmental IQAC. Appropriate remedial actions are taken to enhance the teaching and learning Process.

	PO1	PO2	PO3	PO4	PO5	O6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
Maximum PO	2.60	2.40	2.60	2.20	-	-	-	-	-	-	-	-	2.60	2.20
Target (75% of Maximum Value)	1.95	1.80	1.95	1.65	-	-	-	-	-	-	-	-	1.95	1.65
Attainment	**1.94**	**1.80**	**1.94**	**1.64**	-	-	-	-	-	-	-	-	**1.94**	**1.66**

Figure 14: Analysis of PO Attainments of a Course with Targets

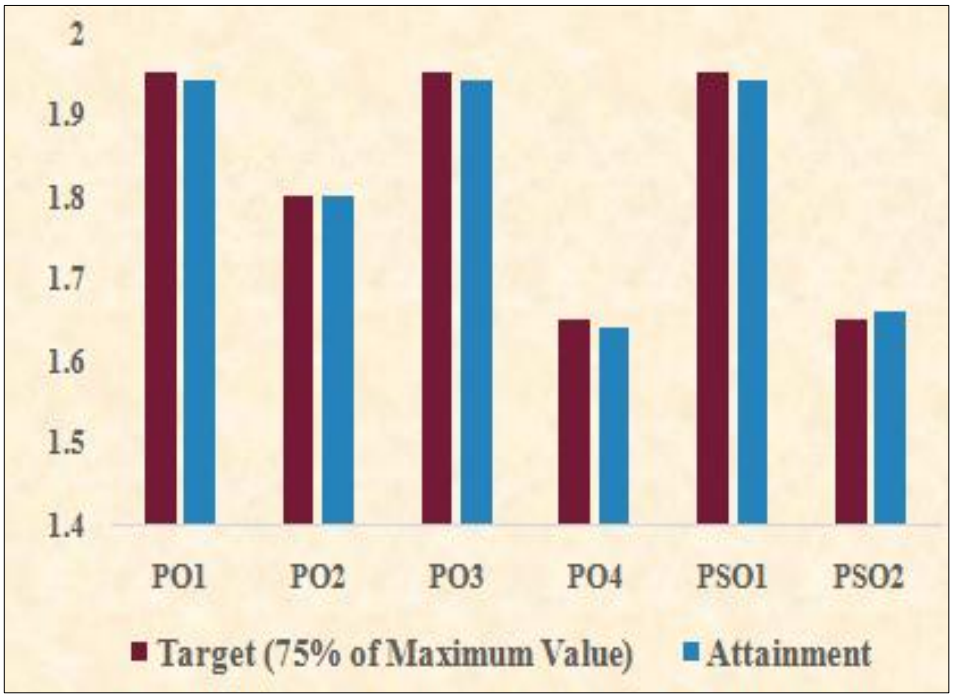


Figure 15: Comparison of PO Attainment with Targets for a Course

Appropriate actions are taken in terms of remedial classes, bridge courses, inclusion of new elective courses, updating course contents and innovative teaching-learning methods are introduced to improve the attainment of CO and PO.

The computation of attainments, analysis and continuous improvements measures are done for all the courses.

8. ATTAINMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES FOR A BATCH

To compute the PO and PSO attainment of a batch, all the core courses studied by that batch of students should be taken into consideration. The average of PO attainment of all the courses is considered as the Direct PO attainment of the Batch.

Course	PO1	PO2	PO3	PO4	…	PO8	PO9	PO10	PSO1	PSO2
C101										
C102										
C103										
.										
.										
C201										
C202										
.										
.										
C301										
C302										

Figure 16: PO Attainment Matrix of a Batch

The overall attainment of direct PO/PSO by a batch of students is calculated by averaging all the PO's/PSO's attained by the students in all the courses studied by them through their program.

Similar to direct attainment of PO's/PSO's, the indirect attainment of PO's/PSO's is obtained by means of the following,

- Student Exit survey, done at the end of the program.
- Alumni Survey
- Recruiter Survey and
- Parent Feedback.

All the questions are mapped to the PO's and the attainment levels are mapped to the answers.

