CHAUDHARY DEVI LAL UNIVERSITY, SIRSA
(Established by the State Legislature Act 9 of 2003)
"B" Grade NAAC Accredited
Barnala Road, Sisa-125055,
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(Through E-Mail)

NOTIFICATION

It is notified for information to all the concerned that the following UGC Guidelines already approve by the Academic Council in its 40th meeting held on 29.11.2024 vide Resolution No. 40.16 and refer to Executive Council, the Vice-Chancellor has approved the recommendation of the Academic Council under section 11(6) of University Act in anticipation approval of the Executive Council's and adopt the following UGC Guidelines.

(i) UGC Guidelines for "Curriculum and Credit Framework for postgraduate Programme are attached at **Annexure-I (Pages-01 to 11).**

(ii) Guidelines for Innovation/Innovative Pedagogical approaches an evaluation Reforms" at **Annexure- II (Pages- 01 to 36).**

17/4/2025
REGISTRAR

Endst./Acad./AC-II/2024/ 2896-2942 Dated: 17/4/25

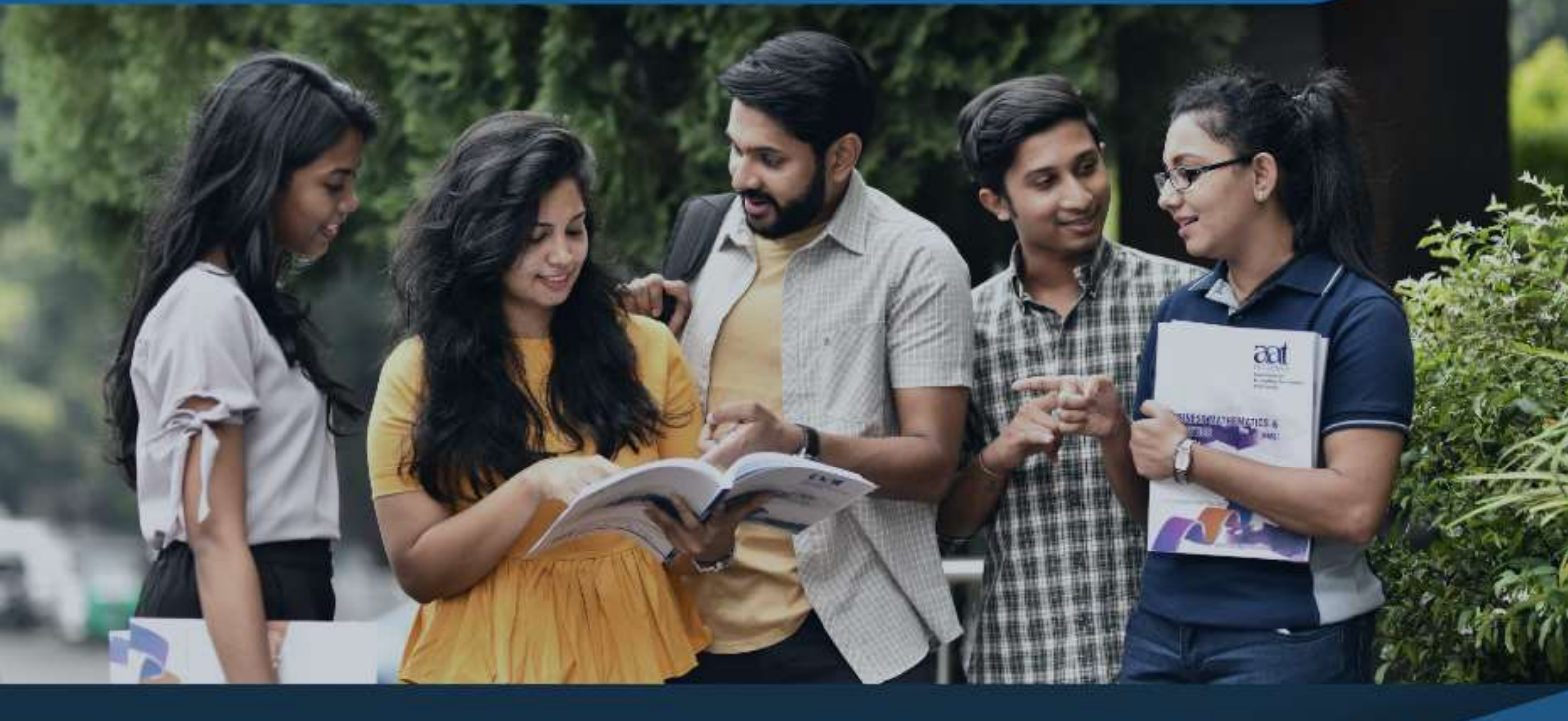
A copy of the above forwarded to the following for information:

1. The Dean Academic Affairs, CDLU, Sirsa.
2. All Deans of Faculties and Chairpersons of UTD(s), CDLU, Sirsa.
3. The Dean of Colleges, CDLU, Sirsa with the request to inform all the Principals of Affiliated Colleges, Sirsa and Fatehabad (Districts).
4. The Controller of Examinations, CDLU, Sirsa.
5. The Dean, USGS, CDLU, Sirsa.
6. The Nodal Officer, NEP-2020, CDLU, Sirsa.
7. The Director, UITDC, CDLU, Sirsa to upload the above notification alongwith annexure on the University Website.
8. P.S. to V.C (for information of the Vice Chancellor), CDLU, Sirsa.
9. P.A. to Registrar (for information of the Registrar), CDLU, Sirsa.

15.4.2025
Deputy Registrar (Acad.)
***for* Registrar**

ज्ञान-विज्ञान विमुक्तये

Curriculum & Credit Framework for Postgraduate Programmes



सत्यमेव जयते

ज्ञान-विज्ञान विमुक्तये

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TABLE OF CONTENTS

FOREWORD

प्रो. म. जगदीश कुमार
अध्यक्ष
Prof. M. Jagadesh Kumar
Chairman

सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
शिक्षा मंत्रालय, भारत सरकार
University Grants Commission
Ministry of Education, Govt. of India

12th June, 2024

FOREWORD

Education's primary stakeholders are its students. However, the rigid disciplinary boundaries in the higher educational system tied them to subjects at a very early stage rather than assisting them in discovering their true interests. Consequently, the National Education Policy 2020 strongly emphasises multidisciplinary and holistic education.

UGC has developed the Curriculum and Credit Framework for Postgraduate Programmes while considering the restructured degree programmes, entry and exit procedures, etc. The framework is a testament to student empowerment, giving them freedom, flexibility and choices. The framework, which has no discipline-specific entry requirements and shows the credit structure and curriculum contents for both one- and two-year PG programmes, also offers an exit option at the end of the first year in two-year PG programmes.

I am delighted to share the Curriculum and Credit Framework for Postgraduate Programmes prepared by UGC. I express my gratitude to the Expert Committee led by Prof. K. K. Pant and UGC officials for their invaluable assistance in drafting the Curriculum and Credit Framework for Postgraduate Programmes.

Since this framework will significantly impact students' careers, I urge all higher education institutions to implement it and ensure the advantages reach the students rapidly.

M Jagadesh Kumar

(Prof. M. Jagadesh Kumar)

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Curriculum and Credit Framework for Postgraduate Programmes

1.0 Introduction

India is among the fastest-growing economies in the world. Knowledge creation and research are critical in sustaining economic growth. A robust ecosystem of research, with a vast talent pool, is perhaps more important than ever if India is to become a leading knowledge society and one of the largest economies in the world in the coming years and decades. For that to happen, the nation needs a significant expansion of its research capabilities and output across disciplines.

The higher education sector is likely to expand significantly with the possible addition of more and more young Indians into higher education as India moves towards becoming a knowledge economy and society. A major thrust, therefore, is given in NEP 2020 with initiatives such as multidisciplinary education with multiple entry and exit options, research at the undergraduate level, learning outcomes-based curriculum approach, etc.

The postgraduate (PG) programmes help students to extend their knowledge of their chosen subject and prepare them for higher research studies. The advanced knowledge and specialized skills they gain in the PG programme are crucial to sustaining the journey of a student from the acquirer of knowledge to the creator of knowledge.

The re-structured degree programmes are promoted in both undergraduate and postgraduate education. The NEP 2020 states that "the undergraduate degree will be of either 3 or 4-year duration with appropriate certifications, e.g., a UG certificate after completing 1 year in a discipline or field including vocational and professional areas, or a UG diploma after 2 years of study, or a Bachelor's degree after a 3-year programme. The 4-year multidisciplinary Bachelor's programme, however, shall be the preferred option since it allows the opportunity to experience the full range of holistic and multidisciplinary education in addition to a focus on the chosen major and minors as per the choices of the student".

In conformity with the restructured undergraduate programmes mentioned above, the policy says HEIs will have the flexibility to offer different designs of PG programmes also.

2.0 Recommendations of NEP 2020 Relevant to Postgraduate Education

- There may be a 2-year programme with the second year devoted entirely to research for those who have completed the 3-year Bachelor's programme;
- For students completing a 4-year Bachelor's programme with Honours/Honours with Research, there could be a 1-year PG programme;
- There may be an integrated 5-year Bachelor's/Master's programme;

- Universities will aim to offer PG programmes in core areas such as Machine Learning as well as multidisciplinary fields "AI + X" and professional areas like health care, agriculture, and law;
- There shall be a National Higher Education Qualifications Framework (NHEQF). Higher education qualifications leading to a degree/diploma/certificate shall be described by the NHEQF in terms of such learning outcomes. Accordingly, the levels prescribed for the PG programme are levels 6, 6.5, and 7;
- PG framework should be in sync with National Credit Framework (NCrF) for the creditization of all learning and assignment, accumulation, storage, transfer & redemption of credits, subject to assessment.

3.0 Main Features of the PG curriculum framework

- Flexibility to move from one discipline of study to another;
- Flexibility for students who qualify UG with a major and minor (s) to opt for either major or minor(s) subject or any other subject if they are able to prove their competence in PG programme;
- Opportunity for learners to choose the courses of their interest;
- Flexibility to switch to alternative modes of learning (offline, ODL, Online learning, and hybrid modes of learning);
- Mobility and flexibility as per the UGC (Establishment and Operation of Academic Bank of Credits in Higher Education) Regulations, 2021, and UGC Guidelines for Multiple Entry and Exit in Academic Programmes offered in Higher Education Institutions. These documents are to facilitate the implementation of the proposed "Curriculum and Credit Framework for Postgraduate Programmes".

