NATIONAL EDUCATION POLICY (NEP) CELL
UNIVERSITY OF KASHMIR

Hazratbal, Srinagar – 190006
nep@uok.edu.in | daa.uok.edu.in

CIRCULAR

KU-2024-NEP-CIRCULAR/0237   May 15, 2025

Subject: Guidelines for Designing Programme Learning Outcomes (PLOs), Course Learning Outcomes (CLOs) with template and Mapping their Attainment Levels.

In connection with the above captioned subject, enclosed find herewith the guidelines and templates duly approved by the competent authority of this University to be incorporated in the curricula of UG/PG/FYIM programmes as per NEP 2020.

(Prof. Mushtaq Ahmad Siddiqi)
Chief Coordinator. NEP Cell

Guidelines for Designing Programme Learning Outcomes (PLOs), Course Learning Outcomes (CLOs) and Mapping their Attainment Levels

This document provides comprehensive guidelines to help various departments within the University to design Programme Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs) for their academic programmes and courses, calculate their attainment levels and map the CLOs with PLOs effectively.

Introduction

National Education Policy (NEP) 2020 of India emphasizes outcomes-based education (OBE), which aims at achieving specific learning goals at the programme and course levels. It also envisages the need for clear and measurable Programme Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs), with an emphasis on holistic education and skill development.

In outcome-based education (OBE), the focus is on what the student learns and achieves by the end of the programme. The Programme Learning Outcomes (PLOs) are broad statements defining the skills, knowledge, and competencies expected from graduates of the programme. On the other hand, Course Learning Outcomes (CLOs) are specific to each course and define what a student should be able to achieve upon completion of that course.

Additionally, it is essential to track the attainment of these outcomes to ensure that students are progressing towards achieving the goals of the program. This document outlines a structured process for designing these outcomes, mapping them, and calculating their attainment.

Types of Learning Outcomes

- o **Outcome-Based Education (OBE)** is a student-centric teaching and learning methodology in which the course delivery and assessment are planned to achieve stated objectives and outcomes. It focuses on measuring student performance i.e. outcomes at different levels.
- o **Course Learning Outcomes (CLOs):** Course Learning Outcomes (CLOs) are what the student should be able to do at the end of a course. The most important aspect of a CLO is that it should be tangible, observable and measurable. Earlier it was referred to as Course Outcome(CO).
- o **Programme Learning Outcomes (PLOs):** Programme Learning Outcomes are statements that describe what the knowledge, skills and attitudes students should have at the time of completion of any degree program. That means just at the end of the Programme these represent the knowledge, skills and attitudes they should have imbibed or learnt. Earlier it was referred to as Programme Outcome (PO). It also includes erstwhile Programme Specific Outcomes (PSOs) that referred to outcomes, specific to a particular Programme and characterize the specificity of the core courses of a program. The objectives would be around 2 to 4 in number. In the National Education Policy (NEP-2020), PO & PSO have been replaced by and are equivalent to PLOs (both generic and specific). Similarly, COs have been replaced by CLOs.
- o **Programme Educational Objectives (PEO):** These are broad statements that describe the career and professional accomplishments both immediately and few years after the completion of any particular program.

Designing Programme Learning Outcomes (PLOs)

Programme Learning Outcomes (PLOs) are designed to clearly define what graduates of a particular programme are expected to know, be able to do, or demonstrate on completion of the programme. There is an emphasis to ensure that the PLOs reflect the overarching goals of the programme, like preparing students for the workforce, enhancing ethical and social responsibility and fostering critical thinking. These include outcomes specific to disciplinary areas of learning associated with the chosen field (s) of learning as well as generic learning outcomes. These also include transferable skills and competencies that graduates of all programmes of study should acquire and be able to demonstrate for the award of the Certificate/Diploma/Degree. The Programme Learning Outcomes focus on knowledge and skills that prepare students for further study, employment, and responsible citizenship.