Table 15: Indirect Attainment of PO

Course	PO1	PO2	PO3	PO4	…	PO8	PO9	PO10	PSO1	PSO2
Student Exit Survey										
Parent Feedback										
Alumni Survey										
Recruiter Survey										

Overall PO/PSO attainment is calculated using both the direct and indirect PO/PSO attainment. 80% of direct attainment and 20% of indirect attainment is used to calculate the overall PO/PSO attainment as described in the equation below.

$$Overall\ PO, PSO\ Attainment = 80\%\ Direct\ Attainment + 20\%\ Indirect\ Attainment$$

9. EVALUATION OF CO AND PO/PSO ATTAINMENT OF A BATCH

The attainment of CO's and PO's for the various courses and the overall PO attainment of a batch of students are evaluated by the department academic committees, board of studies and IQAC. Appropriate actions are taken in terms of remedial classes, bridge courses, inclusion of new elective courses, updating course contents and innovative teaching-learning methods are introduced to improve the attainment of CO.

Similarly, the gaps in attainment of PO's are considered and changes in terms of curriculum, regulations are carried out as needed.

Industrial Interactions, Guest Lectures, Hands –On sessions etc., are introduced to improve the PO attainment. For each PO, a threshold is fixed after detailed discussion in the Department Advisory Committee or the Department Internal Quality Assurance Cell. If final attainment of PO is less than the threshold, appropriate remedial action needs to be taken.

10. VISIBILITY OF PO, PSO AND CO

Program outcomes and course outcomes for all program offered by the Institution are stated and placed on prominent places in the department, classrooms and laboratories. They are also published on website and communicated to teachers and students.