4.0 Credit Requirement and Eligibility for the PG Programme

- A bachelor's degree with Honours/ Honours with Research with a minimum of 160 credits for a 1-year/2-semester PG programme at level 6.5 on the NHEQF.
- A 3-year/6-semester bachelor's degree with a minimum of 120 credits for a 2-year/4-semester PG programme at level 6.5 on the NHEQF.
- A 4-year Bachelor's degree (e.g. B.E., B.Tech. etc.) with a minimum of 160 credits for a 2-year/4-semester PG programme (e.g. M.E., M. Tech. etc.) at level 7 of NHEQF.
- A student is eligible for a PG programme in a discipline corresponding to either major or minor(s) discipline in UG programme. In this case, the University can admit the students in the PG programme based on the student's performance in the UG programme or through an entrance examination. However, irrespective of the major or minor disciplines chosen by a student in a UG programme, a student is eligible for admission in any discipline of PG programmes if the student qualifies the National level or University level entrance examination in the discipline of the PG programme.

5.0 Statement of the Generic Outcomes of Learning at a Postgraduate level

Under the National Higher Education Qualifications Framework (NHEQF), higher education qualifications are classified along a continuum of levels from level 4.5 to level 8. The NHEQF levels represent a series of sequential stages expressed in terms of a range of learning outcomes against which typical qualifications are positioned/located. Learning outcomes, are statements of what the learner is expected to know, understand, and/or be able to do on the successful completion of an approved programme of study/learning at a specified level. Students on completion of the chosen programme(s) of study under the NHEQF must possess and demonstrate the graduate attributes defined in terms of the expected learning outcomes.

NHEQF level 4.5 represents learning outcomes appropriate to the first year (first two semesters) of the undergraduate programme of study, while Level 8 represents learning outcomes appropriate to the doctoral-level programme of study. Detailed learning outcomes for the PG programme are given in the National Higher Education Qualifications Framework.

https://www.ugc.gov.in/pdfnews/2990035_Final-NHEQF.pdf

In accordance with the NHEQF, the levels for the PG programme are given in the Table.1

S.No.	Qualifications	Level	Credits	Credit Points
1.	P.G. Diploma	6	40	240
2.	1-Year PG after a 4-year UG	6.5	40	260
3.	2-Year PG after a 3-year UG	6.5	40 + 40	260
4.	2-Year PG after a 4-year UG such as B.E., B. Tech. etc.	7	40 + 40	280

6.0 Graduate Attributes of PG Programmes

Qualifications that signify completion of the postgraduate degree are awarded to students who: i) have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context; ii) can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; iii) have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments; iv) can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously; v) have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

Accordingly, the NHEQF outlines the statement of learning achievements at a particular level on the basis of the following elements of descriptors:

- Knowledge and understanding
- General, technical, and professional skills required to perform and accomplish tasks

- Application of knowledge and skills
- Generic learning outcomes
- Constitutional, humanistic, ethical, and moral values
- Employability and job-ready skills, and entrepreneurship skills and capabilities/ qualities and mindset.

7.0 Designs of Postgraduate Programme

According to the policy, HEIs will have the flexibility to have different designs of PG programme. Seemingly it appears there are three designs of PG such as 1-year PG, 2-year PG, and an integrated 5-year programme. However, given that in 4-year UG there are bachelor's (Hons.) and bachelor's (Hons. with Research), creditization of work experience, combinations of disciplines with emerging subjects such as AI, Machine Learning, etc. makes the number of curricular frameworks much higher. Accordingly, the higher education institutions prepare the curriculum as per the graduate attributes of the programme.

8.0 Curricular Components

For 2-year PG: Students entering 2-year PG after a 3-year UG programme can choose to do (i) only course work in the third and fourth semester or (ii) course work in the third semester and research in the fourth semester or (iii) only research in the third and fourth semester.

1-year PG: Students entering 1-year PG after a 4-year UG programme can choose to do (i) only coursework or (ii) research or (iii) coursework and research.

5-year Integrated Programme (UG+PG): At the PG level, the curricular component of 5-year integrated programme will be similar to that of 2-year PG mentioned above.

Programmes that are intended to sharpen the students' analytical abilities to optimally solve problems, the curriculum, in general, comprises advanced skills and real-world experience and less of a research component. Such programmes should have a curriculum that is different from other programmes.

9.0 Credit Distribution

a) For 1-year PG

Curricular Components	PG Programme (one year) for 4-yr UG (Hons./Hons. with Research) Minimum Credits			
	Course Level	**Coursework**	**Research thesis/project/Patent**	**Total Credits**
Coursework + Research	500	20	20	40
Coursework	500	40	--	40
Research	-	-	40	

b) **For 2-year PG**

<table>
<tr><th colspan="2" rowspan="2">Curricular Components</th><th colspan="4">Two-Year PG Programme (Generic and Professional)
Minimum Credits</th></tr>
<tr><th>Course Level</th><th>Coursework</th><th>Research thesis/project/Patent</th><th>Total Credits</th></tr>
<tr><td colspan="2">PG Diploma</td><td>400</td><td>40</td><td>--</td><td>40</td></tr>
<tr><td colspan="2">1st Year
(1st & 2nd Semester)</td><td>400
500</td><td>24
16</td><td>--</td><td>40</td></tr>
<tr><td colspan="6">Students who exit at the end of 1st year shall be awarded a Postgraduate Diploma</td></tr>
<tr><td rowspan="3">2nd Year
(3rd & 4th Semester)</td><td>Coursework & Research</td><td>500</td><td>20</td><td>20</td><td>40</td></tr>
<tr><td>Coursework

(or)</td><td>500</td><td>40</td><td>--</td><td>40</td></tr>
<tr><td>Research</td><td>--</td><td>--</td><td>40</td><td>40</td></tr>
</table>

Exit Point:

For those who join 2 year PG programmes, there shall only be one exit point. Students who exit at the end of 1st year shall be awarded a Postgraduate Diploma.

The PG programme should include vocational courses relevant to the chosen discipline.

9.1 Course Levels

400-499: Advanced courses which would include lecture courses with practicum, seminar-based course, term papers, research methodology, advanced laboratory experiments/software training, research projects, hands-on-training, internship/apprenticeship projects at the undergraduate level or First year Postgraduate theoretical and practical courses

500-599: For students who have graduated with a 4-year bachelor's degree. It provides an opportunity for original study or investigation in the major or field of specialization, on an individual and more autonomous basis at the postgraduate level

10.0 Flexibility

Flexibility is the hallmark of NEP 2020. The benefit of PG degree is that they offer great flexibility viz. enrolling in online programmes, pursuing two postgraduate programmes simultaneously, creditizing work experience, etc.

Postgraduate programmes which are entirely online, allow students to participate in the programme along with their current responsibilities. This makes earning a postgraduate degree while continuing to work easier and more accessible to individuals.

Another opportunity for students is the facility to pursue two academic programmes simultaneously 1) in two full-time academic programmes in the physical mode provided that there is no overlap of class timings between the two programmes 2) two academic programmes, one in full-time physical mode and another in Open and Distance Learning (ODL)/Online mode; or up to two ODL/Online programmes simultaneously. Degree or diploma programmes under ODL/Online mode shall be pursued with only such HEIs which are recognized by UGC/Statutory Council/Govt. of India for running such programmes.

Creditization of relevant work experience is another initiative to make education more holistic. The NCrF enables the assignment of credits for the experience attained by a person after undergoing a particular educational programme. In case a learner through employment gains experience relevant to the PG programme he/she wants to pursue, the work experience can be creditized after assessment. Accordingly, the duration can be adjusted by the HEIs. The maximum weightage provided for under this dimension is two (2) i.e. a candidate/ trained person can at best earn credits equal to the credits acquired for the base qualification/ skill, provided he has more than a certain number of years of work experience. The redemption of credits so earned, however, shall be based on the principle of assessment bands given in the NCrF. Link for NCrF is given:

(https://www.ugc.gov.in/pdfnews/9028476_Report-of-National-Credit-Framework.pdf)
The credit points may be redeemed as per Academic Bank of Credit (ABC) guidelines for entry or admission in higher education at multiple levels enabling horizontal and vertical mobility with various lateral entry options

The principle of calculating credits acquired by a candidate by virtue of relevant experiential learning including relevant experience and professional levels acquired and attaining proficiency levels (post-completion of an academic grade/ skill-based program) gained by the learner/student in the industry is given in the Table below:

Credit Assignment for relevant experience / proficiency

Experience cum Proficiency Levels	**Description of the relevant Experiential learning including relevant experience and professional levels acquired and attaining proficiency levels**	**Weightage/ multiplication Factor**	**No. of years of experience (Only indicative)**
Trained/ Qualification attained	Someone who has completed the coursework/ education/ training and has been taught the skills and knowledge needed for a particular job or activity	1	Less than or equal to 1 year
Proficient	Proficient would mean having the level of advancement in a particular profession, skillset, or knowledge	1.33	More than 1 less than or equal to 4
Expert	Expert means having high level of knowledge and experience in a trade or profession	1.67	More than 4 less than or equal to 7
Master	Master is someone having exceptional skill or knowledge of a subject/domain	2	More than 7

11.0 Switching Subjects in Postgraduate Programme

The first degree often makes students think of a different career path that requires a change of subject. Changing direction with a postgraduate degree has its challenges, but NEP gives enough freedom to make it a possibility. The postgraduate programmes provide an opportunity for students to change the field and realize their vision, as per the pathways given below:

a) A student is eligible for admission in a PG programme either in the major or minor discipline taken by the student in his/her UG programme.

b) Irrespective of the major or minor disciplines taken by a student in a UG programme, a student is eligible for admission in any discipline of PG programmes if the student qualifies the National level or University level entrance examination in the discipline of PG programme.

Candidates who have completed 4-year UG programme or a 3 year UG and 2 year PG programme or 5 year integrated programme (UG + PG) in STEM subjects will be eligible for admission in M.E., M. Tech. in allied areas.