Following steps are generally required to develop Programme Learning Outcomes:

- **Identification of the Purpose of the Programme:** The mission of the programme needs to be identified in accordance with the institutional mission and strategic goals, industry or professional needs, accreditation requirements (e.g., of NAAC, NBA, NIRF etc.) and stakeholder expectations and market requirements.
- **Stakeholders' Feedback:** Feedback on the knowledge and skill sets, competencies of the students acquired on completion of the programme and the gaps, if any, received from faculty, employers, alumni, students, and accrediting bodies shall have to be used for improvement and relevance of the Programme Outcomes with the employment requirements.
- **Core Competency Areas:** Core areas of Learning (typically 4–8) need to be identified covering Knowledge (e.g., theoretical foundations), Analytical thinking, Skills (e.g., research, communication, problem-solving), Values or Attitudes (e.g., ethics, professionalism, cultural sensitivity) Integration (e.g., applying knowledge in practical or interdisciplinary settings), Leadership qualities and ability to work in teams
- **Avoiding Ambiguity:** Making use of clear, measurable language like "analyse," "design," "synthesize," "evaluate" etc. and avoiding vague terms like "understand" or "be familiar with." etc. *Example: "Graduates will analyse and apply ethical principles in business decision-making" instead of "Students will understand business ethics."*
- **Assessment Methods:** Ensuring that the assessment methods (both direct as well as indirect) of PLOs shall be valid, reliable and consistent.
- **Alignment of PLOs with CLOs:** Ensuring that the CLOs from each course of the programme contributes towards the attainment of different PLOs in order to ensure **curriculum mapping** and its assessment.

The PLOs may be stated in the programme specific regulations/scheme as per following domains:

- Knowledge and Understanding
- Skills/Technical Skills
- Application of Knowledge and skills
- Communication Skills
- Critical thinking
- Ethics
- Life-long Learning
- Creativity

o Research Aptitude
o Problem Solving

Designing Course Learning Outcomes (CLOs)

The term 'course' is used to mean the individual courses of study that make up the scheme of study for a programme. Course learning outcomes are specific to the learning for a given course of study related to a disciplinary or interdisciplinary/multi-disciplinary/trans-disciplinary areas of learning. These are designed to clearly define what students are expected to know, be able to do, or demonstrate on completion of a course. Generally, each unit of a course should have one CLO. CLOs, as such, need to be designed to help students achieve different PLOs, envisaging that each course contributes to one or more PLOs. Following steps are generally required to develop course learning outcomes**:**

o **Identification of Course Objectives and Goals:** Identification of the skills or knowledge the students require by the end of the course. These objectives can align with PLOs keeping in view the programme requirements.

o **Content Analysis and Discipline-Specific Knowledge:** Identification of key concepts, theories, methods, and skills that are central to the subject matter in order to cover the most important aspects of the discipline.

o **CLOs Reflect Different Learning Domains:** To ensure that CLOs cover cognitive, affective (attitude-based), and psychomotor (skill-based) domains, depending on the nature of the course.

o **Determining Cognitive Levels:** Bloom's Taxonomy, covering six different levels of learning, from basic to more complex may help categorize learning outcomes like Remembering, Understanding, Applying, Analysing, Evaluating and Creating that can guide the type of skills or knowledge students should master at each stage of the course.

o **Measurable and Action-Oriented Outcomes:** Learning outcomes should be specific, measurable, achievable, relevant, and time-bound (SMART) with action-oriented and observable behaviours**.**

o **Alignment with Assessment Methods:** The CLOs need to be aligned with the assessment methods that measure the desired learning outcomes of the students effectively.

o **Stakeholders' Feedback:** Feedback on the relevance and clarity of the learning outcomes from teachers, academic advisors, industry practitioners as well as the students who have previously taken the course or similar courses be given weightage to ensure the relevance of the outcomes with the employment requirements.

Course Learning outcomes may be in the form of statements that describe what the students are expected to know and be able to do after the successful completion of the course/paper. These are relatively narrower course specific statements and, therefore, should be prepared and incorporated accordingly at the end of the course contents in accordance with the Model Syllabus Format (Annexure-I) as:

Name of the course (e.g. Chemistry with Course Code: MCHMCAC125 comprising 4 Units)

Unit-wise CLOs	After the completion of this course/paper the students will be able to do (Unit-wise CLOs):
MCHMCAC125.1	Statement
MCHMCAC125.2	Statement
MCHMCAC125.3	Statement
MCHMCAC125.4	Statement

CLOs are to be stated for each course/paper of a programme in a similar manner.

Steps to Create a CLO-PLO Matrix

o Define Course Learning Outcomes (CLOs): Clearly articulate the learning objectives for each course.