Figure 17: Vision, Mission, PO and PSO boards placed in the Departments

Figure 18: Web Portal Screen shot for MBBS Program

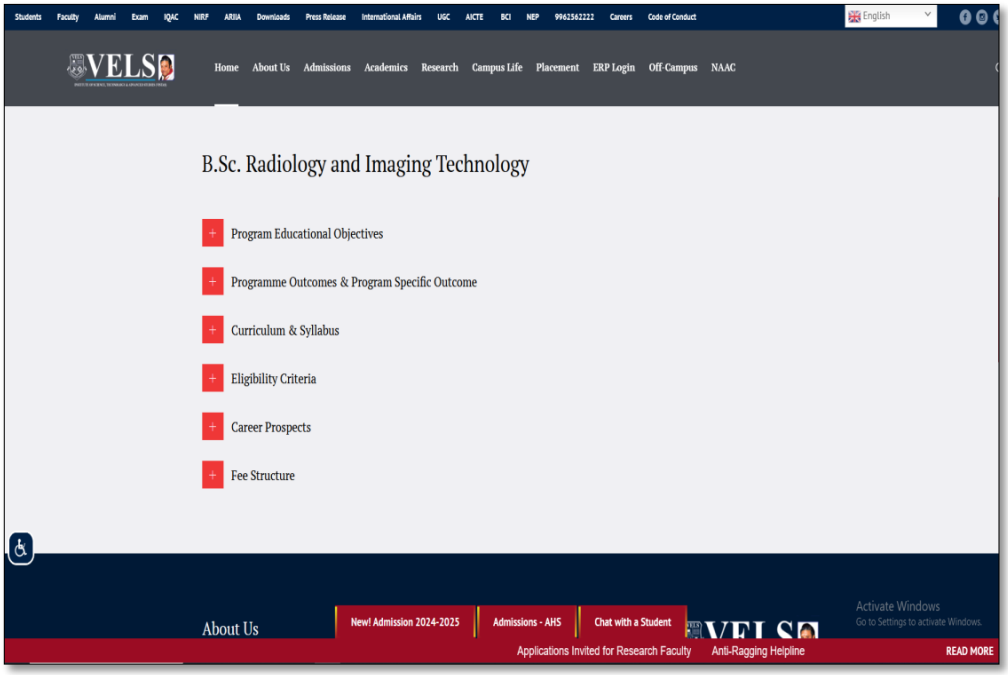


Figure 19: Web Portal Screen shot for B.Sc. Radiology and Imaging Technology

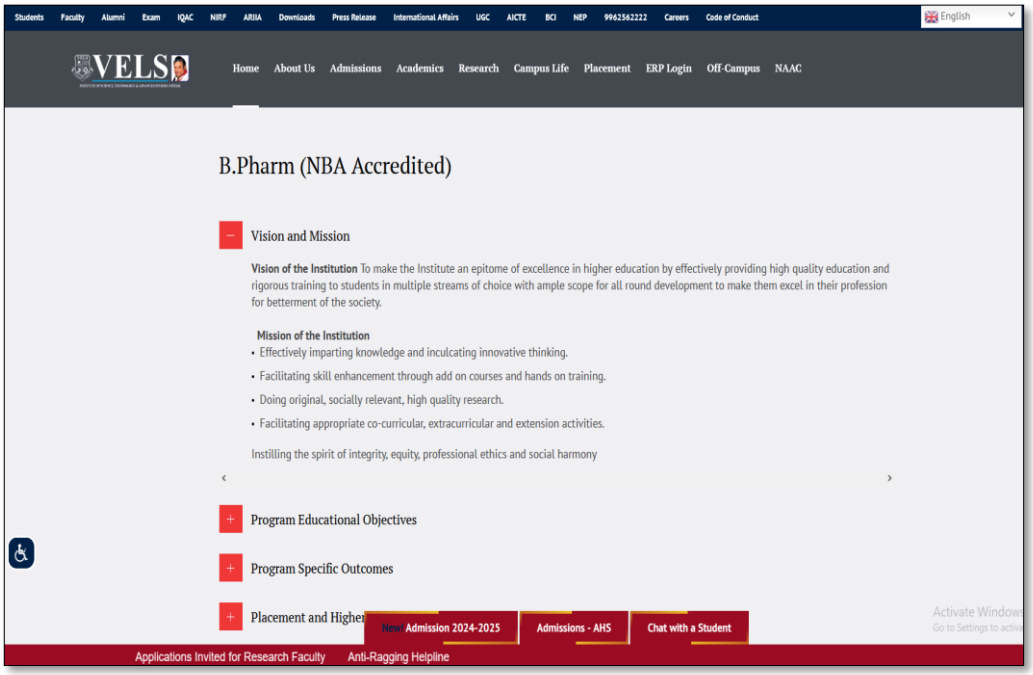


Figure 20: Web Portal Screen shot for B. Pharm

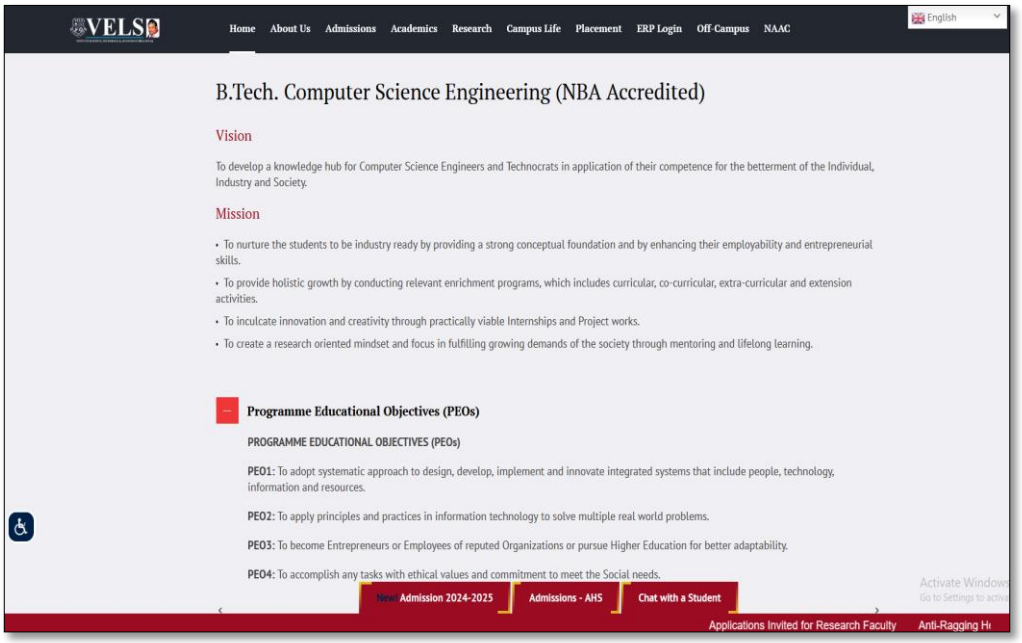


Figure 21: Web Portal Screen shot for B.Tech (CSE)

