



तातडीचे-

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दिनांक:- २० ऑक्टोबर, २०२२

प्रति,

कृलगुरु,
सर्वे अकृपी विद्यार्थी/ अभियंत विद्यार्थी

विषय- राष्ट्रीय शैक्षणिक धोरण, २०२० अंतर्गत सध्या सूरु असलेल्या ३ वर्षांच्या अभ्यासक्रमावरून इ ३ वर्षांच्या अभ्यासक्रमाकडे स्थलांतराचा आगांखडा, एकसमान बहुविद्याशास्त्रीय शैक्षणिक अभ्यासक्रम आगांखडा, सामान्य अध्यापनशास्त्रावरांनी विधायक अध्यापनशास्त्राचा आगांखडा आणि विद्यार्थ्यांच्या सर्वोर्णाल विकासामाठी वैद्यकितकूल शिक्षणाचा आगांखडा यांचे अंमलवजावणीवाबत.

संदर्भ- शासन निर्णय क्रमांक एनईपी-२०२२/ प्र.क्र.१०५/ विशि-३ दिनांक २६, ०४, २०२२ या
शासन पूरकपत्र क्र. एनईपी-२०२२/ प्र.क्र.१०५/ विशि-३ दिनांक ०१, ०६, २०२२

महोदय/ महोदया,

राष्ट्रीय शैक्षणिक धोरण, २०२० ची राज्यात अंमलवजावणी कराऱ्याच्या दृष्टीने या धोरणाचा अभ्यास करण्यासाठी दिनांक १६ ऑक्टोबर, २०२० च्या शासन निर्णयानुसार डॉ. रघुनाथ माशेलकर, माजी महाराष्ट्राचालक, वैज्ञानिक आणि औद्योगिक संशोधन परिषद, नवी दिल्ली योग्या अध्यक्षांतराली स्थापन कराऱ्यात आलेल्या कर्यवैल गटाने आपला अहवाल शासनास दि. ३० जून, २०२१, रोजी सादर केला होता. दि. २९ जानेवारी, २०२२ रोजी झालेल्या मंत्रिमंडळ बैठकीत डॉ. रघुनाथ माशेलकर समितीच्या अहवालातील शिकारशीप्रमाणे विभागाने सादर केलेल्या प्रस्तावास मान्यता देण्यात आली होती.

त्यानुसार विषयाकौत प्रकरणी संदर्भाधीन शासननिर्णयान्वये या पूरकपत्रान्वये स्थापन कराऱ्यात आलेल्या डॉ. रघुनाथ कुलकणी, तत्कालीन प्र.कृलगुरु, मुंबई विद्यार्थी, मुंबई याच्या अध्यक्षांतरालील समितीने आपला अहवाल शासनास सादर केला आहे. सदर अहवालाची प्रत सोबत जोडली आहे. सदर अहवालातील शिकारशी शासनाने विकाराल्या असून या शिकारशीची, विहित प्राधिकरणांची मान्यता घेऊन, तातडीने अंमलवजावणी कराऱ्यावाबाबत विद्यार्थींनी निर्णय घ्यावा.

आपला,

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२. निवडनस्ती (विशि-३)

NEP 2020

Report on Structure and Curriculum of Four
Year and Dual Multidisciplinary Degree
Programme with Multiple Entry and Exit
Options for Implementation in State
Universities of Maharashtra

Submitted to

Ministry of Higher and Technical Education,
Government of Maharashtra,
Maharashtra State

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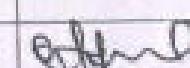
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NEP Committee-I Composition

Sr No.	Name	Current Designation		Signature
1	Prof. Ravindra D. Kulkarni	Ex-ProVice Chancellor, University of Mumbai, Mumbai and Sr. Professor, ICT, Mumbai	Chairman	
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24	Dr. Ajeenkya DY Patil	Chancellor, Ajeenkya DY Patil University, Pune	Member	
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Glossary

Academic Credit: An academic credit is a unit by which the course work (theory/practical/ training) is measured. Each course may be allotted credits in proportion to the time expected to be devoted by the student for that course. Thus, it determines the number of hours of instructions required per week. One credit means the standard methodology of calculating one hour of theory or one hour of tutorial or two hours of laboratory work or one week of internship per week for a duration of a semester (13-15 weeks) resulting in the award of one credit; which is awarded by a higher educational institution on which these regulations apply.

Academic Bank of Credits (ABC): ABC is an academic service mechanism as a digital/virtual/online entity established and managed by MoE/UGC to facilitate students to become its academic account holders and paving the way for seamless student mobility, between or within degree-granting Higher Education Institutions (HEIs) through a formal system of credit recognition, credit accumulation, credit transfers and credit redemption to promote distributed and flexible teaching-learning.

Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

Assessment: It is the process of collecting, recording, scoring, describing and interpreting information about learning

Academic Flexibility: It is the provision for innovative and interchangeable curricular structures to enable creative combinations of Courses/Programmes in Disciplines of study leading to Degree/Diploma/PG Diploma/Certificate of Study offering multiple entry and multiple exit facilities in tune with National Education Policy-2020, while removing the rigid curricular boundaries and creating new possibilities of life-long learning.

Affiliated College: It implies any higher education institution approved by the affiliating university on the basis of the stipulated norms and guidelines by virtue of which it provides for a course/programme of study for obtaining any qualification from a university.