- o Define Programme Learning Outcomes (PLOs): Identify the Program-Level Outcomes that graduates should achieve.
- o Map CLOs to PLOs: Determine which CLOs contribute to which PLOs.
- o Use a Matrix: Organize the information in a matrix format, with CLOs in rows and PLOs in columns.
- o Indicate the Strength of Correlation: You can use symbols, numbers, or colours to indicate the strength of the relationship between CLOs and PLOs (e.g., 3 for high, 2 for Medium, 1 for Low and 0 for no Correlation).
- o Review and Iterate: Regularly review and update the matrix to ensure it accurately reflects the Programme's Curriculum and Learning Objectives.

Mapping Factor (Correlation Level)

It indicates the extent to which a certain CLO matches or maps with the PLO (mapping "CLO to PLO")

- o 3 - indicates Substantial (high) correlation mapping (high contribution of the CLO towards attainment of the PLO)
- o 2 - indicates Moderate (medium) correlation mapping (medium contribution of the CLO towards attainment of the PLO)
- o 1 - indicates Slight (low) correlation mapping (some contribution of the CLO towards attainment of the PLO)
- o o - indicates no correlation mapping (no contribution of the CLO towards attainment of the PLO)

Level of Attainment

Here levels of attainment are taken as 0-No; 1-Low; 2-medium; 3- High

Levels of attainment can be defined for CIE (Continuous Internal Evaluation) as (Preferably Unit-wise)

- o Attainment Level 3: 60% Students scoring >= 70% of max marks allocated to CLO
- o Attainment Level 2: 50% Students scoring >= 70% of max marks allocated to CLO
- o Attainment Level 1: 40% Students scoring >= 70% of max marks allocated to CLO
- o Attainment Level 0: Less than 40% Students scoring >=70% of max marks allocated to CO

Levels of attainment can be defined for SEE (Semester End Examination) as (At Course Level)

- o Attainment Level 3: 60% Students scoring >= 55% of max marks allocated to CLO
- o Attainment Level 2: 50% Students scoring >= 55% of max marks allocated to CLO
- o Attainment Level 1: 40% Students scoring >= 55% of max marks allocated to CLO
- o Attainment Level 0: Less than 40% Students scoring >=55% of max marks allocated CLO

CLO Attainment Targets

- o Similar targets can be identified for all the CLOs (Internal as well as External in aggregate) of a course. For example, the target can be "the class average marks >= 60% marks".
- o Targets are the same for all CLOs and are set in terms of performance levels of different groups of students (slow learners, advanced learners, self-pacers etc.).
- o Different targets could be set for each CLO of a course separately (e.g., CLO1 – 60%; CLO2 – 80%; CLO3 – 50%; CLO4 – 70% etc.). Though it does not directly indicate the distribution of performance among the students, it has the advantage of finding out the difficulty level of specific CLOs.
- o Targets are quantified into following levels
  - • Level 3: >= 60% Students scoring >= 70% of max marks allocated to CLO
  - • Level 2: >= 50% Students scoring >= 70% of max marks allocated to CLO

- Level 1: >= 40% Students scoring >= 70% of max marks allocated to CLO
- Level 0: Less than 40% Students scoring >=70% of max marks allocated to CLO

(Note: Aim should always be to attain Level 3 for all CLOs)

Attainment Methods

- o Direct attainment of CLOs can be determined from the performance of students in all the relevant assessment instruments (all the components of Internal & External Assessment).
- o Indirect attainment of CLOs can be determined from the course exit survey (The exit survey form should permit receiving feedback from students on all the CLOs).

Direct CLO Attainment

- o Direct attainment of CLOs is determined from the performance of students in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE).
- o The proportional weightages of CIE: SEE will be as per the academic regulations in force. It could either be 28:72 or as specified in the regulations.
- o Direct attainment of a specific CLOs is determined from the performance of students in all the assessment items related to that particular CLO.

Direct CLO attainment from CIE

- o Continuous Internal Evaluation (CIE) is conducted and evaluated by the department. The question-wise marks are needed in all assessment items for the CLO attainment through CIE.
- o When questions are mapped with relevant CLOs, the department can access the performance of students with respect to each CLO.

Direct CLO attainment from SEE

As the Semester End Examination (SEE) is conducted and evaluated by the University for the departments and affiliated colleges, the departments in Tier 2 institutes get only total marks scored in SEE and not question-wise marks. As a consequence, departments and affiliated colleges have no means of computing the direct attainment of individual CLOs from SEE. Therefore, they may treat the average marks in SEE as the common attainment of all CLOs.