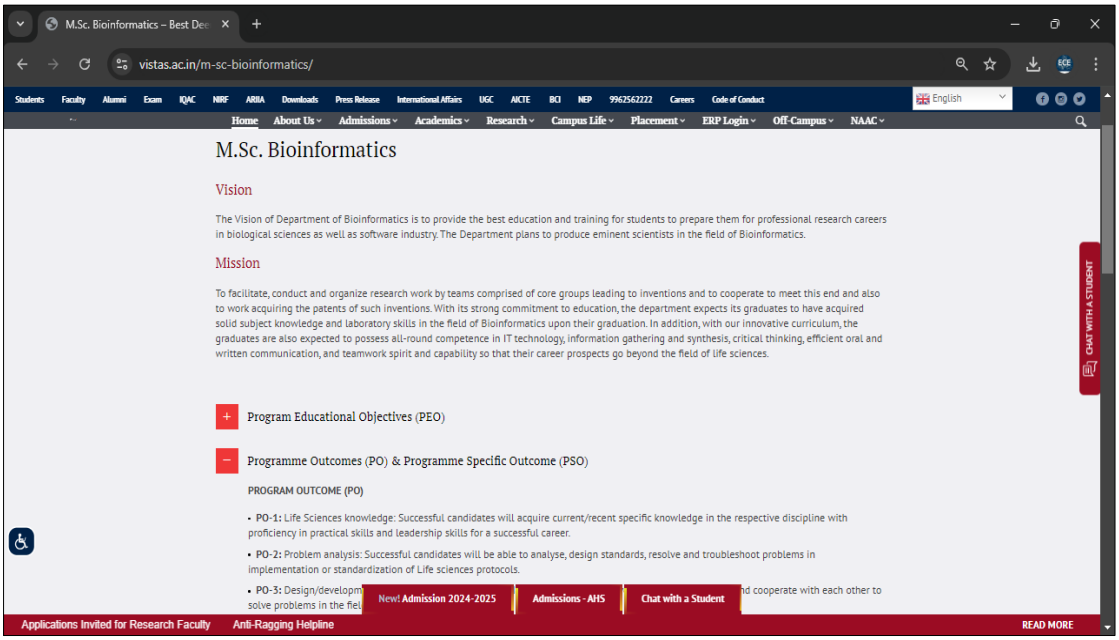


Figure 22: Web Portal Screen Shot for M.Sc (Bioinformatics)

The web links for all the program are as listed in the table below,

Table 16: Web links of all program indicating the CO-PO Mapping

Programme	Website link
M.B.B.S	https://velsmedicalcollege.com/pdf/po-co-mapping.pdf
B.Sc. - Nursing	https://velnursingcollege.com/bsc-nursing/
B.Sc Operation Theatre and Anesthesia Technology	https://vistas.ac.in/b-sc-operation-theatre-and-anesthesia-technology/
B.Sc Optometry	https://vistas.ac.in/b-sc-optometry/
B.Sc Radiology and Imaging Technology	https://vistas.ac.in/b-sc-radiology-and-imaging-technology/
B.Sc., Physician Assistant	https://vistas.ac.in/b-sc-physician-assistantschool-of-allied-health-sciences/
B.Sc., Cardiac Care Technology	https://vistas.ac.in/b-sc-cardiac-care-technology/
B.Sc., Medical Laboratory Technology	https://vistas.ac.in/b-sc-medical-laboratory-technology/

Programme	Website link
M.Sc., Yoga	https://vistas.ac.in/m-sc-in-yoga/
B.Pharmacy	https://vistas.ac.in/b-pharm/
B.Pharmacy (Practice)	https://vistas.ac.in/b-pharm-practice/
M.Pharmacy (Pharmaceutics)	https://vistas.ac.in/m-pharm-pharmaceutics/
M.Pharmacy (Pharmaceutical Analysis)	https://vistas.ac.in/m-pharm-pharmaceutical-analysis/
M.Pharmacy (Pharmacy Practice)	https://vistas.ac.in/m-pharm-pharmacy-practice/
Pharm.D	https://vistas.ac.in/pharm-d-vistas/
Pharm.D (Post Baccalareate)	https://vistas.ac.in/pharm-dpb/
B.P.T	https://vistas.ac.in/bachelor-of-physiotherapy/
M.P.T (Neuro)	https://vistas.ac.in/m-p-t-neurology/
M.P.T (Ortho)	https://vistas.ac.in/m-p-t-orthopaedics/
M.P.T (Sports)	https://vistas.ac.in/m-p-t-sports/
M.P.T (Hand)	https://vistas.ac.in/m-p-t-hand-conditions/
M.P.T (Cardio)	https://vistas.ac.in/m-p-t-cardio-respiratory-diseases/
B.Sc., Biotechnology	https://vistas.ac.in/b-sc-biotechnology/
B.Sc., Biochemistry	https://vistas.ac.in/b-sc-biochemistry/
B.Sc., Microbiology	https://vistas.ac.in/b-sc-microbiology/
B.Sc., Bio-computing	https://vistas.ac.in/b-sc-bio-computing/
B.Sc.,(Hons) Agriculture	https://vistas.ac.in/b-sc-honsagriculture/
M.Sc., Advanced Biochemistry	https://vistas.ac.in/m-sc-biochemistry/
M.Sc., Immunology & Microbiology	https://vistas.ac.in/m-sc-immunology-and-microbiology/
M.Sc., Bioinformatics	https://vistas.ac.in/m-sc-bioinformatics/
M.Sc., Biotechnology	https://vistas.ac.in/m-sc-biotechnology/