Autonomous College: It means any institution, whether known as such or by any other name accorded with autonomous status by the UGC upon the recommendations of the affiliating university and the State Government concerned, by virtue of which it provides for a course/programme of study with academic and innovation flexibility for obtaining any qualification from a university and which, in accordance with the Rules and Regulations of such university, is recognized as competent to provide for such course/programme of study and present students undergoing such course/programme of study for the examination leading to the award of such qualification.

Choice Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses (core major, electives, minor, soft skill courses etc)

Code: Each course shall bear a distinguishing code (three letters and three digits) that identifies the discipline from which it is being offered.

Conventional Mode of Learning: It means a mode of providing learning opportunities through face to face interaction between the teacher and learner in regular class room environment but does not exclude supplementary instructions if any for the learner through use of online.

Course: A basic unit of education and/or training. It means a paper which is taught for at least one semester as a part of a subject and is a component of a program. All courses need not carry the same weightage. A collection of courses forms a program of study.

Credit Point: It is the product of grade point and number of credits for a course.

Cumulative Grade Point Average (CGPA): Weighted average of the grade points obtained in all courses registered by the student across semesters.

Evaluation: It is the process of making judgments based on evidences and interpretations gathered through examination and assessment and on the basis of agreed upon criteria.

Foreign Higher Educational Institution: It represents a Higher Educational Institution duly established or incorporated or recognised in a foreign country and offering academic and research programmes at the undergraduate and/or higher levels.

Grade Point: Numeric weightage attached to each letter grade.

Grade Point Average (GPA): A system of calculating academic achievement based on an average, calculated by multiplying the numerical grade point received in each course by the number of credits.

Graduate Attributes (GAs): It is a set of individually assessable outcomes that are indicative of the graduate's potential to acquire competencies in that programme.

Higher Education Institutions: The Higher Education Institutions (HEIs) who are empowered to award degrees by themselves or through their affiliating universities in accordance with Section 22 of the UGC Act, 1956.

Lateral Entry: Lateral entry or admission is granted to those students who have exit after award of Certification, Diploma, or a Basic Bachelor's Degree and are eligible for and desirous of re-entering into the second year/ third year/ fourth year, respectively of same four year multidisciplinary degree programme at any ABC registered HEI within stipulated/ permissible period of years as decided by Statutory Councils of that HEI. Lateral entry is also open to those students, if he/she has already successfully completed a multidisciplinary four year first degree programme and is desirous of and academically

capable of pursuing another multidisciplinary four year first degree programme in an allied subject.

Learning Management System (LMS): It means a system to keep track of delivery of e-Learning Programmes, learner's engagement, assessment, results, reporting and other related details in one centralized location.

Learning Outcome Based Education (LOBE): Adherence to student-centric learning approach to measure student's performance based on pre-determined set of outcomes.

Letter Grade: Index of performance resulting from the transformation of actual marks obtained by a student in a course.

Major Courses: The discipline in which the student shall pursue major study in his/her Undergraduate/Master's Programme.

Proctored Examination: It means the examination conducted under the supervision of approved person or technology enabled proctoring which ensures the identity of the test taker and the integrity of the test taking environment, either in pen-paper mode or in computer based testing mode or in full-fledged online mode, as may be permissible.

Programme: Programme /Programme of study means a higher education programme pursued for a degree specified by the Commission under Section 22 (3) of the UGC Act. It also refers to a collection of courses in which a student enrolls and which contributes to meeting the requirements for the awarding of one or more Certificates/ Diplomas/ Degrees.

Programme Education Objectives (PEOs): PEOs are broad statements that describes what graduates are expected to attain within few years of graduation.

Programme Learning Outcomes (PLOs): They represent the knowledge, skills and attitudes a student should attain at the end of the programme.

Qualifications: Qualifications are formal 'awards' such as a certificate, diploma or a degree. Qualifications are awarded by a competent authority such as a college or university in recognition of the attainment by students of the expected learning outcomes on the successful completion of a particular programme of study. Qualifications can also signify the competence to follow an occupational practice.

Rubric (Assessment Rubric): A rubric for assessment, also called a scoring guide, is a tool used to interpret and grade students on any kind of work against criteria and standards.

Semester Grade Point Average (SGPA): Performance of a student in a given semester.

Abbreviations

ABC	: Academic Bank of Credits
AICTE	: All India Council for Technical Education
AISHE	: All India Survey of Higher Education
AIU	: Association of Indian Universities
B.A.	: Bachelor of Arts
B. Com.	: Bachelor of Commerce
B.Ed.	: Bachelor of Education
B.Sc.	: Bachelor of Science
B.Voc.	: Bachelor of Vocation
BCI	: Bar Council of India
BLA	: Bachelor of Liberal Arts
BLE	: Bachelor of Liberal Education
BoD	: Board of Deans
BoS	: Board of Studies
BoG	: Board of Governors
CAD/CAM	: Computer-Aided Design/ Computer-Aided Manufacturing
CBCS	: Choice Based Credit System
CDAC	: Centre for Development of Advanced Computing
CEP	: Continuing Education Programme
CIET	: Central Institute of Educational Technology
CSIR	: Council of Scientific and Industrial Research
CUET	: Common University Entrance Test
CSR	: Corporate Social Responsibility
CSTT	: Commission for Scientific and Technical Terminology
CTE	: College of Teacher Education
CU	: Central Universities
DAE	: Department of Atomic Energy
DARE	: Department of Agricultural Research and Education
DBT	: Department of Biotechnology
DSC	: Department/ Subject Specific Course
DSE	: Department/ Subject Specific Electives
DST	: Department of Science and Technology
DTE	: Department/ Directorate of Technical Education