12.0 Assessment Strategy

The NEP 2020 emphasizes upon formative and continuous assessment rather than summative assessment. Therefore, the scheme of assessment should have components of these two types of assessments. Assessment have to have correlations with the learning outcomes that are to be achieved by a student after completion of the course. Therefore, the mode and system of assessments have to be guided by the learning outcomes. For more details on assessment strategy, HEIs may refer to UGC Guidelines for Innovative Pedagogical Approaches & Evaluation Reforms.

13.0 Plagiarism Check

The Higher Education Institution concerned shall have a mechanism using well-developed software applications to detect plagiarism in research work and the research integrity shall be an integral part of all the research activities.

14.0 Letter Grades and Grade Points

The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester. The SGPA is based on the grades of the current term, while the Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study. The HEIs may also mention marks obtained in each course and a weighted average of marks based on marks obtained in all the semesters taken together for the benefit of students.

Letter Grade	Grade Point
O (Outstanding)	10
A+ (Excellent)	9
A (Very Good)	8
B+ (Good)	7
B (Above Average)	6
C (Average)	5
P (Pass)	4
F (Fail)	0
Ab (Absent)	0

Computation of SGPA and CGPA

UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

SGPA (Si) = ∑(Ci x Gi) / ∑Ci

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

Example for Computation of SGPA

Semester	Course	Credit	Letter Grade	Grade point	(Credit x Grade)
1	Course 1	3	A	8	3 x 8 = 24
1	Course 1	4	B +	7	4 x 7 = 28
1	Course 1	3	B	6	3 x 6 = 18
1	Course 1	3	O	10	3 x 10 = 30
1	Course 1	3	C	5	3 x 5 = 15
1	Course 1	4	B	6	4 x 6 = 24
		20			139
SGPA					139/20=6.95

ii. The Cumulative Grade Point Average (CGPA) is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

CGPA = ∑(Ci x Si) / ∑ Ci

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

Example for Computation of CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit 20 SGPA 6.9	Credit 20 SGPA 7.8	Credit 20 SGPA 5.6	Credit 20 SGPA 6.0
CGPA= (20 x 6.9 + 20 x 7.8 + 20 x 5.6 + 20 x 6.0)/80 = 6.6			

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

Transcript (Format): Based on the above recommendations on Letter grades, grade points and SGPA and CCPA, the HEIs may issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

References:

1. The National Education Policy 2020 (https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf)
2. National Credit Framework (NCrF) (https://www.ugc.gov.in/pdfnews/9028476_Report-of-National-Credit-Framework.pdf)
3. The National Higher Education Qualifications Framework (NHEQF) (https://www.ugc.gov.in/pdfnews/2990035_Final-NHEQF.pdf)
4. Curriculum and Credit Framework for Undergraduate Programmes. (https://www.ugc.gov.in/pdfnews/7193743_FYUGP.pdf)

ज्ञान विज्ञान विमुक्तये

आचार्य मनिष र. जोशी
सचिव

Prof. Manish R. Joshi
Secretary

सत्यमेव जयते

आज़ादी का अमृत महोत्सव

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(शिक्षा मंत्रालय, भारत सरकार)
(Ministry of Education, Govt. of India)

ACKNOWLEDGEMENT

A document on **"Curriculum and Credit Framework for Postgraduate Programmes"** has been prepared with the help of an Expert Committee comprising Prof. K.K. Pant, Director, IIT Roorkee, Prof. Dhananjay Singh, School of Language, Literature and Culture Studies, JNU, Prof. Payal Mago, Director, Campus of learning, Delhi University, Dr. Ranjana Arya, School of Biotechnology, JNU, Ms. Sarika Dixit, Consultant, NCVET, Prof. Tirthankar Bhattacharya, Department of Mathematics, Indian Institute of Science, Prof. Nalin Pant, Department of Chemistry, IIT Delhi, Prof. Sangeeta Sahney, School of Management & Entrepreneurship IIT Jodhpur, Dr. N. Gopukumar, Joint Secretary, UGC (Co-ordinating Officer).

UGC acknowledges and appreciates the efforts made by the Expert Committee in preparing this document.

(मनिष जोशी)

New Delhi.
14th June 2024/ 24 ज्येष्ठ 1946

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Curriculum & Credit Framework for Postgraduate Programmes

सत्यमेव जयते

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University Grants Commission
Ministry of Education
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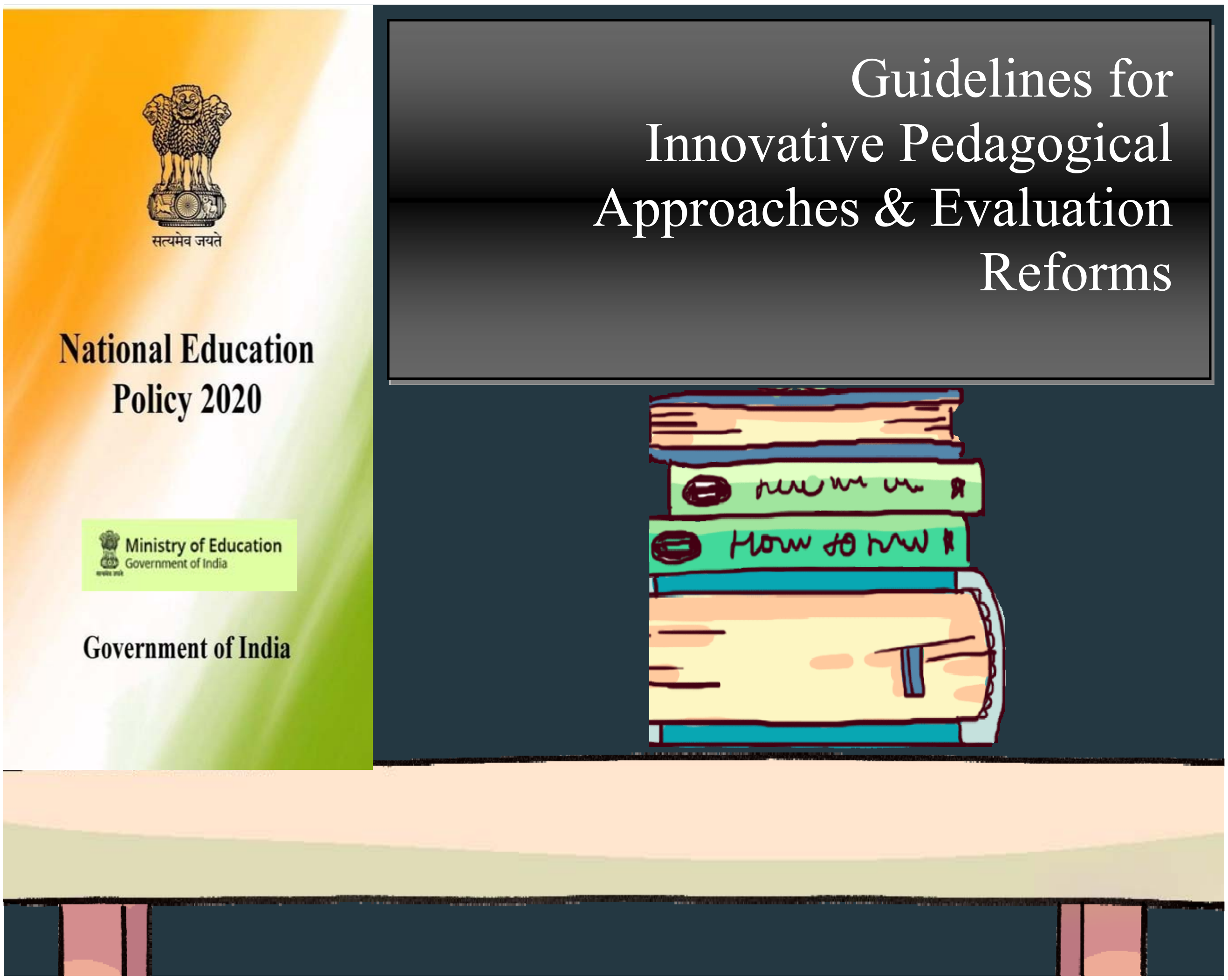

Guidelines for
Innovative Pedagogical
Approaches & Evaluation
Reforms
सत्यमेव जयते
National Education
Policy 2020
Ministry of Education
Government of India
Government of India

Table of Contents

1. Preamble:

The traditional Indian teaching-learning system has been driven by *Guru-Shishya parampara.* It is a holistic system which provided comprehensive knowledge, value-based learning as well as requisite life skills suited to the learners. Diverse pedagogies have been used for achieving core objectives of the entire learning processes, which included exposure to real life experiences and hands on learning, value-based learning through stories/narrations, problem-solving through explorations, role plays, memorization and dissemination through debates and discussions.

In the past few decades, various policy frameworks have been developed to address the evolving needs of different pedagogical approaches in higher education. The recent National Education Policy 2020 (NEP) is the outcome of mammoth exercise to integrate Indian traditional value-based education with the present technology dominated teaching and learning process. It aims to overhaul the existing education system through a multipronged approach, one of which is developing a pedagogy that makes education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible and enjoyable. As the NEP 2020 strives to develop well-rounded, competent individuals with 21st-century skills, the curricula and pedagogies have to be reoriented and revamped for the same, which includes raising the standard of curricula and using appropriate pedagogies to deliver effectively to the learners.

The NEP 2020, in its Para‘s, namely, Para 4.4, Para 9.3 (d), Para 11.6, Para 12.1, Para 12.2 and Para 12.6, envisions innovative pedagogical approaches and their role in higher education. The policy emphasises the holistic development of the learners, which requires using innovative pedagogical approaches such as experiential learning, cutting edge pedagogy, art integrated learning, flipped classroom etc.

The NEP 2020 is learner centric in its approach, and teachers play a pivotal role in its implementation. The policy gives teachers more autonomy in choosing aspects of pedagogy so that they may plan teaching-learning in the manner they find most effective for the students in their classrooms. However, the meaningful exercise of this autonomy and flexibility depends on the teacher's understanding of the different pedagogical approaches.