PLO Attainment Methods

For Calculation of Programme Learning Outcome, two methods are used:

(i) Direct Method   (ii) Indirect Method

Direct Method:

In direct method, CLO attainment of all the courses contributing to a particular Programme Learning Outcome are used to calculate the attainment levels.

Indirect Method

- o In indirect method, surveys from current passing out students (Programme exit survey), survey from employer (during placement), survey from industry persons (if students are working as interns for some industry) are to be considered.
- o All the survey and feedback responses need to be quantified using a Likert scale of 4 (3-excellent, 2-good, 1-satisfactory, 0-not satisfactory)

Indirect method should be based on following predefined levels

- o Level-3: 80% or above survey takers giving a score of 2 or 3
- o Level-2: 70% or above but less than 80% survey takers giving a score 2 or 3
- o Level-1: 60 % or above but less than 70% survey takers giving a score 2 or 3

Programme Learning Outcomes (PLOs) attained through the attainment of CLOs.

- o For a given course, all CLOs are mapped to certain PLOs, as shown in the Table 2.

o The overall CLO attainment values, CLO-PLO mapping values are used to compute the attainment of PLOs.

Mapping

Mapping is a process of representing the correlation between CLOs and PLOs in the scale of 0 to 3 as follows (Table 1)

Table 1: Scale of Mapping between CLOs and PLOs

Scale	Parameters
0	If the contents of course have no correlation with the particular Programme Learning Outcome (i.e. not in agreement with the particular PLO).
1	If the contents of course have low correlation with the particular Programme Learning Outcome (i.e. in agreement with the particular PLO to a small extent only).
2	If the contents of course have medium correlation with the particular Programme Learning Outcome (i.e. in agreement with the particular PLO to a reasonable extent).
3	If the contents of course have strong correlation with the particular Programme Learning outcome (i.e. in agreement with the particular PLO to a large extent).

CLO-PLO Mapping Matrix: Table 2 shows the CLO-PLO mapping matrix for a course (e.g. MCHMCAC125) assuming that there are 10 PLOs and 4 CLOs.

Table 2: CLO-PLO matrix for the course MCHMCAC125 (CHEMISTRY: ANALYTICAL CHEMISTR

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	Average CLO
MCHMCAC125.1	3	3	2	3	3	0	2	3	1	2	2.20
MCHMCAC125.2	3	2	3	3	3	2	2	0	2	1	2.10
MCHMCAC125.3	2	3	3	3	2	3	2	3	2	2	2.50
MCHMCAC125.4	3	2	2	2	3	3	3	3	3	1	2.50
Average PLO	**2.75**	**2.50**	**2.50**	**2.75**	**2.75**	**2.00**	**2.25**	**2.25**	**2.00**	**1.50**	**2.33**

Note: The values in the table 2 are hypothetical

Table 3: CLOs-PLOs Mapping Matrix for all the courses (e.g., Assuming 5 courses in each of the 4-Semesters of Chemistry)

COURSE CODE	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	Average CLO
MCHMCAC125	2.75	2.50	2.50	2.75	2.75	2.00	2.25	2.25	2.00	1.50	**2.33**
MCHMCBC125	3.00	2.00	2.00	2.60	2.50	3.00	2.80	2.70	2.80	2.60	**2.60**
MCHMC----125	2.00	2.50	3.00	2.00	2.00	2.50	3.00	2.50	2.00	2.50	**2.40**
MCHMC----125	2.00	2.80	2.50	3.00	3.00	2.80	2.50	3.00	3.00	2.00	**2.66**
MCHMC----125	3.00	3.00	2.00	2.00	2.00	3.00	2.80	2.50	2.00	3.00	**2.53**
MCHMC----225	2.00	2.40	3.00	3.00	3.00	2.40	3.00	2.00	3.00	2.00	**2.58**
MCHMC----225	3.00	2.75	2.00	2.50	2.50	2.75	2.40	1.75	2.50	3.00	**2.52**
MCHMC----225	2.50	2.25	3.00	2.80	2.80	2.25	2.75	2.75	2.80	2.00	**2.59**
MCHMC----225	2.80	1.50	2.50	3.00	3.00	1.50	2.25	2.50	3.00	3.00	**2.51**
MCHMC----225	3.00	2.00	2.80	2.40	2.40	3.00	1.50	2.80	2.40	2.50	**2.48**
MCHMC----325	2.40	2.25	3.00	2.75	2.75	2.00	2.00	3.00	2.75	2.80	**2.57**
MCHMC----325	2.75	3.00	2.40	3.00	2.00	1.50	3.00	2.40	3.00	3.00	**2.61**
MCHMC----325	2.25	1.75	2.75	2.50	1.75	2.00	2.00	2.75	2.00	2.40	**2.22**
MCHMC----325	1.50	1.50	2.90	2.25	2.80	2.50	2.75	2.25	1.75	2.75	**2.30**
MCHMC----325	2.00	2.80	2.60	2.60	2.80	2.80	2.00	1.50	2.60	2.60	**2.43**
MCHMC----425	2.25	2.00	3.00	2.00	2.00	3.00	3.00	2.00	2.00	2.00	**2.33**
MCHMC----425	3.00	3.00	2.50	3.00	3.00	2.50	2.50	3.00	3.00	3.00	**2.85**
MCHMC----425	2.25	2.00	2.80	2.00	2.00	2.80	2.80	2.00	2.00	2.00	**2.27**
MCHMC----425	2.75	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	**2.98**
MCHMC----425	1.50	2.50	2.40	2.50	2.50	2.40	2.40	2.50	2.50	2.50	**2.37**
AVERAGE PLO	**2.44**	**2.38**	**2.63**	**2.58**	**2.53**	**2.49**	**2.54**	**2.46**	**2.51**	**2.51**	**2.50**