EVLSC	: Professional Ethics, Value Education and Life Skills courses
FSC	: Faculty/ Discipline Specific Course
FSE	: Faculty/ Discipline Specific Electives
FOSSEE	: Free and Open-Source Software in Education
GA	: Graded Accreditation
GCCs	: Global Capability Centers
GEC	: General Education Council
GEs	: Generic Electives
GER	: Gross Enrolment Ratio
GoI	: Government of India
HBCSE	: Homi Bhabha Centre for Science Education
HEI	: Higher Education Institutions
HRDC	: Human Resource Development Centre
IAF	: Institutional Accreditation Framework
IASE	: Institute of Advanced Studies in Education
ICAR	: Indian Council of Agricultural Research
ICT	: Information and Communication Technology
IDP	: Institutional Development Plan
IIEC	: India International Education Centre
IIT	: Indian Institute of Technology
IKS	: Indian Knowledge System
INI	: Institutions of National Importance
INSA	: Indian National Science Academy
ITI	: Industrial Training Institute
IUC	: Inter-University Consortium
MERU	: Multidisciplinary Education and Research Universities
MoE	: Ministry of Education
MOOC	: Massive Open Online Course
MoU	: Memorandum of Understanding
MSDE	: Ministry of Skill Development and Entrepreneurship
MSRIC	: Maharashtra State Research and Innovation Council
MSME	: Micro, Small and Medium Enterprises
NAAC	: National Assessment and Accreditation Council
NASSCOM	: National Association of Software and Services Companies

NCC	:	National Cadet Corps
NCERT	:	National Council of Educational Research and Training
NCF	:	National Curriculum Framework
NCTE	:	National Council for Teacher Education
NCVET	:	National Council for Vocational Education and Training
NCVIE	:	National Committee for the Integration of Vocational Education
NEET	:	National Eligibility cum Entrance Test
NETF	:	National Educational Technology Forum
NGO	:	Non Governmental Organization
NHEQF	:	National Higher Education Qualifications Framework
NHERA	:	National Higher Education Regulatory Authority
NIEPA	:	National Institute of Educational Planning and Administration
NIOS	:	National Institute of Open Schooling
NIT	:	National Institutes of Technology
NITI	:	Aayog National Institution for Transforming India
NMEICT	:	National Mission on Education through ICT
NPSDE	:	National Policy on Skills Development and Entrepreneurship
NQR	:	National Qualifications Register
NRED	:	National Repository of Educational Data
NRF	:	National Research Foundation
NROER	:	National Repository of Open Educational Resources
NSDA	:	National Skill Development Agency
NSDC	:	National Skill Development Corporation
NSQF	:	National Skills Qualifications Framework
NSS	:	National Service Scheme
NTA	:	National Testing Agency
ODL	:	Open and Distance Learning
OEs	:	Open Electives
OER	:	Open Educational Resources
PG	:	Postgraduate
PSSB	:	Professional standard setting body
PTO	:	Patent and Trademark Office
RCI	:	Rehabilitation Council of India
RHEI	:	Registered Higher Education Institutions

RSA	:	Rashtriya Shiksha Aayog
RUSA	:	Rashtriya Uchchatar Shiksha Abhiyan SC Scheduled Caste(s)
SCERT	:	State Council of Educational Research and Training
SDG	:	Sustainable Development Goals
SEC	:	State Education Commission
SEZ	:	Special Education Zone
SHEC	:	State Higher Education Council
SKP	:	Skill Knowledge Provider
SSC	:	School Specific Course
SSE	:	School Specific Electives
SSD	:	Ms State Skill Development Mission
SSRA	:	State School Regulatory Authority
STEAM	:	Science, Technology, Engineering, Art & Design, and Mathematics
STEM	:	Science, Technology, Engineering, and Mathematics
SVE	:	School of Vocational Education
SWAYAM	:	Study Webs of Active Learning for Young Aspiring Minds
TEI	:	Teacher Education Institution
U-DISE	:	Unified District Information System for Education
UG	:	Undergraduate
UGC	:	University Grants Commission
UHV	:	Universal human values
VESB	:	Vocational Education Skills Board

Preface

Amidst rapid demands of constant change put forth by a globalized economy, the higher education sector in India is going through its transformation stage. India has been forecast to be one of the youngest countries in the world gearing towards knowledge-based leadership. Aligning this, the National Education Policy-2020 (NEP-2020) aims to meet the changing educational requirements, innovation, and research through bringing in the host of changes in the education system, right from the pre-primary years to higher education. NEP-2020 promotes rigorous research-based specialization and opportunities for multidisciplinary work and interdisciplinary thinking at the graduate, Master's and doctoral level education in large multidisciplinary universities. One of the major changes was changing the 3-year undergraduate (UG) or Bachelor's degree programme to 4 year Multidisciplinary UG Programme with multiple entry and exit options to orient the students with right skill, attitude and employability. With introduction of Academic Bank of Credits, students can move between different universities if they need and collect credits based on their work. These credits can be collected, transferred and go into the final degree earned. In order to fulfill the objectives of expansion, access, equity and inclusion, quality and excellence in higher education, all university and college campuses would need to be transformed to become more holistic learning environments that enrich students with new knowledge and skills to engage meaningfully in the emerging socio-economic transformation. More importantly, the university and college campuses should nurture education and research activities that are alive to the dynamics of the society and industry in the neighborhood and guide and support them not just in terms of human resource but also through relevant studies, research and innovation on the campus and in the university at large. Thus, the NEP 2020 envisages a holistic and multidisciplinary education system that would aim to develop all capacities of human beings - intellectual, aesthetic, social, physical, emotional, ethical, and moral - in an integrated manner.