Pedagogical practices determine the learning experiences arranged for the learners, thus directly influencing their learning outcomes. Therefore, the use of relevant pedagogy is necessary to achieve the objectives of the curricula successfully. Such pedagogy has to have an increased emphasis on an inclusive approach to communication, discussion, debate, research, and cross-disciplinary and interdisciplinary thinking opportunities. Teachers should be provided with requisite training on pedagogical approaches for capacity building to achieve the desired learning outcomes for students. Such aspects of training on pedagogy must focus on the following:

- Addressing the different learning needs of students within a classroom and institutions-needs of differently-abled students.
- The difference in the learning styles (visual, auditory and kinaesthetic learning styles) of students.
- Diversity of the background of students in terms of the discipline of study, the social, economic, cultural and educational background.
- The difference in the pace of learning.

Adopting an inclusive approach: The NEP 2020 focuses on providing accessible, inclusive and equitable education. The pedagogy used in a classroom must reflect the inclusive approach so that learners can relate what is taught in the class with the multiple perceptions and realities they experience.

Embracing Multi-disciplinarity: Singularity in terms of acquiring knowledge in a particular discipline lacks the understanding of the complexity and interplay of various factors in the causation as well as finding a durable solution to a problem. Therefore, NEP 2020 promotes multi-disciplinarity. Accordingly, there is a need to change the pedagogical approach to instil in the students the multidisciplinary approach for understanding the core concepts, identifying and formulating problems, and exploring possible solutions.

Learning mode centric pedagogy: The key modes of learning, viz. physical or offline, online, hybrid or blended modes, and flipped classroom necessitate varying pedagogies suited to the channel/s of communication characteristic to each mode of learning. Therefore, appropriate pedagogy needs to be devised and adopted accordingly to avoid gaps in the teaching and learning process through these modes.

Learning method based pedagogy: There are multiple methods of learning which can be used based on the desired learning outcomes or degrees of active participation of learners in the teaching-learning process both within and outside the classroom. For instance, if the learning outcome is sensitization about a real-time problem, then it is essential to incorporate fieldwork with an observational study or survey in addition to the theoretical grounding required. If the aim is to provide hands-on or experiential learning, it is important to incorporate field-based, example-based, or project-based learning as pedagogy. Further, when the active engagement of learners in the learning process is desired, the use of collaborative and cooperative learning strategies, such as group discussion, brainstorming, role plays, case-studies, and self-learning methods supporting flipped classroom pedagogy are the important teaching-learning methods to encourage articulation, demonstrate new understandings of the content and apply it in solving problems. Flipped classroom pedagogy involves self or peer study by students before class to develop an understanding of the learning material provided by the teacher and thereafter engage in debate, discussion, analysis among students guided by the teacher during the class time. It is one of the important pedagogies to encourage articulation, demonstrate new understandings of the content and apply it in solving problems.

Each learning method may have an appropriate pedagogy for delivering to the learners what is to be learnt. Thus, determining the appropriate pedagogy for a chosen learning method is an essential step toward effective teaching-learning.

Given the significance of pedagogy and the different aspects of it which are to be taken into consideration, there is a need to formulate guidelines for innovative pedagogical approaches taking care of the following objectives:

- Pedagogical approaches for different learning needs of students
- Pedagogical approaches for different modes of teaching-learning such as physical, blended and online
- Pedagogical approaches for different disciplines, multi and inter-disciplinary approaches
- Evaluation & Assessment corresponding to defined Learning Outcomes requiring specific pedagogical strategies

- Pedagogical approaches enabling collaboration, cooperation, creation and co-creation among learners
- Capacity building of teachers with respect to pedagogical approaches
- Any other measures to achieve recommendations of NEP 2020 with respect to pedagogical approaches

These guidelines aim to suggest innovative pedagogies and develop the linkage of Graduate Attributes, as listed in National Higher Education Qualifications Framework (NHEQF), with learning needs and pedagogical approaches to better serve towards achieving the NEP 2020 vision.

2. Pedagogy and Its importance:

Pedagogy is an art of sharing knowledge which is dynamic in nature and may vary from teacher to teacher, classroom to classroom, institution to institution and platform to platform. The most critical factor in pedagogy is the constructivism.

An effective pedagogical approach may touch upon the following:

- Pedagogies are constantly evolving processes; every pedagogy is different and may be modified as per 21st Century learning.
- Pedagogy must fit the targeted audience and focus on helping students to develop an understanding of the knowledge delivered and relate with real life scenarios.
- To provide rich classroom experiences, various tools or methods may be integrated to enhance level of interaction and discussion within the class.
- Different assessment tools need to be explored for higher and inclusive productivity of the learners. Integrating ICT into assessment and evaluation processes may provide self-assessment opportunity to learners.

3. Innovative Pedagogical Approaches:

The adjectival word _innovative‘ connotes featuring new methods that are advanced and original; and in the context of _innovative pedagogical approaches‘, it may be understood to be those pedagogical approaches which involve usage of appropriate means (tools) and methods (ways) in a new and creative ways and in varied combinations in order to make the teaching-learning process more effective by enabling the learners to attain the expected/defined learning outcomes, develop students' capabilities in problem-solving, teamwork, learning to learn, reflective thinking etc. to be creative, adapt to changes, manage and analyze information, and work with knowledge.

Innovative pedagogical approaches positively impact student learning, behaviour and attitudes and are capable of ensuring that all students achieve the defined course/programme learning outcomes and demonstrate the expected graduate attributes. Para 13.4 of NEP 2020 recognises flexibility for teachers to adopt innovative pedagogies to ensure a motivated and creative teacher.

There are four broad categories of pedagogical approaches, namely - Behaviourism, Constructivism, Social Constructivism, and Liberationist.

(i) Behaviourism:

The theory of behaviourism informs its approach toward teacher-centred learning. It advocates the use of direct instruction and lecture-based lessons wherein the teacher is the sole authority to lead the lesson and the knowledge being delivered in a curriculum where each subject is taught discretely (topic-based learning). A behaviourist pedagogical approach is expected to use a lesson mixture of lecturing, modelling and demonstration, rote learning, and choral repetition. All these activities are 'visible' and structured and are led by the teacher. However, during the lesson, the shift may come where the student is the centre of the activity and demonstrates one‘s learning. Behaviourism is also sometimes referred to as a traditional teaching style.

(ii) Constructivism:

Learning through experiences and reflections is a part of constructivism theory. Constructivist pedagogy is 'invisible pedagogy' as it puts the child at the centre of learning. A constructivist approach would incorporate project work and inquiry-based learning and might adopt a Montessori or Steiner method. A lesson having constructivism theory includes individualisation and leads to slower-paced learning having hidden outcomes with the support of the expert and less teacher talk. This pedagogy also has scope for emphasis on being outdoors and engaging with nature. Constructivism is also sometimes referred to as a progressive teaching style.

(iii) Social Constructivism:

Social constructivism pedagogy could blend two priorities: teacher-guided and student-centred. The teacher uses group work elements, having smaller group sizes and limited topics for choices. The teacher may also use teacher modelling, questioning, and a mixture of individual, pair, and whole-class instruction.

(iv) Liberationism:

A liberationist approach involves democracy in the classroom as the student's voice is placed at the centre. The class discovers the subjects together, and the teacher plays the role of a learner. A teacher may use examples like literature containing non-standard constructions, such as graffiti or hip-hop. Students playing the role of the teacher decide about the topic of the lesson and showcase their learning through performance, speech, or dance. The teacher thus provides space and opportunity for the students to learn independently.

In addition to the points above, the following innovative pedagogies may be considered:

- Blended learning – Rethinking the purpose of the classroom and classroom time
- Gamification – Engagement through play and the pedagogies of games
- Computational thinking – Problem-solving approach through logic
- Experiential learning – Investigating in a complex world
- Multi-literacies and discussion-based teaching – Fostering critical thinking and questioning

Three structural changes within the educational systems that have an excellent potential for emboldening the successful development of innovative pedagogies mentioned above are:

1. Professional development to ensure the foundations of quality teaching;
2. Widening the profile of educators;
3. Supporting new models that are hybrids between formal and non-formal learning;

Recently, a new form of teaching, learning, and assessment have been explored, in order to guide teachers and policymakers in productive innovation, and proposed, under the title ―Innovating Pedagogy‖[1].

- Artificial intelligence in education
- human-centred System
- Learning through open data
- Engaging with data ethics
- Social justice pedagogy
- Learning from animations
- Multisensory learning
- Online laboratories – Laboratory access for all

Another pedagogy which is much needed to be cultivated is ‗Gratitude' as pedagogy. ―Gratitude involves the acknowledgement of what people have or receive and the conscious action of wanting to give back in some ways. When applied in an academic context, gratitude can help students to improve student-teacher and student-student relationships; it can help them to be more aware of their learning environment and increase understanding and focus on their studies. One practical approach to implementing gratitude as a pedagogy involves asking teachers and students to examine their attitude before starting their teaching or learning and during learning activities. A more detailed reflection can bring awareness of any negative attitudes towards certain topics or learning activities. These are then analysed and replaced by elements of gratitude.‖[2] It is also suggested to develop gratitude journal to enhance teaching-learning. Both teachers and students can maintain personal journals and write down three good things related to their teaching and learning respectively on a daily or weekly basis. Through this way, students and teachers would value the time and the opportunity to appreciate what was learned and taught and the people involved in the process.[3]

It is believed these pedagogies will play a part in shaping the future of teaching and learning and in opening possibilities for learners and teachers.

[1] Lucian Ciolan, et al (ed.) (2021), ―*Innovative Pedagogies: Ways into the Process of Learning Transformation*‖

[2] Kukulska-Hulme, A., et al (2021), *Innovative Pedagogy 2021: Open University Innovation Report 9*. Milton Keynes: The Open University. p.2.

[3] See, *Id* at p. 20.

4. Pedagogical Approaches Addressing Learning Needs:

Pedagogy, as a focus for teaching and learning, involves reflecting on different pedagogical approaches and helping teachers to improve and innovate the art of teaching. The changing environmental paradigms require new types of graduates and bring renewed pressure for higher education to respond by developing and cultivating the students capable of meeting those challenges at their workplaces. Therefore, a teacher must assess students' learning needs to adopt the matching pedagogical approach. Further, different students have their optimum learning methods. Some are fast in learning while reading texts and others ensure first listening to the teacher. Another group of students may learn once they have a practical demonstration. A teacher could find it challenging to maintain the balance that will be favourable to every student.

The learner's learning needs represent the gap between the learning experience one wants to have and their current state of knowledge, skill, and enthusiasm. There are four different domains of potential learning needs, viz., Cognitive, Social, Affective and Psychomotor, and these are detailed below in Table 1.