<u>Note</u>: **The values in the table 3 are hypothetical**

Attainment of CLOs

75% weightage to direct and 25% weightage to indirect evaluation methods may be assigned. The attainment of CLOs can be measured on the basis of the results of internal assessment and Semester End Examination (SEE). The attainment is measured on a 4-point scale after setting the target for CLO attainment. Table 4 shows the CLO attainment levels for internal assessment as per departmental regulations (assuming the set target of 60% marks) and letter grade A for Semester End Examination (SEE).

Table 4: CLO Attainment Levels for Internal Assessment and End Semester Examination

Attainment Level	For Continuous Internal Evaluation (CIE)	For Semester End Examination (SEE)
0 (No attainment)	<40% of students score equal to or more than set target %age (say 60 %) for internal assessment of a course.	<40% of students obtained letter grade of 'A' in SEE of a course.
1 (Low level of attainment)	40% to < 50% of students score equal to or more than set target %age (say 60 %) for internal assessment of a course.	40% to < 50% of students obtained letter grade of 'A' in SEE of a course.
2 (Medium level of attainment)	50% to < 60% of students score equal to or more than set target %age (say 60 %) for internal assessment of a course.	50% to < 60% of students obtained letter grade of A in SEE of a course.
3 (High level of attainment)	60% or more of students score equal to or more than set target %age (say 60 %) for internal assessment of a course.	60% or more students obtained letter grade of A in SEE of a course.

Note: The assessment methods for internal assessment are class participation, assignment /presentation/quiz/class test etc. and mid-term examination. The set target is assumed as 60% for internal assessment and grade A for SEE. Varying across departments/institutes to be decided by The Boards of Studies

The marks of internal assessment are based on class participation, assignment /presentation/quiz/class test etc. and mid-term examination. A proper mapping of CLOs with these assessment methods should be defined before measuring the attainment level.

For determining the attainment levels for end semester examination, it is assumed that questions in the end term examination are based on all CLOs of the course. Attainment levels for end semester examination of a course can be determined after the declaration of the results.

The overall CLO attainment level of a course can be obtained as:

Overall, CLO attainment level = 28% of CLO attainment level in Continuous Internal Assessment (CIS) + 72% of CLO Attainment level in Semester End Examination.

The overall CLO attainment levels can be obtained for all the courses of a Programme in similar manner.

Attainment of PLOs

The overall attainment level of PLOs is based on the values obtained using direct and indirect methods in the ratio of 72:28. The direct attainment of PLOs is obtained through the attainment of CLOs. The overall CLO attainment value as estimated above and CLO-PLO mapping value as shown in Table 3 are used to compute the attainment of PLOs. PLO attainment values obtained using direct method can be written as shown in the Table 5.