Programme	Website link
M.Sc., Applied Medical Biotechnology & Clinical Research	https://vistas.ac.in/m-sc-biotechnology/
B.B.A	https://vistas.ac.in/b-b-a/
BBA Digital Marketing	https://vistas.ac.in/b-b-a-digital-marketing-2/
B.B.A., Logistics and Shipping	https://vistas.ac.in/bba-logistics-and-shipping/
B.Com., Accounts & Finance	https://vistas.ac.in/b-com-accounts-finance/
B.Com., General	https://vistas.ac.in/b-com-general/
B.Com., Computer Applications	https://vistas.ac.in/b-com-computer-applications/
B.Com., Corporate Secretaryship	https://vistas.ac.in/b-com-corporate-secretaryship/
B.A., Economics	https://vistas.ac.in/department-of-economics/
M.A., Economics	https://vistas.ac.in/m-a-economics/
M.B.A. Specialisations in : HR, Marketing, Systems, Finance, Production	https://vistas.ac.in/m-b-a-finance-hr-marketing-systems-production-2/
M.B.A.,Shipping and Logisticss Mgmt.	https://vistas.ac.in/m-b-a-shipping-and-logistics-management-slm/
M.B.A., Logistics & Supply Chain Mgmt.	https://vistas.ac.in/m-b-a-logistics-and-supply-chain-management/
M.B.A. Business Analytics	https://vistas.ac.in/m-b-a-business-analytics/
M.B.A. Sports Management	https://vistas.ac.in/m-b-a-sports-management/
M.B.A. - Innovation, Entrepreneurship and Venture Development(IEV)	https://vistas.ac.in/mba-innovation-entrepreneurship-venture-development-iev/
B.E., Marine Engineering	https://vistas.ac.in/b-e-marine-engineering/
B.Tech., Computer Science Engineering	https://vistas.ac.in/department-of-computer-science-and-engineering/

Programme	Website link
B.Tech - CSE Artificial Intelligence and Machine Learning	https://vistas.ac.in/b-tech-cse-in-artificial-intelligence-machine-learning/
B.Tech - CSE Artificial Intelligence and Data Science	https://vistas.ac.in/b-tech-cse-in-data-science/
B.Tech.,IT (Cloud and Mobile Based Application Development)	https://vistas.ac.in/b-tech-information-technology/
B.Tech., Electronics & Communication Engineering	https://vistas.ac.in/department-of-electronics-and-communication-engineering/
B.Tech.,Electronics & Computer Engineering	https://vistas.ac.in/b-tech-electronics-and-computer-engineering-2/
B.Tech., Electrical & Electronics Engineering	https://vistas.ac.in/department-of-electrical-and-electronics-engineering/
B.Tech., Mechanical Engineering	https://vistas.ac.in/department-of-mechanical-engineering/
B.Tech., Automobile Engineering	https://vistas.ac.in/department-of-automobile-engineering/
B.Tech., Civil Engineering	https://vistas.ac.in/department-of-civil-engineering/
B.Tech., Biomedical Engineering	https://vistas.ac.in/department-of-biomedical-engineering/
B.Tech., Biotechnology	https://vistas.ac.in/b-tech-biotechnology/
B.Tech., Naval Architecture & Off.Shore Engineering	https://vistas.ac.in/b-tech-naval-architecture-and-offshore-engineering/
B.Sc., Nautical Science	https://vistas.ac.in/b-sc-nautical-science/
B.Sc., Maritime Operations	https://vistas.ac.in/b-b-a-maritime-logistics/
M.E., Computer Science and Engineering	https://vistas.ac.in/m-e-computer-science-and-engineering/
M.E., Computer Integrated Manufacturing	https://vistas.ac.in/m-e-computer-integrated-manufacturing-2/
M.E., Construction Engineering & Management	https://vistas.ac.in/m-e-construction-engineering-and-management-2/