Table 1: Domains of Learning Needs[4]

Cognitive	Social	Affective	Psychomotor
Recognize good questions	Communicate with peers	Attain goals	Be in a comfortable setting
Ask good questions	Give and receive support	Nurture positive attitudes	Have transportation
Get help from experts	Experience external motivation	Be open to feedback from others	Have childcare
Practice problem-solving	Make a difference	Have time for reflection and Self-assessment	Get enough sleep
Think independently	Interact while problem-solving	Possess well-founded Self-Confidence	Have a good diet/ adequate energy level
Create work products	Explore and challenge conventions	Define and respond to the locus of control	Exercise
Process new information	Grow with friends	Have a sense of belonging	Have access to equipment and tools

[4] Source: Cambridge Academies - Kingman Unified School District #20. https://www.kusd.org/education/academic-programs/cambridge-academies

Use learning resources	Manage time and tasks	Understand the motivations of others	Engage in appropriate and timely demonstrations

The *diversity of learning needs* of the learners occurs due to the nature of the discipline, course, level of study, necessary level of competency, and applicability of knowledge. Therefore, identification of specific learning needs is required to reflect in the learning outcomes of a course, which in turn are expected to reflect in graduate attributes (GA).

Linking learning needs with graduate attributes (GAs) would ensure the holistic development of a student, as envisioned in NEP 2020. Development of graduate attributes, as specified in NHEQF, would require specific pedagogical approaches to serve the learning needs of a student. Thus, a teaching-learning process that ensures establishing linkages between graduate attributes, learning needs and pedagogical approaches would serve the purpose of outcome-based teaching-learning process. Table 3 lists the suggestive pedagogical approaches that help develop specific graduate attributes by specifying learning needs.

Table 3: Suggestive Pedagogical Approaches

Graduate Attributes	Learning Needs	Suggestive Pedagogical Approach
Comprehensive knowledge	To know the discipline in its current form, its emergence and future developmental aspects, Interdisciplinary and multi-disciplinary context for discipline knowledge	Classroom Lecture using chalk and talk technique, case study examples, Discussion method, Thematic Teaching and Learning by design
Procedural knowledge	To know how to use the knowledge professionally for highly skilled work/tasks related to the chosen field(s) of learning, including knowledge required for undertaking self-employment initiatives, and knowledge and mindset necessary for entrepreneurship involving enterprise creation, improved product	Activity-based learning,

	development, or a new model of organization	
Skill	To have the skills in areas related to specialization in the chosen disciplinary/interdisciplinary area(s) of learning in a broad multidisciplinary context, including wide-ranging practical skills, involving a variable in routine and non-routine contexts relating to the chosen field(s) of learning	Training, Workshops, Vocational Internship,
Complex problem-solving	To have the competence to solve problems in familiar and non-familiar and non-familiar contexts	Analysis of critical incidents originating in familiar and non-familiar situations
Critical thinking	Having an analytical mind and the ability to synthesize information from varied sources	Group discussion, Brainstorming, Real-life problems allowing reflection time, Integration among students
Creativity	To be able to think differently and have out-of-box solutions	Stimulus activity, Reframing problems, Brainstorming, Free writing, Mind mapping
Communication Skills	To have - good listening capability, expression of thoughts in a clear and precise manner, sensitivity in communication, confidence and technical correctness	Content-based instruction, Jigsaws, cognitive learning, think-aloud pair problem-solving
Research-related skills	To have research capabilities in terms of problem formulation, the proposition of hypotheses, use of appropriate research tools for data collection and analysis, report writing and research ethics	Guided questioning, Experiment, Discussion, Self-reflection, Collaboration, Project work
Coordinating/collaborating with others	To have the capacity to coordinate and collaborate with others toward the achievement of group goals	Peer teaching, Group project, Group grid, think-aloud pair problem-solving
Leadership	To have the capacity to organize and direct the	Teamwork, Decision

readiness/qualities	teamwork	making
Learning how to learn skills	To have the ability to pursue self-directed learning activities throughout the life to be a lifelong learner	Exploration, Self-learning, Real-life problems, Allow reflection time, Integration among students
Digital literacy skills	To have the capacity to use various ICT tools and software and integrate them to analyse the data	Use of practical exercises using ICT tools and software
Multicultural competence	To know the values and beliefs of multiple cultures and be able to engage in a multi-cultural environment	Interact with a diverse group, Cultural meet, Diversity focused conference
Value inculcation	To imbibe constitutional, humanistic, ethical, and moral values in life, including universal human values of truth, righteous conduct, peace, love, nonviolence, scientific temper, and citizenship values	Storytelling, Debate, Discussion, Cultural meet, Celebration of days of national importance
Autonomy, responsibility and accountability	To be able to work independently, identify appropriate resources required for a project, and manage a project through to completion, thus showcasing the responsibility and accountability in action	Use of project work and fieldwork
Environmental awareness and action	To know the actions needed to mitigate the effects of environmental degradation, climate change and pollution	Fieldwork, Project, Scenario planning, Dramatization, Discussion method, Observation method
Community engagement and service	To know and participate in the practices for community development	Fieldwork involves community services, Outdoor learning, Project management.
Empathy	To learn the ways to identify with the needs of other individuals and groups	Storytelling, Debate, Critical incident,

5. Pedagogical Approaches Enabling Learning of Multi-disciplinary and Inter-disciplinary Courses:

The NEP 2020 Para‘s, viz., Para 11.3, Para 11.6 and Para 11.7, provide specific details about the scope of multi-disciplinary and inter-disciplinary education to have holistic development of a learner.

Multi-disciplinary Education is a unique educational approach that allows students to learn and explore distinct subjects or curricula from various disciplines. There is no *rigid separation* in disciplines. The curriculum would enable students to develop a holistic understanding of the subject approaches in terms of similarities and differences between them. Varied academic disciplines in the curriculum are included to help in nurturing the ability to critically think and have solutions to problems that are not easily acquired from everyday experience. When taught and appropriately assessed, the varied disciplines, including humanities, social sciences, science, mathematics, languages, and the arts, help develop the ability to think critically and creatively. The student needs to be able to reflect on and apply approaches they learn in academic disciplines and become effective, critical and creative thinkers in everyday life in an interdisciplinary way.

Interdisciplinary Education refers to the combination of two or more academic disciplines into one. Interdisciplinary understanding brings the ability and confidence to navigate between disciplines to make inter linkages for developing new perspectives having a holistic appreciation of knowledge. Disciplinary understanding provides the base to create a rigorous interdisciplinary approach. In the absence of disciplinary understanding, learning can lead to superficial coverage and confusion. Teachers enable students to make connections in their minds between what they learn in one context and another with the help of a supportive curriculum. Excellent institutions support teachers in planning collaboratively for the development of interdisciplinary understanding. Teachers also need to understand what their colleagues are teaching to a particular year group to connect with their own classes.

Trans-disciplinary Education, thus, is an arrangement of the knowledge and skills within one subject area. It aims at integrating the subject‘s knowledge and skills into a coherent whole.

6. Information & Communications Technology (ICT) in the Classroom:

ICT for enabling learner-centred interactions, collaborative tools, ICT tools for fostering cognitive skills such as summarising, visual presentation; concept mapping, etc. are significant in development of 21st century skills.

Teachers can provide knowledge in different digital formats such as short-span videos, info graphics, audio podcast, concept-maps, whereas discussion forums, quizzes, sharable docs, blogs, clickers, etc., can also be used for learner-engagement and collaboration.

Using digital technologies in classrooms has continued to expand over the past decade. Educators find ways to commonly employ today's technologies like desktops, laptops, tablets and smart phones, ensuring learning across various subjects. Though it is challenging to include ICT-based resources and activities in teaching programmes, using ICT resources is considered an essential skill all learners need to develop. It is critical for today's generation of learners to use ICT resources to access, process, evaluate and communicate information and data. The use of ICT contributes equally to the learners and teachers for being confident, responsible, reflective, and innovative and engaged (Table 4).

Table 4: ICT Contributions to Teachers and Learners[5]

ICT Contributions	Learners	Teachers
Confident	Confident in working with information and ideas of their own and others.	Confident to teach their subject and engage with each student in the learning process.
Responsible	Responsible for themselves, responsive to and respectful of others.	Responsible for themselves, responsive to and respectful of others.
Reflective	Reflective as learners, developing their ability to learn.	Reflective as learners themselves, developing their practice.
Innovative	Innovative and equipped for new and future challenges.	Innovative and equipped for new and future challenges.
Engaged	Innovative and equipped for	Intellectually, socially and

[5] Source: https://www.doralinternational.org/cambridge, https://www.browardschools.com/Page/32816 Learner & Teacher Attributes

	new and future challenges.	professionally engaged, and ready

7. Innovative Pedagogies:

Multiple approaches to teaching-learning allow the teaching-learning process to keep pace with current and future developments. Use of experiential learning, inquiry-based learning, case-based instruction, problem-based learning, individual/group project-based learning, discovery learning, practical work, enhanced technology use and integration- including the use of digital and e-learning technologies and resources, online platforms and methods improve teaching-learning-assessment processes. Field-based learning and visits to industrial or other research facilities etc., help in deduction based learning. The following pedagogies emphasize constructive learning and active involvement of the learners in their learning journey, fulfilling the need of 21st Century learning environment.

(i) **Flipped classroom pedagogy:** It is an innovative pedagogical approach based on the constructivist school of thought. It is based on the blended form of learning with an emphasis on the 21st Century skills such as Creating, Evaluating and Analysing in the form of activity-based learning in the classroom wherein the interaction between student and teacher takes place in a flexible learning environment and culture.

(ii) **Art Integrated Learning Pedagogy:** It is a joyful and experiential learning pedagogy. It is about identifying the needs and potential of the learners and nourishing them to provide holistic growth. The students actively participate in the process of learning wherein they explore, develop and express their understanding and creative output using various arts forms and makes connections across curricula.

(iii) **Project-based Learning Pedagogy:** It is pedagogy of reflective practice and collaboration wherein students connect the concepts with real-life situations so that it could promote lifelong learning and 21st-Century skills using an online platform for engagement of learners.

(iv) **Cutting Edge Pedagogy:** It is pedagogy of learning with innovation and problem-solving skills, wherein students are engaged using Technology. The diverse needs of the learners are catered to using digital and technological platforms such as pear deck for interactive online/digital learning.

