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CIRCULAR

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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.

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Guidelines for Programme Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs) Under NEP- 2020

Types of Learning Outcomes:

- **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.
- **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 CO is that it should be tangible, observable and measurable. Earlier it was referred to as **Course Outcomes (COs).**
- **Program Learning Outcomes (PLOs):** Program 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 program these represent the knowledge, skills and attitudes they should have imbibed or learnt. Earlier it was referred to as Program Outcomes (POs). It also includes erstwhile Program Specific Outcomes (PSOs) that referred to outcomes, specific to a particular program 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 In the National Education Policy (NEP-2020), PO & PSO have been replaced by and are equivalent to PLOs (both generic and specific). Similarly, COs have been replaced by CLOs.
- **Program 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.

Programme Learning Outcomes (PLOs): PLOs 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 programs of study should acquire and be able to demonstrate for the award of the Certificate/Diploma/Degree. The **Program Learning Outcomes** would also focus on knowledge and skills that prepare students for further study, employment, and responsible citizenship.

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

1. Knowledge and Understanding
2. Skills/Technical Skills
3. Application of Knowledge and skills
4. Communication Skills
5. Critical thinking
6. Ethics
7. Life-long Learning
8. Creativity
9. Research Aptitude
10. Problem Solving

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/transdisciplinary area of learning. One CLO for each unit may be stated.

Course Learning outcomes are the 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 beginning 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 program in a similar manner.

Steps to Create a CLO-PLO Matrix:

1. Define Course Learning Outcomes (CLOs): Clearly articulate the learning objectives for each course.
2. Define Program Learning Outcomes (PLOs): Identify the Program-Level Outcomes that graduates should achieve.
3. Map CLOs to PLOs: Determine which CLOs contribute to which PLOs.
4. Use a Matrix: Organize the information in a matrix format, with CLOs in rows and PLOs in columns.
5. 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).

6. Review and Iterate: Regularly review and update the matrix to ensure it accurately reflects the Program'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 either "CLO to PLO" or "PLO to PEO")

- 3 - indicates Substantial (high) correlation mapping (high contribution of the CLO towards attainment of the PLO)
- 2 - indicates Moderate (medium) correlation mapping (medium contribution of the CLO towards attainment of the PLO)
- 1 - indicates Slight (low) correlation mapping (some contribution of the CLO towards attainment of the PLO)
- x - 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):

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

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

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

CLO Attainment Targets:

- 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".
- 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.).
- 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.
- 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:

- 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).
- 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:

- Direct attainment of CLOs is determined from the performance of students in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE).
- The proportional weightages of CIE: SEE will be as per the academic regulations in force. It could either be 70:30 or as specified in the regulations.
- 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

- 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.
- 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

However, Semester End Examination (SEE) is conducted and evaluated by the University for the departments and affiliated colleges. Thus, 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 Program 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 Program Learning Outcome are used to calculate the attainment levels.

Indirect Method:

- In indirect method, surveys from current passing out students (program exit survey), survey from employer (during placement), survey from industry persons (if students are working as interns for some industry) are to be considered.
- 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 too should be based on following predefined levels:

- Level-3: 80% or above survey takers giving 2 or 3 marks
- Level-2: 70% or above but less than 80% survey takers giving 2 or 3 marks
- Level-1: 60 % or above but less than 70% survey takers giving 2 or 3 marks

Program Learning Outcomes (POOs) attained through the attainment of CLOs.