This report presents the credit structure and curricular development in reference to introduction of the Four-year multidisciplinary UG courses (Bachelor's degree-research/ honours) in state universities of Maharashtra in line with NEP-2020, NHEQF and all related UGC guidelines. There will be much more flexibility in structure and design of curriculum under Four-year multidisciplinary UG Programme and students could choose

how long they wanted to study the courses with required credit structures. Depending on how long a course they study, they will be awarded a certificate or diploma or a degree. Students can get a certificate after a One-year programme, a diploma after Two years, a bachelor's degree after Three years, and a Bachelor's degree with research or honours after Four years. Students will have the flexibility to join a programme in odd semesters or leave a programme after successful completion of even semesters as per their future career needs. On exit, the students will have the option to re-enter the programme from where they had left off, at the same or in a different institution. This is a big boon for students, and they don't need to think about losing a year or two if they have been studying one programme for two years already when they plan to move into a different one. This Four-year multidisciplinary undergraduate degree option allows students to focus on their chosen minors and major. The different courses under curriculum of Four-year multidisciplinary UG Programme are skill-based, choice-based and cross-disciplinary, trans-disciplinary and multi-disciplinary in nature that would provide the students the option of electives across the disciplines as per the objectives of the NEP 2020. Various Combinations of major and minor, based on subject/ school/ faculty specific domain and distribution of credits amongst major subjects, minor courses, vocational courses, ability enhancement courses, modules on Indian Knowledge System and other courses are delineated through suitable examples. Apprenticeship and internship, proposed under NEP-2020 will have a huge role to play in institutionalizing the curriculum framework for industry-academia linkage to increase the employability of the students. World over, apprenticeship is considered as the most efficient and promising structured training for exposure to the real working environment. This has enormous potential to combine work-based learning with theoretical knowledge of related disciplines. Students can pursue specialisation in a particular subject (4 year honours degree) or study research (4 year research degree) for one year after they had completed their three-year degree. This kind of flexibility gives students adequate options in planning their careers, taking care of life events that may require them to discontinue their studies temporarily at any juncture. There would be no hard separations between 'arts' and 'sciences', between 'curricular' and 'extracurricular' activities, between 'vocational' and 'academic streams', etc. The Report presents a multi-disciplinarity and a holistic approach to education across the professional courses, sciences, social sciences, arts, humanities, and sports in terms of curricular development and distribution of credits. The necessity of design of the learning outcomes-based curriculum framework for undergraduate education based on the expected

learning outcomes and academic standards that are expected to be attained by graduates of a programme of study and holder of a qualification are illustrated on the basis of UGC guidelines. A whole new format of assessment tools using digital platforms need to be utilized to build the requisite skills that is required of a growing economy. It is expected that the curriculum design will enable all students who have enrolled in higher education programmes to attain the requisite skills of higher order through the intended learning outcomes. The dual/joint/ twining degree programme provides the additional mechanism of skill upgradation and employability enhancement. A multidisciplinary institution should not only have different departments covering multiple disciplines, but also should have innovative programmes of a multi- and inter-disciplinary nature to help widen learners' thinking and learning capability and enable students to become well-rounded individuals. All HEIs will develop IDPs to assess human resources requirements, in terms of faculty and administrative staff shortages, the physical infrastructural facilities, ICT related technology requirements, Learning infrastructure such as labs, libraries, CPD requirements, Student Support related areas and Teaching infrastructure. The HEIs must be committed to the holistic development of students and faculty training and should work on establishment of quality learner support system, infrastructure upgradation and end to end digitization.

Chapter I

**Multiple Entry and Admission Path
at different levels for
Multidisciplinary Four Year Degree and
Five Year Integrated PG Programme
in line with NEP-2020**

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The higher education qualifications leading to a certificate/degree/diploma, in line with multidisciplinary four year degree programme are well described by the UOC guidelines for Multiple Entry and Exit in Academic Programmes offered in Higher Education Institutions and NHEQE. It also envisages multiple entry and exit points and re-entry options thus, facilitating holistic multidisciplinary education and creating new possibilities for life-long learning.

1.1 Structure of Four-Year Multidisciplinary Degree Programme with multiple entry and exit options

To enable multiple entry and exit points in the academic programmes, qualifications such as certificate, diploma, degree are organized in a series of levels, as presented in Table 1.1, in an ascending order from level 4.5 to level 6; Level 4.5: represents certificate and level 6 represents bachelor degree with honors/ research.

Table: 1.1 Qualification Type and Credit Requirements of Four Year Multidisciplinary Degree Programme with multiple entry and exit options

Levels	Qualification title	Min. Credit requirements	Year and Semester
4.5	UG Certificate	40	1 year, 2 Sem
5.0	UG Diploma	80	2 years, 4 Sem
5.5	Bachelor Degree	120	3 years, 6 Sem
6.0	Bachelor Degree-Honors	160	4 years, 8 Sem
6.0	Bachelor Degree- Research	160	4 years, 8 Sem

a) **Level 4.5:**

Undergraduate Certificate (in the field of learning/discipline) for those who exit after the first year (two semesters) of the undergraduate programme. (Programme duration: first year or two semesters of the undergraduate programme) and earn credits of minimum 40

b) **Level 5.0:**

Undergraduate Diploma (in the field of learning/discipline) for those who exit after two years (four semesters) of the undergraduate programme (Programme duration: First two years or four semesters of the undergraduate programme: min. 80 credits

c) **Level 5.5: Bachelor's Degree (Programme duration: Three years or six semesters):**
min. 120 credits

d) **Level 6.0:**

- i. Bachelor's degree 'with honors' after a 4-year (eight semesters) programme; minimum 160 credits.
- ii. Bachelor's degree 'with research' after a 4-year (eight semesters) programme if the student completes a rigorous research project in her/his major area(s) of study as specified by the HEI; min. 160 credits.