(v) **Critical Pedagogical Approach:** This approach emphasizes enhancing the learners' critical thinking skills by raising questions such as what they are learning and why they are learning, problem posing, and letting the students discover the answers. Learners acquire knowledge by investigation.

8. Modes of Teaching Learning and Pedagogical Approaches:

NEP 2020 envisions holistic education for learners. The underlying need for holistic education is to have the combined use of different pedagogical modes to ensure:

(i) Transmission of pre-existing knowledge.

(ii) Development of independent and self-directed problem solving.

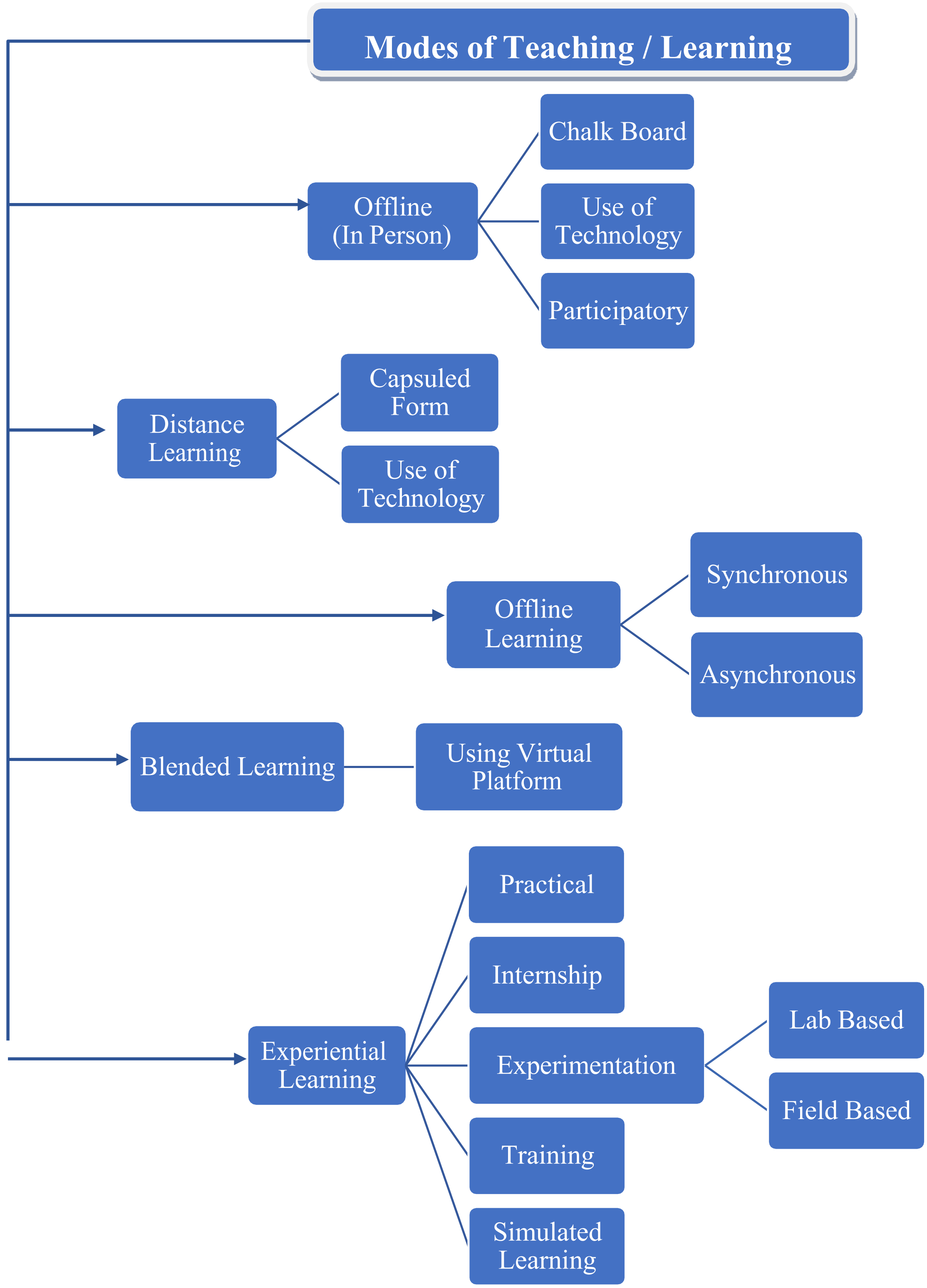
(iii) Use of dialogue and collaboration to develop inquiry and critical thinking skills through interaction.

(iv) Transformation of learners having idea about their purpose and identity while striving for wisdom and compassion to have holistic orientation about self and external environment.

Thus learning experiences need to allow for analysis, synthesis, and experimentation in disciplinary and interdisciplinary domains. Figure 2 shows various modes of teaching & learning which-

- Have different levels of student-teacher interaction;
- Have different levels of student participation and engagement in-class discussion;
- Have different levels of visualization and verbalization effects;
- Have different levels of required skill orientation;
- Have different levels of experimentation opportunities;
- Require different competency level for teacher;
- Require different methodology for evaluation, assessment and feedback;
- Differently require availability, knowledge and expertise for the use of technology;

Figure 2: Modes of Teaching-Learning



(A) Offline Modes of Teaching:

Models of Teaching: Models such as Concept-Attainment Model, Role-Play, Assertive Training Mode, Inquiry-Training Model, Jurisprudential Inquiry Model, synectics are a few powerful models for classroom environments, even in Higher Education. Each model has direct instructional as well as nurturing effects such as development of concept-formation, logical reasoning, creativity, assertiveness, etc.

Various modes of pedagogy[6] that a teacher at HEI may use for offline (in-person classroom) teaching are:

(i) **Cooperative Learning Strategies (CLS):** These strategies include methods such as Jigsaw, Think-Pair-Share, Team-Pair-Solo, Inside-Outside Circle, Fishbowl, Project Quality Plan (P-Q-P), etc.

(ii) **Brainstorming:** Using chalkboard or a presentation device to invite ideas of learners on a problem/issue without allowing them to criticise, but encouraging wild ideas which should follow short-listing and critically analysing ideas generated. Sometimes, these ideas may be categorised by learners and the teacher together or learners alone to learn _types‘ or _categories‘ of new concepts.

(iii) **Group discussions:** The use of discussions is an attempt to counteract the risk of the teacher/educator taking a transmissive or authoritarian approach, enabling the learner group to explore their own and others‘ views. Group discussions encourage active listening, self-reflection, and the exchange of different cultural narratives, worldviews and attitudes.

(iv) **Role-plays:** This technique provides an opportunity for participants to take on different identities (roles) and act these out with or for others in a scenario depicting some sustainability issues or event so that both participants and spectators can empathize with (put themselves in the shoes of) others, and understand their perspective, experiences and contexts, or issue, better.

[6] Source: Education for Sustainable Development (ESD). https://1library.net/article/education-for-sustainable-development-esd.q595w1rz

(v) **Guided Questioning:** Using probing and structured questions, for example, during fieldwork or on an interpretive walk, to direct learners' thinking about particular aspects of their experience.

(vi) **Interpretive Trails:** It is a guided walk or a trail with interpretive signage through an area where one can learn about the natural or built environment. There are different ways in which the interpretation can occur: through signs, poster boards or plaques along the way, a booklet with a map and additional information, a knowledgeable guide, and digital technologies. Many nature reserves and botanical gardens, for example, layout walks through exciting sections of the area, illustrate different ecosystems, archaeological sites, places of cultural interest etc.

(vii) **Music, Poetry and Visual Art:** People learn differently. There are different ways of accessing and expressing knowledge. Art can provide a better outlet for some people's ideas and experiences than more formal types of expression. There are opportunities for people (children and adults) to give creative expression to their ideas and to reflect on their experiences and feelings about matters, such as sustainability, in open-ended and creative ways. Many art forms are not language-based, so they have much potential in contexts where language might be a barrier to learning. Music can help bridge barriers between very different people and hence facilitate social learning deliberations.

(viii) **Stimulus activities:** A stimulus activity involves watching a video or looking at photos, poems or newspaper extracts to initiate reflection or discussion. Learners may even be interested in producing their own work, such as photos taken to stimulate a debate. Using videos or an externally produced document enables the multipliers to bring in a wide range of viewpoints for critical analysis.

(ix) **Critical incidents:** Learners are given an example and asked what they would do, what they could do and what they should. Critical incidents allow them to consider their perspectives and actions in the light of an ethical stance. A teacher can use this approach with groups to promote awareness and deep reflection about multiple perspectives on sustainable development paths.

(x) **Case studies:** These provide learners with in-depth information about a particular issue in one specific context (with varying amounts of detail and formality). Case studies can bring diverse learning domains into curriculum areas and promote the learners' group with a holistic view of an issue. Case studies enable students to investigate what affects their local area, work with community groups, NGOs or private enterprises, and work together to find solutions for local issues.

(xi) **Reflexive accounts:** Individuals consider their position concerning new knowledge about an issue. It may help them understand their actions contributing to the issue of concern, e.g., sustainability issues. This pedagogical approach makes learners reflect on personal roles, attitudes and responsibilities concerning sustainability issues.

(xii) **Critical reading and writing:** These are important social practices which are the keys for promoting learning. To assess the author‘s possible motivation in the text, learners de-construct the discourses and try to visualize alternative futures.

(xiii) **Problem-based learning:** Problem-based learning is an iterative learning process. A teacher uses this approach to teach a whole range of subject matter. Education for sustainable development, for example, requires the identification of sustainability-related issues for students to investigate and generate a body of knowledge. Students can develop a vision of alternative actions and potential solutions to the problem, which helps devise a plan of action, followed by a period of reflection and evaluation. This process thus promotes both the conceptual and practical aspects of sustainability literacy.

(xiv) **Solution-based learning:** This approach involves an idea that one wants to bring to life and action. Therefore, it is important to work with and get inspired by positive examples to promote positive emotions and motivation for active participation in the communities and institutions.

(xv) **Fieldwork and outdoor learning:** Fieldwork is an example of experiential pedagogy that can influence students‘ emotions and help develop the essential critical thinking skills to understand the complexity of an issue. Fieldwork and outdoor learning are often based on issues in the local community and environments, linking theory to real-world examples.