Programme	Website link
M.E., Automobile Engineering	https://vistas.ac.in/me-automobile-engineering/
B.Sc., Chemistry	https://vistas.ac.in/department-of-chemistry/
B.Sc., Computer Science	https://vistas.ac.in/b-sc-computer-science/
B.Sc.,Computer Science in Cyber Security	https://vistas.ac.in/b-sc-computer-science-in-cyber-security/
B.Sc., Computer Science in Artificial Inteligence and Machine Learning	https://vistas.ac.in/b-sc-computer-science-with-specialisation-in-aiml-ii-shift/
B.C.A	https://vistas.ac.in/b-c-a-phase-2-shift-1/
B.C.A., Cloud Technology and Information Security	https://vistas.ac.in/bca-cloud-technology-and-information-security/
B.C.A., Data Science	https://vistas.ac.in/b-c-a-data-science/
B.Sc., Information Technology	https://vistas.ac.in/department-of-information-technology/
B.C.A., Block Chain Technology	https://vistas.ac.in/b-c-a-block-chain-technology-association-with-ibm/
B.Sc., Aviation	https://vistas.ac.in/b-sc-aviation-2/
B.B.A., Aviation Management	https://vistas.ac.in/b-b-a-aviation-management-phase-2/
B.Sc.-Aeronautical Science	https://vistas.ac.in/bsc-aeronautical-science/
B.Sc., Visual Communication	https://vistas.ac.in/b-sc-visual-communication/
B.Sc., Animation	https://vistas.ac.in/b-sc-animation/
B.A., Bharatanatiyam	https://vistas.ac.in/b-a-western-classical-music/
B.A., Western Classical Music	https://vistas.ac.in/b-a-western-classical-music/
B.Sc., Hotel & Catering Management	https://vistas.ac.in/b-sc-hotel-and-catering-management/

Programme	Website link
B.Ed.,	https://vistas.ac.in/b-ed/
B.A., English	https://vistas.ac.in/b-a-english/
M.Sc., Chemistry	https://vistas.ac.in/m-sc-chemistry/
M.Sc., Pharmaceutical Analytical Chemistry	https://vistas.ac.in/m-sc-pharmaceutical-and-analytical-chemistry-2/
M.Sc., Computer Science	https://vistas.ac.in/m-sc-computer-science/
M.Sc., Information Technology	https://vistas.ac.in/m-sc-information-technology/
M.Sc., Data Science & Business Analytics	https://vistas.ac.in/m-sc-data-science-and-business-analytics/
M.C.A.	https://vistas.ac.in/mca/
M.Sc., Visual Communication	https://vistas.ac.in/m-sc-visual-communication/
M.A., Bharata Natyam	https://vistas.ac.in/m-a-bharathanatyam/
M.Sc., Hotel & Catering Management	https://vistas.ac.in/m-sc-hotel-and-catering-management/
M.A., English	https://vistas.ac.in/m-a-english/
M.A., Astrology	https://vistas.ac.in/m-a-astrology/
B.A., LL.B (Hons.)	https://vistas.ac.in/ba-llb/
B.B.A., LL.B.,(Hons)	https://vistas.ac.in/b-b-a-ll-b/
B.Com., LL.B.,(Hons)	https://vistas.ac.in/b-com-llb/
LL.B	https://vistas.ac.in/llb/
LL.M., Constitutional Law and Administrative Law	https://vistas.ac.in/ll-m-constitutional-and-administrative-law/
LL.M., Corporate and Commercial Law	https://vistas.ac.in/ll-m-corporate-and-commercial-law/
LLM Criminal Law and Criminal Justice Administrarion	https://vistas.ac.in/ll-m-criminal-law-criminal-justice-administration/

Programme	Website link
LLM Law relating to Intellectual Property rights	https://vistas.ac.in/ll-m-law-relating-to-intellectual-property-rights-2/