Thus, the structure of the 4-year multidisciplinary bachelor's degree programme which 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, is based on:

- i. four-year bachelor's degree programme with honors,
- ii. four-year degree bachelor's degree programme with research, if the student completes a rigorous research project in their major areas of study

1.2 Structure of 1 or 2-year and 5-year Integrated PG Multidisciplinary Programme with multiple entry and exit options

In addition to 4-year multidisciplinary degree programme, the NEP 2020 also envisages flexibility in the design and duration of master's degree programmes.

a. **Level 6.5:**

Post-Graduate Diploma for those who exit after successful completion of the first year or two semesters of the 2-year master's programme). (Programme duration: One year or 2 semesters)- min. 40 credits

- b. **Level 7:**
 - i. Two Year Master's Degree (Programme duration: Two years or four semesters after obtaining a three-year bachelor's degree): min. 80 credits, second year devoted entirely for research, for those who have completed three-year Bachelor degree
 - ii. One year Master's Degree (Programme duration: One year or two semesters after obtaining a four-year Bachelor's Degree (Honors/Research)- min. 40 credits
- c. **Level 8 represents Ph. D. Research Degree.**

A 5-year Integrated Bachelor's and Master's program shall have minimum of 200 credits. The exact number of credits for different UG and PG programs will be determined by the individual Universities but shall lie within the stated limits.

1.3 Codes and Levels of Courses for UG, PG and Ph. D. Programme

As per UGC draft on 'Curricular Framework and Credit System for the Four-Year Undergraduate Programme', Courses in four-Year Undergraduate Programme are structured in the form of codes, which are segregated based on learning outcomes, level of difficulty and academic rigor.

- i. Courses in the 0-99 code will be pre-requisite courses required to undertake an introductory course which will be a pass or fail courses with no credits. Students will have to clear these courses in order to move ahead in their programme. These will include basic courses which will prepare the students for the advanced subjects that will be taught to them in the future. These courses will replace the existing informal way of offering bridge courses based on gap analysis.
- ii. 100-199 codes will include foundational courses that will make students gain basic knowledge of subjects and help them decide the subject or discipline of interest. These courses may also be prerequisites for courses in the 'major' subject. These courses will equip the student with the foundational theories, concepts, perspectives, principles, methods, and procedures of critical thinking to provide a broad basis for taking up more advanced courses.

- iii. 200-299 codes will include intermediate-level courses including subject-specific courses intended to meet the credit requirements for 'minor' or 'major' areas of learning. These courses can be prerequisite courses for advanced level major courses.
 - iv. 300-399 codes will have higher-level courses which are required for majoring in a disciplinary/interdisciplinary area of study for a degree.
 - v. 400-499 codes will include the advanced courses. These would include taught 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 under-graduate level or First year post-graduate theoretical and practical courses.
 - vi. 500-599 codes will include the courses at first year Master's degree level for the 2-year Master's degree programme.
 - vii. 600-699 codes will be the courses for the second year of a 2-year Master's or 1-year Master's degree programme,
 - viii. Codes 700-799 and above will include courses for doctoral students.
- 1.4 Rationalization of existing programmes/courses in accordance with NEP-2020, and preparation of the plan for transition from pre to post NEP-2020 with effect from academic year (AY) 2022-23 OR 2023-24**
- (a) **University and Colleges offering PG Programme:**
- Transformation of two-year PG programme either to a two-year PG programme with entry and exit options or to 5 year Integrated PG programme with multiple entry and exit options will have to be carried out in phase wise manner.
- Complete conversion of two-year PG programme to 5-year Integrated PG programme will require at least three years: from 2022-23 to 2025-26. With an understanding that four-year Degree programme is being launched in some Central Universities or state universities in other states of India in the AY 2021-22, these students after successful completion of four-year degree course will be allowed to join second year of two year PG programme or final year of five year integrated PG programme in 2025-26.
- Current UG Degree holders will join as usual to first year of the PG Programme. In any case, the credits will be deposited in the ABC for credit mobility. Meanwhile the ABC registered HEIs should initiate framing MoUs with other

registered HEIs for Credit Transfer arrangements, recognition of different course modules under the Programme offered by HEIs and sharing of resources for Multidisciplinary Teaching, Learning and Evaluation.

(b) Autonomous Colleges:

The Autonomous Colleges should start undertaking phase wise conversion of three- year degree programme to -

- i. four-year degree programme with honors,
- ii. four-year degree programme with research, if the student completes a rigorous research project in their major areas of study

Currently (2022-23) there will be no exit option, with a certificate or a diploma, during the first two years viz. 2022-24. The current exit option after three years, with a B.A./B.Sc./ B. Com./ BBS degree in the relevant subject will continue. The exit options will be introduced from 2024 onwards with due changes in programme.