(xvi) **Storytelling:** Telling stories is an engaging and effective form of teaching and learning. Storytelling is currently experiencing a considerable revival of interest since folktales about the relationship between the Earth and its human inhabitants have been at the heart of storytelling since the earliest times. Storytelling draws on indigenous societies and folk art as the oral traditions practised for generations as a means of entertainment, education or cultural preservation. Storytelling makes ideas, theories, and concepts come alive, offer a source of inspiration, provides us with practical insight into approaches to our most persistent environmental, social and economic difficulties, and helps to impart respect for cultural heritage and the environment. This enables teachers to reflect better sustainable development information, principles and values with the group of learners.

(xvii) **Talks and presentations:** In this activity, a body of knowledge or selection of information through a structured verbal and visual presentation is presented. Talks and presentations can be helpful at the start or within a learning process when it may be necessary to provide background information, clarify concepts or introduce a specific focus. Lecturettes of 10-15 minutes at a time to be encouraged followed by participatory, learner-centred methods.

It is used for both types of education - offline and online. A good presentation requires teachers to incorporate visuals such as images, GIFs, videos, etc. as it will lead to use of both auditory and visual senses for better learning.

(B) Online Modes of Teaching:

(i) **Live Online Classes:** With Online classes, teachers deliver online lectures in real-time and need not have students in the physical classroom. Live online classes allow teachers and students to interact face-to-face and have the same classroom-like environment for learning. There are various video conferencing apps which a teacher can use. Teachers need to create and share a link with students for running regular classes. Live online classes break the barriers of reach, and teachers can connect to students from anywhere. Online courses become more engaging with the live use of the online whiteboard.

(ii) **Online Whiteboard:** Teachers can use online whiteboards for best practices in teaching online. In a virtual classroom setup, an online whiteboard helps them convey information and better connect teachers and students. Online whiteboard is a canvas on which teachers can create diagrams, share pre-made templates and charts, make sketches, write up etc.

It works just like the classroom blackboard and digitizes the content provided by the teacher which can be reused. Teachers and students can connect in real-time for assignments, mind mapping, review homework, interactive exercises, brainstorming around lessons, and give feedback.

(iii) **Online Quizzes:** Online quizzes are the effective mechanism to incentivize student completion of preparatory work, enhance active learning, and from the educator‘s perspective these are relatively time efficient. The online quizzes are used to improve instructional design and support formative assessment.

(iv) **Pre-Recorded Video Lectures:** Pre-Recorded Video Lectures are one of the suitable online teaching methods and pedagogy, where the lectures are recorded and shared with the students instead of taking live lectures. It gives them the flexibility to attend the lecture at their own convenient time. Unlike live online courses, students can also use the pre-recorded videos for revision purposes and to clear their doubts.

(v) **Game-Based Teaching:** Game-based teaching methods help students enjoy and not feel bored during teaching lessons. It allows students to be better engaged and not feel stressed students. Students who are not quite good at studying can find this way of teaching helpful in learning and memorizing. Teachers need to ensure that students access the same type of data for game-based teaching. Teachers start teaching using video conferencing tools, including gaming sessions and may chat through the chat option with students asking questions.

(vi) **Collaborative ICT tools:** The use collaborative ICT tools such as Digital Walls, collaborative concept-mapping tools, sticky-notes, project management tools such as Open Project allows for better problem solving skill, increased knowledge, satisfaction and motivation for learning. The teachers need to ensure that students would find the collaborative ICT tools easy to use.

(vii) **Flipped Classroom:** During the past few years, the flipped classroom has gained popularity and has emerged as one of the best teaching practices. Opposite to the traditional classroom concept, in flipped classrooms, students need to read and review the study material before their teacher teaches them. It is a reserving concept of actual in-class where teachers teach, and students study later.

The flipped classroom concept includes effective techniques, like Online quizzes, Polls, Info graphics, Mind maps or word clouds.

(viii) **Class Blog:** Students create a class blog individually or in a group about what they have learnt. An innovative concept class, a blog allows students to explore self-learning and share knowledge with other students by sharing the blog. Teachers can also share their learning material on class blogs.

(ix) **Virtual environments:** Virtual Labs, Museums, Augmented reality (AR) - Virtual reality (VR) Technologies / AR-VR contents are specifically useful in teaching scenarios requiring field work.

(C) Blended Mode of Teaching:

Teachers may combine physical classroom learning activities with online learning components. Using a blended approach as a course design enhances students' teaching and learning experiences. In many cases, the act of ―blending‖ may bring better experiences and outcomes for a student and more efficient teaching and course management practices for a teacher. It can involve a mix of delivery modes, teaching approaches and learning styles. Advances in technology provide new opportunities for blended learning forms for students in diverse environments. Also, blended teaching allows the designing and delivery of courses to enhance the teachers‘ role.

The blended learning approaches a teacher may use include:

- Sharing the Video Lectures with the students for the entire course.
- Use Internet-Based Learning (IBL) to promote self-learning as students must undertake some internet-based projects, i.e., the search & learn approach.
- Project-Based Learning has integrated multiple peer groups for the projects, and students collaboratively generate ideas.
- Use of Tablet (TAB) based remote learning / remote examination and evaluation. Touch screens and digital pens appeal to tactile learners requiring mobile learning.
- Satellite-based TV channels provide an opportunity for mass learning, adult education, and farmer education, taking care of different timings.

- Online Assessments – Quiz, Assignments, Tests, Examinations – at regular intervals to measure learning outcomes.

9. Research as Pedagogy:

Merging education and research by integrating research as a part of teaching pedagogy is an emerged need in our education sector. Research as a pedagogical tool is the evolved form of ―experiential learning‖. It involves reflection, critical analysis and synthesis, initiative, decision-making, and accountability. Students get engaged intellectually, creatively, emotionally, socially, or physically. The actual learning takes place when students reflect & assess their decisions in the light of natural consequences, mistakes, and successes.

The experiential learning theory[7] is based on the idea that learning is a process whereby knowledge is created through experience transformation. It is based on four main elements which operate in a continuous cycle during the learning experience:

- **Concrete experience (Do):** At this stage, the learner actively experiences an activity either in a lab or field.
- **Reflective observation (Observe):** The learner consciously reflects on the experience at this stage.
- **Abstract conceptualization (Think):** At this stage, the learner attempts to conceptualize a theory or model based on his observation
- **Active experimentation (Plan):** This being the last stage, the learner tries to plan how to test the model or theory for further experience.

The introduction of research as a pedagogical tool in higher education gives an opportunity and provides an optimum learning environment as a child would explore on his own, and the learning would be more joyful and long-lasting. It aims at developing knowledge on a topic, helps establish facts, obtain a clearer idea of how reality works, motivation, self-development and helps create new theories. By engaging in research, students can better understand the rationale behind others‘ research.

[7] Kolb, D. A. (2014). Experiential learning: Experience as the source of learning and development. FT press.

Research can be introduced at a very early stage in higher education to create awareness about the process. Research through systematic study makes various available methods that help find solutions.

Research as a learning tool helps:

- Translate classroom knowledge to real-world situations.
- Develop a deeper understanding of course materials.
- Gain real-world skills that potential employers and professional programs value.
- Explore career pathways

Research as a pedagogical tool would help students question their perceptions and motivate them to learn by putting them in a situation where they come to see themselves as the authors of answers, as the agents of responsibility for change. Research as a pedagogical tool encourages students to develop a balanced, diverse approach to solving real-world problems independently and in a team.

10. Capacity Building on Various Pedagogical Approaches:

Para 13.1 of NEP 2020 also emphasises the capacity building of teachers as the most important factor ensuring the quality and engagement of faculty at HEI. This brings attention to the role the teachers‘ pedagogical knowledge, beliefs, experiences, and professional identity have in shaping the learning outcomes of their students.

It is necessary for the teachers to shape their attitudes towards teaching, improve their pedagogies to make them more interactive and student-centric and make classrooms inclusive spaces for not just reading but learning. Proper training, continuous professional development, and effort from the teachers themselves are required to bring about successful change in pedagogy at a substantial level.

In view of the above, it involves the identification of the capacity needs of teachers in terms of:

- Communication skills
- Presentation skills

- Knowledge enrichment
- Library resources
- Class management
- Evaluation and assessment
- Empathy
- Motivation
- Use of digital technologies

11. Improving Teaching Effectiveness: Faculty Development

Use of appropriate pedagogies is essential to ensure teaching effectiveness. However, there are other aspects of the teaching-learning process, like developing competence to assess learner needs, broadening the role of the teacher as a mentor and facilitator, use of library sources, which expands the role of pedagogy in ensuring teaching effectiveness.

All faculty members in higher educational institutions (HEI‘s) acquire and demonstrate specific competencies such as:

- Improving their work performance, particularly in the areas of teaching, and become more effective at facilitating student learning.
- Learning about new fields/frontiers of knowledge and apply new instructional delivery models, technologies, and pedagogies to promote improved student learning outcomes.
- Enhancing teaching effectiveness and excellence in research and engaged scholarship.
- Responding to changing learner characteristics.
- Responding to the emerging curricular thrusts and diversified knowledge requirements in local and global contexts.
- Effectively performing the expanded roles of teachers demanded by the education sector.

Preparing faculty for their expanded role is no longer mere transmitters of knowledge or instructor but also a:

- Facilitator, navigator and pathfinder;
- Counsellor, mentor;

- Content creator, course designer and evaluator;
- Programme/course content designer, creator of learning resources, evaluator, ICT expert etc.
- Reflective practitioners and lifelong learners, etc.

In addition to imparting knowledge in their subject areas, a teacher is required to-deal with students from diverse cultural, social and economic backgrounds, be sensitive to gender issues, promote tolerance and social cohesion, provide special attention to students with learning disabilities, learn and apply new pedagogies and technologies, keep pace with current educational developments and initiatives.

- Reflective practitioners and lifelong learners, etc.
- Performing specific administrative duties and parents and community engagements.

Methods to bring teaching effectiveness through broadening the role of teaching pedagogy are:

- Teachers‘ orientations in a structured manner – Gurudakshta programme
- Regular FDPS/workshops –specific to capacity requirements to be mandated in terms of a specific number
- Access to general reading material
- Participation in seminars/conferences

12. Faculty Feedback:

NEP 2020 advocates taking feedback from students at regular intervals for providing useful input to the teachers.