- For a given course, all CLOs are mapped to certain PLOs, as shown in the Table below.
- The overall CLO attainment value as computed in STEP 8 and the CO-PO mapping values given in the STEP 1 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 1 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 Program Learning Outcome (i.e. not in agreement with the particular PLO).
1	If the contents of course have low correlation with the particular Program 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 Program 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 Program 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
MCHMCAC125.1	3	3	2	3	3	0	2	3	1	2
MCHMCAC125.2	3	2	3	3	3	2	2	0	2	1
MCHMCAC125.3	2	3	3	3	2	3	2	3	2	2
MCHMCAC125.4	3	2	2	2	3	3	3	3	3	1
Average for MCHMCAC125	2.75	2.50	2.50	2.75	2.75	2.00	2.25	2.25	2.00	1.50

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
MCHMCAC125	2.75	2.50	2.50	2.75	2.75	2.00	2.25	2.25	2.00	1.50
MCHMCBC125	3.00	2.00	2.00	2.60	2.50	3.00	2.80	2.70	2.80	2.60
MCHMC --- 125	2.00	2.50	3.00	2.00	2.00	2.50	3.00	2.50	2.00	2.50
MCHMC --- 125	2.00	2.80	2.50	3.00	3.00	2.80	2.50	3.00	3.00	2.00
MCHMC --- 125	3.00	3.00	2.00	2.00	2.00	3.00	2.80	2.50	2.00	3.00
MCHMC --- 225	2.00	2.40	3.00	3.00	3.00	2.40	3.00	2.00	3.00	2.00
MCHMC --- 225	3.00	2.75	2.00	2.50	2.50	2.75	2.40	1.75	2.50	3.00
MCHMC --- 225	2.50	2.25	3.00	2.80	2.80	2.25	2.75	2.75	2.80	2.00
MCHMC --- 225	2.80	1.50	2.50	3.00	3.00	1.50	2.25	2.50	3.00	3.00
MCHMC --- 225	3.00	2.00	2.80	2.40	2.40	3.00	1.50	2.80	2.40	2.50
MCHMC --- 325	2.40	2.25	3.00	2.75	2.75	2.00	2.00	3.00	2.75	2.80
MCHMC --- 325	2.75	3.00	2.40	3.00	2.00	1.50	3.00	2.40	3.00	3.00
MCHMC --- 325	2.25	1.75	2.75	2.50	1.75	2.00	2.00	2.75	2.00	2.40
MCHMC --- 325	1.50	1.50	2.90	2.25	2.80	2.50	2.75	2.25	1.75	2.75
MCHMC --- 325	2.00	2.80	2.60	2.60	2.80	2.80	2.00	1.50	2.60	2.60
MCHMC --- 425	2.25	2.00	3.00	2.00	2.00	3.00	3.00	2.00	2.00	2.00
MCHMC --- 425	3.00	3.00	2.50	3.00	3.00	2.50	2.50	3.00	3.00	3.00
MCHMC --- 425	2.25	2.00	2.80	2.00	2.00	2.80	2.80	2.00	2.00	2.00
MCHMC --- 425	2.75	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
MCHMC --- 425	1.50	2.50	2.40	2.50	2.50	2.40	2.40	2.50	2.50	2.50
AVERAGE	**2.44**	**2.38**	**2.63**	**2.58**	**2.53**	**2.49**	**2.54**	**2.46**	**2.51**	**2.51**

Attainment of CLOs:

We can give 75:25 weightage to direct and indirect evaluation methods. E.g., CLO attainment through internal assessment = 75% of the average of internal assessment + 25% of AQSM (Assignment, quiz, seminar, minor project etc.)
The attainment of CLOs can be measured on the basis of the results of Semester End Examination (SEE) and Continuous Internal Assessment. The attainment is measured on scale of 3 after setting the target for CLOs attainment. Table 4 shows the CLO attainment levels for internal assessment and for Semester End Examination (SEE) assuming the set target of 60% marks for internal assessment and letter grade A for ESE:

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

Attainment Level	For Continuous Internal Evaluation (CIE)	For Semester End Examination (SEE)
0 (No attainment)	<40% of students score more than average %age of marks or set target in assessment methods 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 more than average %age of marks or set target in assessment methods 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 more than average %age of marks or set target in assessment methods 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 students score more than average %age of marks or set target in assessment methods for internal assessment of a course.	60% or more students obtained letter grade of A in SEE of a course.
The assessment methods for Continuous Internal Assessment are class participation, assignment /presentation/quiz/class test etc. and mid-term examination		

Note: In the above table-4, the set target is assumed as 60% for internal assessment and grade A for SEE. It may vary in different departments/institutes. The Boards of Studies of the departments/institutes may finalize the set target.