Since NEP 2020 is promoting the concept of interdisciplinary exchange of knowledge and research themes and thereby abolishing the compartmentalization of Education, different Departments in Universities and Colleges, with common areas of academic and research themes, may come together to offer disciplinary courses and electives in Major/ Core domain as well as in multidisciplinary domain. This will provide good eco-system for the transition from the conventional three year degree programme to the Multidisciplinary Four-Year Degree and Five-Year Integrated PG Programme in line with NEP-2020.

1.5 Admission Path at different levels for four-year multidisciplinary Degree Programme

- a. **First Year Entry 1, Level 4.5:** Students who have successfully completed Grade 12 School Leaving Certificate (in 5+3+3+4) or equivalent shall be eligible for admission to a first-year degree programme. The entry requirement for Level 4.5 is Secondary School Leaving Certificate obtained after the successful completion of Grade 12. A programme of study leading to entry into the first year of the bachelor's degree is open to those who have met the entrance requirements, including specified levels of attainment at the secondary level of education specified in the programme admission regulations of respective University.

Admission to the bachelor's degree programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake and complete a Bachelor's degree programme. The admission shall be made on merit on the basis of criteria notified by the university, keeping in view the guidelines/norms in this regard issued by the UGC and other statutory bodies concerned and taking into account the reservation policy as and when issued by the Government of Maharashtra from time to time.

In order to maintain uniform standards for teacher education (four year B. Ed. Programme), the admission to pre-service teacher preparation programmes shall be through suitable subject and aptitude tests conducted by the National Testing Agency, and shall be standardized keeping in view the linguistic and cultural diversity of the country.

b. In-take capacity and Student enrolment at Level 4.5:

Overall intake capacity shall be defined in accordance with the academic and physical facilities available keeping in mind the norms pertaining to the student-teacher ratio, the teaching-non-teaching staff ratio, laboratory, library, teaching-learning tools and permitted batch size for the courses (theory/ Practical) as decided by Academic Council of respective Universities. The in-take capacity shall be determined at least three months in advance by the university/institution through its academic bodies in accordance with the guidelines/norms in this regard issued by the UGC and other statutory bodies concerned so that the same could be suitably incorporated in the admission brochure for the information of all concerned and uploaded on the institutional website. Reservation for admissions will have to be executed as per Government of Maharashtra Norms. Besides defining titles for common fees for the programme, the fee structure needs to be defined for individual courses which will enable the mechanism for working out the overall fees structure based on the combinations of courses selected by the students for the particular programme.

c. 2nd Year Entry 2 Level 5.0:

The entry requirement for Level 6 is a certificate obtained after completing the first year (two semesters) of the undergraduate programme. A programme of study leading to the second year of the bachelor's degree is open to those who have met

the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake and complete a bachelor's degree programme.

d. **3rd Year Entry 3 Level 5.5:**

The entry requirement for Level 5.5 is a diploma obtained after completing two years (four semesters) of the undergraduate programme. A programme of study leading to the bachelor's degree is open to those who have met the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake and complete a bachelor's degree programme.

e. **4th Year Entry 4 Level 6:**

An individual seeking admission to a Bachelor's degree (Honors) and Bachelor's degree (Research) (Level 6) in a specified field of learning would normally have completed all requirements of the relevant three-year bachelor degree (Level 5.5). After completing the requirements of a three year Bachelor's degree, candidates who meet the minimum CGPA of 7.5 or the minimum eligibility criteria decided by the University Academic Council shall be allowed to continue studies in the fourth year of the undergraduate programme to pursue and complete the Bachelor's degree with Research

1.6 Master's Programme Admission path

- Students shall be admitted to a two-year programme with the second year devoted entirely to research for those who have completed the three-year Bachelor's programme.
- Students completing a four-year bachelor's programme with Honors/Research, may be admitted to a one-year Master's programme,
The admission requirements for Entry 5, level 6.5 or Level 7 are as given below:
 - A four year Bachelor's Degree (Honors/Research) for the one-year/two-semester Master's degree programme (Level 7.0).

- A three year Bachelor's Degree for the two-year/four-semester Master's degree programme with exit option after successful completion of first year of PG Programme.
- A three year Bachelor's Degree for the one-year/two-semester Post-Graduate Diploma programme (Level 6.5).

A programme of study leading to the Master's degree and Post-Graduate Diploma is open to those who have met the entrance requirements, including specified levels of attainment, in the programme admission regulations. Admission to a programme of study is based on the evaluation of documentary evidence (including the academic record) of the applicant's ability to undertake postgraduate study in a specialized field of enquiry.

Students, who wish to pursue a Master's degree in a subject other than the major/core subject studied by him/her in four year multidisciplinary UG programme, must take additional course/s of equivalent credits of that subject, which are not pursued in the previously completed UG programme for the purpose of admission eligibility.

1.7 Lateral Entry/ Re-entry at higher Levels after exit from lower levels of four year multidisciplinary UG degree programme

Students who leave with a Certification, Diploma, or a Basic Bachelor's Degree will be eligible to re-enter the programme at the exit level to complete or progress to the next level through lateral entry mode. Depending upon the academic and physical facilities available, the HEIs may earmark specific seats/ intake for lateral entry in to the second year/ third year/ fourth year of a four year multidisciplinary UG degree programme as approved by PSSB/Govt of Maharashtra/ statutory council of affiliating University plus any consequential vacancies caused by exits to an ongoing programme (four-year Degree Programme and Integrated Master's or second year Master's) plus vacancies created due to % failure in previous year. Lateral entry is open to those students, if he/she has either

- a. successfully completed the first year/second year/third year of the particular four year multidisciplinary degree programme in any ABC registered HEI with valid credits in ABC and re-entering into second year/third year/fourth year, respectively of the same four year degree programme of any ABC registered HEI, within stipulated/ permissible period of years as decided by Statutory Councils of that HEI

OR

- b. already successfully completed a multidisciplinary four-year first-degree programme and is desirous of and academically capable of pursuing another multidisciplinary four year first degree programme in an allied subject.