21st Century pedagogy involves a shift toward using active teaching strategies to ensure relevance and interest in the course. New teaching strategies are necessary to increase students‘ motivation and desire to learn. Immediate and constructive feedback for faculty provides students‘ involvement in the class for effective teaching-learning and relationship-building mechanisms. Different teaching pedagogies allow for varying levels of students‘ interactions with the teacher; an HEI needs to evolve a feedback mechanism that serves the quality teaching-learning process accordingly. Also, an HEI would develop a scheduled feedback mechanism to better serve the teaching-learning process. Using state of the art technology for feedback collection, compilation, analysis, and recording would help in effective feedback management.

13. Evaluation and Assessment:

An effective education system relies on the integrity and efficacy of the existing evaluation system. Unless evaluations are designed to be the best identifiers of the performance of students; students won‘t put in their best efforts in learning and understanding concepts.

It is imperative that an Educational Institute has a robust, yet flexible, evaluation system which is also in consonance with NEP2020 objectives. These objectives, in the context of evaluation, can be summarized as:

1. Continuous and Comprehensive Evaluation
2. Criterion-based grading system
3. Learning Outcome-Based Education and Evaluation

NEP 2020 proposes that HEIs should adopt continuous and comprehensive evaluation rather than high stake examinations. Continuous and comprehensive evaluation embraces horizontal assessment modes instead of one single vertical mode. It can be used to assess the overall development of students, for example, critical thinking, problem-solving ability, right application of knowledge, and adherence to ethics.

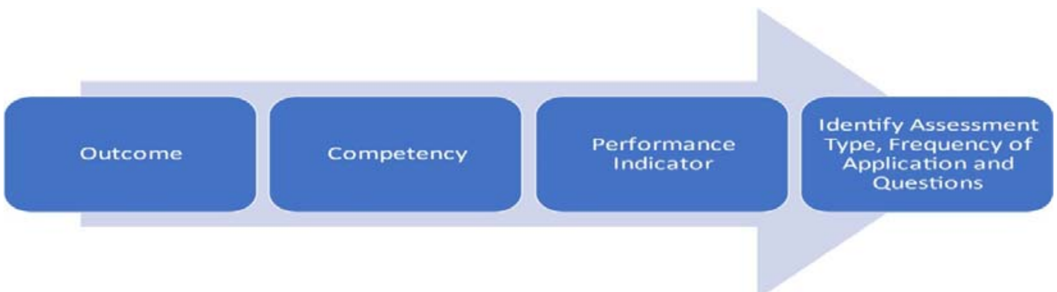
NEP 2020 recommends a criterion-based grading system that emphasises assessment of student achievement based on the learning goals for each programme. A criterion defines the characteristics or traits to be judged. These are derived from the learning outcomes. Grading can be designed to measure the degree of achievement on each criterion thus making assessments more meaningful.

HEIs should focus on Outcome Based education and evaluation. Outcome-Based Education (OBE) advocates the importance of establishing a ‒clear picture of what is important for students to be able to do, and then organizing the curriculum, instruction, and assessment to make sure that this learning ultimately happens. [10]‖ Learning outcome-based performance evaluation is necessary to assess modern skills and domain-specific competencies (British Psychological Society, 2019). It ensures that evaluation is more students centric.

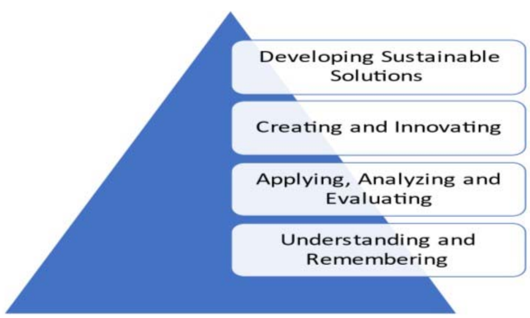
13.1 A Prescription for an Evaluation System

Learning outcomes drive curriculum, instruction and evaluation. Accordingly, the questions that need to be addressed, in sequence, are show in Figure.

This leads to the identification of outcomes, competencies, performance indicators and finally assessment as show in Figure, and as also described in detail.



Any evaluation and assessment system must test different levels of cognitive attainment as illustrated in Figure.

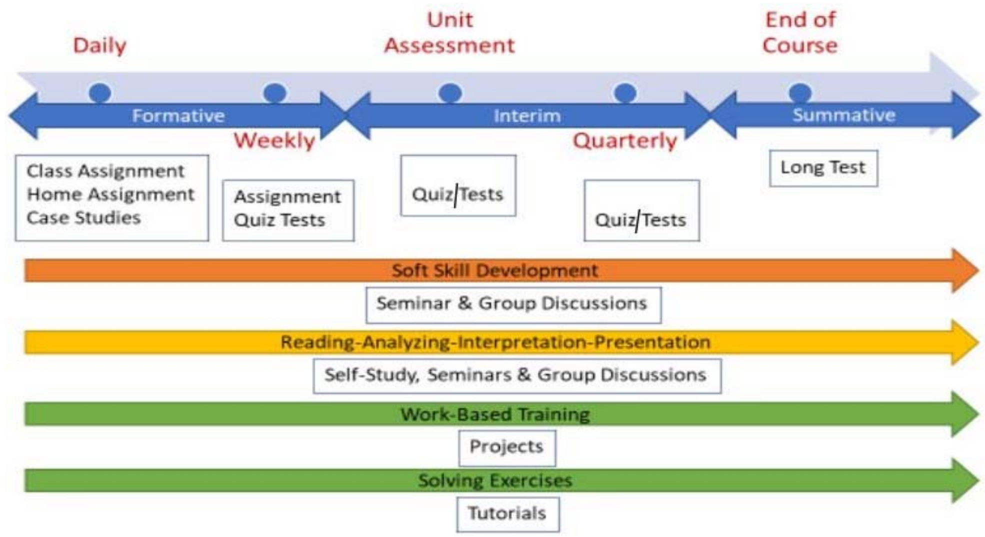


Across these levels, mental skills (knowledge) are tested which deal with how a student acquires, processes, and utilizes knowledge. The levels represent a continuum of increasing cognitive complexity—from remembering to creating to developing sustainable solutions.[11]

(11). A Taxonomy of Learning, Teaching and Assessment , Anderson and Krathwohl's (2001) revision of the original Bloom's taxonomy.

13.2 The Assessment Continuum

Best practice in educational research dictates triangulating assessment data. If several different sources of data, i.e., assessments are used, it increases the probability that an accurate assessment of student learning will emerge. Furthermore, assessments must be continuous, as also suggested in NEP2020, and include a variety of assessments for continuous and complete feedback. The continuum in Figure below positions a sample of types of assessment on a time axis.



14. Evaluation and Assessment Tools:

The National Education Policy 2020 emphasizes formative and competency-based assessment for developing higher-order thinking skills such as creativity, critical thinking and analysis. The assessments help the learner to track and improve the learning outcomes/ approaches and promote holistic development of the learner.

Pedagogical approaches used by a teacher determine the use of one or more types of evaluation tools, which are formative or summative or both. Evaluation and assessment tools supporting the teacher's pedagogy for a course need to help determine the achievement of graduate attributes. In other words, the achievement of different graduate attributes has linkage with specific pedagogical approach(s) and evaluation and assessment tools used as a part of formative and summative assessment.

The Evaluation and Assessment Tools and strategies corresponding to different pedagogical approaches are as follows:

- **Criterion-referenced assessment:** It is the process of evaluating students based on the pre-specified criteria for competency-based outcomes.
- **Rubrics:** It is a method of grading assignments based on certain criteria and helps the learners to understand the performance criteria and performance expectations.
- **Portfolios:** It is based on collecting the students' work for assessment. It can be developed using technology such as a web-based e-portfolio for authentic assessment.
- **Peer Assessment:** It helps the learners to get feedback from their peers and improve their performance.
- **Self-assessment:** It is the process of knowing what the learners already know, what they want to know, and what they have learned.

The use of assessment methods that would assess all aspects of learning, including disciplinary knowledge and skills as well as generic 21st century appropriate skills within a given programme of study, is:

- Time-constrained examinations
- Closed/open book examination
- Problem-based assignments
- Practical assignment reports
- Observation of practical skills
- Individual project reports (case-study reports)
- Team project reports
- Oral presentations, including seminar presentations
- Viva voce interviews
- Computerized adaptive testing
- Peer and self-assessment
- Examination on demand
- Modular certification to facilitate exit and re-entry of learners into the education system

14.1 Semester and Cumulative Grading System

Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA) are the measures of performance of students for the work done in a semester and across all semesters, respectively. **Numerically, it should be expressed up to three decimal places.**

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses completed by a student, i.e

SGPA (Si) = $\sum(Ci \times Gi) / \sum Ci$

(Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the i^{th} course)

On the other hand, CGPA is also calculated in the same manner considering the overall performance of students in terms of all the courses undergone by a student across all the semesters of an academic programme, i.e.

CGPA = $\sum(Ci \times Si) / \sum Ci$

(where Si is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester)

Numerically, all GPA computations should be expressed up to 3 decimal places. This will ensure

- Greater precision in assigning credit to student‘s academic achievements
- Greater precision in discerning differences in achievement
- More precision in conversions from one format to another

14.2 Online Education and Evaluation

The Online Education Program as envisaged in the NEP-2020 also, has twin noble objectives. First, it is meant to provide the ‗last, the lost, the least and the lowest‘ an effectively affordable option for education right from an early stage to beyond University education. Second, it is aimed towards working professionals and students who find it a very convenient option to balance their academic advancement along with their professional careers. However, the challenge in meeting the above goals lies with Institutions in terms of designing, developing and delivering high quality digital content and in implementing a mechanism to evaluate and objectively measure the performance of each student enrolled in this mode of education.

While the components of evaluation may be the same as that in the offline mode, the ‗Online Supervised Monitoring and Evaluation' may be necessary to implement such programs. A test that is administered online is monitored/ mentored in supervised mode. The use of State-of-the-art ICT technologies such as Audio and Videoconferencing, Digital surveillance, Plagiarism detecting software and Online Course Monitoring System will prove to be instrumental in meeting this scenario. Alternately, all tests may be conducted in offline mode at designated canters.

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