Table 5: PLO Attainment Values using Direct Method

Course Code	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	POL10
MCHMCAC125	X = (2.13)	L	G	N						
MCHMCBC125	Y	M	H	K						
MCHMC----125	Z	S	E	U						
MCHMC----125	C	G	X	C						
-										
-										
MCHMC---- 425										
Direct PLO Attainment	Average of above Values (APLO1)	Average of above Values (APLO2)	Average of above Values (APLO3)	--	--	--	--	--	--	--
Contribution of Direct Method	APLO1 x 0.8	APLO1 x 0.8	APLO1 x 0.8							

The PLO Attainment values to be filled in above table can be obtained as follows:

For MCHMCAC125 Cell (Value of X)

PLO1 attainment value = (Mapping factor of MCHMCAC125-PLO1 from Table 3 × Average CLO attainment value for the course MCHMCAC125)/3 = (2.75 x 2.33)/3 = 2.13.

For MCHMC----125 PLO1 Cell (Value of Y)

PLO1 attainment value = (Mapping factor of MCHMCBC125-PLO1 from Table 3 × Average CLO attainment value for the course MCHMCBC125)/3

Similarly values for each cell of Table 5 can be obtained. The direct attainment of PLOs is average of individual PLO attainment values.

In order to obtain the PLO attainment using indirect method, a student exit survey based on the questionnaire of PLOs may be conducted at end of last semester of the program. The format for the same is given in Table 6. Average of the responses from the outgoing students for each PLO is estimated.

Table 6: Questionnaire for Indirect Measurement of PLO (For Outgoing Students)

	At the end of my degree program, I am able to do					
	Please tick any one				Average of Different Responses	Average Response for PLO x 0.2
Statement of PLO1	3	2	1	0		
Statement of PLO2	3	2	1	0		
Statement of PLO3	3	2	1	0		
Statement of PLO4	3	2	1	0		
--	3	2	1	0		
---	3	2	1	0		
---	3	2	1	0		
--	3	2	1	0		
--	3	2	1	0		
Statement of PLO12	3	2	1	0		
3: Strongly Agree; 2: Agree; 1: Average;0 : Do not agree						

The overall PLO attainment values are obtained by adding attainment values estimated using direct and indirect methods in the proportion of 75:25 as follows:

Overall attainment value for PLO1 =

0.75 × average attainment value for PLO1 using direct method (from table 5) +

0.25 × average response of outgoing students for PLO1 (from table 6)

Similarly, overall attainment value can be obtained for each PLO.

Table 7: Overall PLO Attainment Values

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
Direct PLO attainment x 0.75										
Indirect PLO attainment x 0.25										
Overall PLO attainment										
Target	2	2	2	2	2	2	2	2	2	2

The overall PLO attainment values obtained above are compared with set target. The set target for each PLO may be different and can be finalized by the Boards of Studies of the departments/institutes.

If overall PLO attainment value is less than the set target value, then an action plan may be prepared for improvement in the subsequent academic session.

Examples of PLOs

PLOs	UG Certificate in Physical Sciences
After the completion of UG certificate in Physical Sciences, the student should be able to:	
PLO-1: Knowledge and understanding	• Demonstrate the knowledge of basic principles, concepts, facts and broad linkage of chosen subjects of physical sciences.
PLO-2: Skills	• Selecting and using relevant methods, tools, and materials to assess the appropriateness of approaches for solving problems associated with the chosen subjects of physical sciences.
PLO-3: Application of knowledge and Skills	• Apply the acquired operational or theoretical knowledge, and a range of practical skills to select and use basic methods, tools, materials, and information to generate solutions to specific problems relating to the chosen subjects of physical sciences.
PLO-4: Critical thinking	• Listen carefully, read texts, make judgments and take decisions based on analysis of data and evidences.
PLO-5: Ethics	• Put forward convincing arguments to respond to the ethical and moral issues associated with the chosen subjects, practice ethical and moral values in one's life.
PLO-6: Communication	• Express scientific thoughts and ideas effectively in writing and orally and communicate on scientific activities with others using appropriate media.
PLO-7: Life Long Learning	• Acquire knowledge and skills including learning 'How to learn' that are necessary for participating in learning activities throughout life.
PLO-8: Environmental Awareness	• Demonstrate knowledge of effects of environmental degradation, climate change and pollution, effective waste management.
PLO-9: Digital Literacy	• To use ICT in a variety of learning and work situations.