A student will be allowed to enter/re-enter only at the odd semester. Re-entry at various levels for lateral entrants in academic programmes should be based on the earned and valid credits as deposited and accumulated in Academic Bank of Credits (ABC) through Registered Higher Education Institutions (RHEI) and proficiency test records. Hence, the University/ College will have to work out prerequisites and entry norms for lateral admissions such as previous year CGPA, a written test and/or interview, requirement of bridge courses etc. In case the lateral entrants is desirous of joining to four year degree programme different from his/her earlier Programme (i.e. with different combinations of Major and Minor), then the BoS of that HEI should decide the requirements of bridge courses, prerequisite courses and additional credit requirements for new combinations of Major and Minor which the lateral entrant must fulfil for the purpose of joining new Programme. However, in terms of the admission eligibility requirements, the student must belong to the same faculty/ discipline in terms of Major Subject i.e., the Major subject of his/her earlier Programme and the Major subject of new Programme for which he/she is seeking admission must be from the same faculty/discipline. Reservation for lateral entry will have to be executed as per Government of Maharashtra Norms. Lateral entry for Diploma Engineering/ Pharmacy holders (in the relevant subject) is already allowed upto 10% of the original intake plus consequential vacancies into second year of Integrated Programme of Engineering and Technology/ Pharmacy (M. Tech/ M. Pharm.) or Four Year Degree Programme in Engineering and Technology/ Pharmacy as per the norms/ regulations of DTE, Government of Maharashtra.

1.8 Common University Entrance Test (CUET) as basis for admission path for UG and PG Programmes across country and CET (Common Entrance Test) for admission path across Maharashtra State

Ministry of Education (MoE), Government of India (GOI) has established the National Testing Agency (NTA) as an independent, autonomous, and self-sustained premier testing organization under the Societies Registration Act (1860) for conducting efficient,

transparent and international standards tests in order to assess the competency of candidates for admissions to HEIs. The NTA has been assigned the task of conducting the Common University Entrance Test (CUET) for Post Graduate (PG) and Undergraduate (UG) programmes, for admission to different programmes of the participating Central/ State Universities. The objective is to provide a single window opportunity to the students to seek admission in these participating Universities / Institute(s) across the country. NTA engages with its stakeholders viz. students, parents, teachers, experts, and partner institutions on a regular basis in order to practice the values of quality, efficiency, effectiveness, equity, and security of assessments.

Common University Entrance Test (CUET) was introduced for admission into UG/ PG programmes in Central and participating State Universities with effect from the academic session 2022-23. It is expected that the CUET will provide a common platform and equal opportunities to candidates across the country, especially those from North-East and from rural and other remote areas and help to establish better connect with the Universities. A single Examination will enable the Candidates to cover a wide outreach and be part of the admissions process to various Central as well as participating State Universities.

State Universities may utilize normalized scores and conduct their individual counselling on the basis of the score card of CUET (UG and PG) provided by the NTA. Based on normalized scores, the Merit list will be prepared by participating Universities/ organizations for admission to various UG and PG programme.

A similar state level mechanism can be thought of by Government of Maharashtra as additional supporting system for admission to multidisciplinary four year Degree and five year integrated PG Programme. State CET Cell (State Common Entrance Test Cell) of Government of Maharashtra is already involved for conducting Entrance Test for admission to various UG and PG professional programmes across Maharashtra State Colleges and Universities. The Government of Maharashtra and statutory bodies of Universities should decide on extending the jurisdiction of State CET Cell for working out the state level system for admission to various nonprofessional multidisciplinary four year Degree and five year integrated PG Programme as additional supporting mechanism to CUET (UG and PG).

Chapter II

**Credit structures and Outcome based
Curriculum Development for
Multidisciplinary Four-Year Degree and
Five Year Integrated PG programmes
as per NHEQF Guidelines**

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Credit structures and Outcome based Curriculum Development for Multidisciplinary Four Year Degree and Five Year Integrated PG programmes as per NHEQF Guidelines

The NEP 2020 envisages imaginative and flexible curricular structures with multiple entry and exit options, to enable the creative combinations of disciplinary areas for study in multidisciplinary contexts, (including vocational courses), thus, removing the currently prevalent rigid boundaries and creating new possibilities for life-long learning. The National higher education qualification framework (NHEQF) has made provisions for flexibility and innovation in

- i) programme design and syllabi development,
- ii) teaching-learning process,
- iii) assessment of students' learning levels, and
- iv) periodic programme reviews within a broad framework of agreed expected programme/course learning outcomes and academic standard. Thus, it is essential to design the multidisciplinary curriculum for Graduate-level, master's, and doctoral programmes of study in multidisciplinary universities, while providing rigorous research-based specialization, in line with NHEQF guidelines.