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 Semester End Examination (SEE), it is assumed that questions in the end term examination are based on all CLOs of the course. Attainment levels for Semester End Examination (SEE) 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 = 72% of CLO attainment level in Semester End Examination (SEE) + 28% of CLO Attainment level in Continuous Internal Assessment (CIA).
Table 5 illustrates the mapping of assessment methods of Continuous Internal Assessment (CIS) with CLOs along with the procedure for measuring the overall CLOs attainment level for Continuous Internal Assessment as well as Semester End Examination for one course/paper of a program.

Table 5: Illustration of measuring overall CLO attainment levels

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

Name and Code of the Course							
Name of the student	Roll No.	Class Participation (Max. Marks:)	Assignment /Presentation/ Quiz/Class test etc. based on CLO_1 (Max. Marks:)	Assignment /Presentation / Quiz/Class test etc. based on CLO_2 (Max. Marks:)	Mid-Term Examination		SEE
					Question Based on CLO_3 **(Max. Marks:)**	Question Based on CLO_4 (Max. Marks:)	Letter Grade of the Course
Name1	R1						
Name2	R2						
.	.						
.	.						
%age of Students scoring more than 60% (Grade A for SEE)	CP	P1	P2	P3	P4	PSEE	
Average %age: (CP+P1+P2+P3+P4)/5							
Attainment Level	IA = 1, 2 or 3 as per scale defined (Table 4)						SEE= 0, 1, 2 or 3 as per scale (Table 4)
Overall, CLO attainment level	72% of SEE + 28% of CIA						

Attainment of PLOs

The overall attainment level of PLOs is based on the values obtained using direct and indirect methods in the ratio of 75:25. 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 6.

Table 6: PLO Attainment Values using Direct Method

Course Code	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	POL10
MCHMCAC125	X = (2.13)	A	D	G	J	M	P	S	V	
MCHMCBC125	Y	B	E	H	K	N	Q	T	W	
MCHMC --- 125	Z	C	F	I	L	O	R	U		
MCHMC --- 125										
-										
-										
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 0.75	APLO1 x 0.75	APLO1 x 0.75							

The PLO Attainment Values to be filled in above table can be obtained as follows:
For MCHMCAC125 Cell (Value of X):
PLO1 Attainment Value, out of 3 = (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, out of 3 = (Mapping factor of MCHMCBC125-PLO1 from Table 3 × Average CLO attainment value for the course MCHMCBC125)/3
Similarly values for each cell of Table 6 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 7. Average of the responses from the outgoing students for each PLO is estimated.

The overall PLO attainment values are obtained by adding attainment values estimated using direct and indirect methods in the proportion of 72:28 as follows:

Overall attainment value for PLO1 =

0.8 × average attainment value for PLO1 using direct method (from table 6) +

	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 0.25
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						

0.25 × average response of outgoing students for PLO1 (from table 7)

Similarly overall attainment value can be obtained for each PLO.

Table 7: Questionnaire for Indirect Measurement of PLO Attainment (For Outgoing Students)

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
Direct PLO attainment										
Indirect PLO attainment										
Overall PLO attainment										
Target	2	2	2	2	2	1.5	2	2	2	2

Table 8: Overall PLO Attainment Values

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.

Annexure-I

Examples of PLOs

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.

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: ----------

Course Content:

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
MCHMCAC125.1										
MCHMCAC125.2										
MCHMCAC125.3										
MCHMCAC125.4										
Average for MCHMCAC125										

Suggested Reading including online resources

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

Assessment methods and weightages in brief (as per requirement)