PLOs	UG Diploma in Physical Sciences
After the completion of UG Diploma in Physical Sciences, the student should be able to:	
PLO-1: Knowledge and understanding	• Demonstrate the deeper knowledge and understanding of principles, concepts, facts and broad linkage of chosen subjects of physical sciences.
PLO-2: Skills	• Selecting and using relevant methods, tools, and materials to assess the appropriateness of approaches from a range of sources for solving complex problems associated with the chosen subjects of physical sciences.
PLO-3: Application of knowledge and Skills	• Apply the acquired operational or theoretical knowledge, and a range of practical skills to select and use appropriate methods, tools, materials, and information to generate solutions to specific problems relating to the chosen subjects of physical sciences.
PLO-4: Critical thinking	• Listen carefully, read texts, make judgments and take decisions based on analysis of data and evidences, present complex information in a clear, scientific and concise manner.
PLO-5: Ethics	• Formulate arguments in support of actions to address the ethical and moral issues associated with the chosen subjects, practice ethical and moral values in one's life.
PLO-6: Communication	• Express scientific thoughts and ideas effectively in writing and orally and communicate on scientific activities with others using appropriate media.
PLO-7: Life Long Learning	• Acquire knowledge and skills including learning 'How to learn' that are necessary for participating in learning activities throughout life.
PLO-8: Environmental Awareness	• Apply knowledge, skills and attitude to mitigate the effects of environmental degradation, climate change and pollution, effective waste management.
PLO-9: Digital Literacy	• To use ICT in a variety of learning and work situations.

PLOs	Bachelor Degree in Physical Sciences
After the completion of Bachelor degree in Physical Sciences, the student should be able to:	
PLO-1: Knowledge and understanding	• Demonstrate the comprehensive and specialized knowledge and deep understanding of principles, concepts, and facts about current and emerging issues relevant to chosen subjects of physical sciences.
PLO-2: Skills	• Selecting and using relevant methods, tools, and materials to assess the appropriateness of approaches for solving specific problems associated with the chosen subjects of physical sciences.
PLO-3: Application of knowledge and Skills	• Apply the acquired operational or theoretical knowledge, and a range of practical skills to analyze quantitative and qualitative data to assess the different approaches to generate solutions to specific problems related to the chosen subjects of physical sciences.
PLO-4: Critical thinking	• Listen carefully, read texts, make judgments and take decisions based on analysis of data and evidences, present complex information in a clear, scientific and concise manner.
PLO-5: Ethics	• Follow ethical practices in all aspects of research and development, including avoiding unethical practices such as fabrication, falsification or misrepresentation of data or committing plagiarism.
PLO-6: Communication	• Able to communicate effectively on complex scientific activities with the scientific community and with society at large, such as, being able to comprehend and write effective scientific reports and design documentation, make effective presentations.
PLO-7: Life Long Learning	• Acquire knowledge and skills including learning 'How to learn' that are necessary for participating in learning activities throughout life.
PLO-8: Environmental Awareness	• Apply knowledge, skills and attitude to mitigate the effects of environmental degradation, climate change and pollution, effective waste management.
PLO-9: Digital Literacy	• To use ICT in a variety of learning and work situations, appropriate software to analysis the data.
PLO-10: Research Aptitude	• Ask relevant/appropriate questions, identifying, formulating and analyzing the research problems and to draw conclusion from the analysis.

Annexure I

Model Format for 1- Year /2- Year /5-Year PG Programme Syllabus

Title of the Programme
[Master's (PG) Degree Programme in Chemistry]

Semester – I

Course Code: Title   **Credits: 04; Total Contact Hrs.60**
(MCHMCAC125: Analytical Chemistry)   **Max. Marks: 100**

Course Learning Outcomes (CLOs) [minimum one CLO for each unit]

CLO 1: -----------
CLO 2: -----------
CLO 3: -----------
CLO 4: -----------
Unit-I

Unit-II

Unit-III

Unit-IV

CLO-PLO Matrix for the Course

UNIT-WISE CLOs	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	Average (CLO)
MCHMCAC125.1	-	-	-	-	-	-	-	-	-	-	
MCHMCAC125.2	-	-	-	-	-	-	-	-	-	-	
MCHMCAC125.3	-	-	-	-	-	-	-	-	-	-	
MCHMCAC125.4	-	-	-	-	-	-	-	-	-	-	
Average(PLO)											

Note: '-' indicates contribution of unit-wise CLOs to identified PLOs that can be within range of 0 to 3 on a four-point scale. (see page no 07 for reference)

Suggested Reading including online resources

Teaching-Learning Strategies/pedagogy in brief (if any)

Assessment methods and weightages in brief (as per requirement)