For effective implementation of multidisciplinary four-year degree programme, the curriculum is required to be more flexible, with greater choices of credits across different streams. Various Combinations of Major / Minor Subjects are required to be identified and defined to realize the 'unique blend' of research in science and technology, commerce and management, humanities and arts and other interdisciplinary studies. A major subject/ core subject is the subject that represents the main focus of a degree. The degree in Major is permitted if the student opts and accrues courses with minimum of 50-60% credits corresponding to the Major. A minor is a secondary subject that may complement the major or can have interdisciplinary bandwidth. Minors are a bunch of courses and can be related or unrelated to the major. A university must declare the minors and make it available for the students to choose from. In addition to major and minor courses, the flexible and innovative curricula of all HEIs shall include credit-based courses on ability enhancement, environmental education, Indian Knowledge System (IKS), value-based education and professional ethics, skill based and vocational courses, co-curricular courses, projects in the areas of community

engagement and service, and internships. As part of a holistic education, students at all HEIs will be provided with opportunities for internships with local industries, businesses, banks, artists, crafts persons, and so on, as well as research internships with faculty and researchers at their own or other HEIs / research institutions, so that students may actively engage with the practical side of their learning and, as a byproduct, further improve their employability.

2.1 Distribution of Credits across Multidisciplinary Four Year Degree and Five Year Integrated PG programmes

(a) Four Year multidisciplinary Degree Programme

For the four-year multidisciplinary bachelor degree programme, the distribution of credits will be as follows:

- Disciplinary/interdisciplinary major (minimum of 40-56 credits)
- Disciplinary/interdisciplinary minor (maximum of 20-28 credits)
- Skill based/Vocational studies (12-18 credits)
- Field projects/internship/apprenticeship/community engagement and service (24-32 credits) with maximum six credits per Semester
- Remaining credits covering Generic or open electives, Ability enhancement course (AEC), Indian Knowledge System (IKS), value-based education, Life Skills and professional ethics, Co-curricular courses such as Sports and Culture, NSS/NCC etc.

Four-year multidisciplinary degree programme with Honors/ Specialization Degree will have Internship and Core /Major Courses with minimum of 20 credits per Sem. in the Fourth Year.

Four-year multidisciplinary degree programme with Research will have Research Projects, Seminar, Dissertation and Internship with minimum of 20 credits per Sem. in the Fourth Year.

Every four year degree multidisciplinary program curriculum design must specify prerequisite courses, mandatory courses, credit distribution among core/ major, optional core, subject-specific and open-electives and it should also specify how many and which credits can be transferred and other eligibility criteria. Every course must specify the requirement of pre-requisites and number of credits.

- (b) For the Master's programmes, the Universities will have the flexibility to offer different designs:
- i) A two-year programme with the second year devoted entirely to research for those who have completed the three-year Bachelor's programme;
 - ii) A one-year Master's programme for students who are completing a four-year Bachelor's programme with Research;
 - iii) A one-year/two-semester Post-Graduate Diploma programme builds on a Bachelor's degree and requires min. of 40 credits for individuals who have completed a Bachelor's degree
 - iv) An integrated five-year Master's programme with multiple entry and exit options at different levels e.g., the student may exit at the end of the third year with a Bachelor's degree, with an entry to a Master's programme in another HEI.

The overall structure for the 5-year Integrated PG Programme with the broad-based multidisciplinary curriculum will be as follows:

- i) core component consisting of the major discipline and a minor/allied discipline contributing to 60-70%
- ii) a multidisciplinary component at different levels (in line with distribution of credits for four year multidisciplinary degree programme) accounting for the remaining 30-40% of the credits
- iii) Multiple entries and exits within a program: Student will earn minimum of 20 credits per semester and minimum of 40 credits per year in every program. Students can have multiple entry and exit options in Five-Years Integrated Master's Degree programme with exit at the end of the first year with Certificate, exit at the end of second year with Diploma, exit at the end of third year with a Bachelor's degree and exit at the end of the fourth year with a Bachelor's Honors/ Research degree.
- iv) Students who leave with a Certification, Diploma, a Basic Bachelor's Degree or a Bachelor's Honors/ Research degree will be eligible to re-enter the 5-year Integrated PG Programme at the exit level to complete or progress to the next level.

Master's and doctoral programmes, while providing rigorous research-based specialization, should also provide opportunities for multidisciplinary work, in academia, government, research institutions, and industry.

2.2 Disciplinary Major/ Core- Mandatory and Electives and Disciplinary/ Interdisciplinary Minor

Students must select a 'major subject/ discipline' and a 'minor subject/discipline' from the lists of various course combinations and options provided by the HEC. The Courses of study indicate pursuance of study in a particular discipline/faculty. Every discipline/faculty shall offer different categories of subjects of study, viz. Department/Subject Specific Core courses (DSCs) or School Specific Cores (SSC) or Faculty Specific Cores (FSC), Minor Subject courses and different categories of courses as Electives viz. Discipline/ Department/Subject Specific Electives (DSE) or School Specific Elective (SSE) or Faculty Specific Electives (FSE), and Generic/ Open Electives (GEs or OEs). Various combinations of Major / Minor can be worked out based on Baskets of courses to be offered to the students by the University/ Colleges.

a) Department/ Subject Specific Core or Major (DSC)

Department/Subject Specific Core (DSC) is a single discipline course of study or specific subject course of study, which should be pursued by a student as a mandatory requirement of his/her programme of study. DSCs shall be the core credit courses of that particular Subject which will be appropriately graded and arranged across the semesters of study, being undertaken by the student, with multiple exit options as per NEP 2020. The DSCs specified in the framework would be identified by the concerned Department/ School of College/ University as core/ major courses to be taught in a Programme.

For example, for the award of single subject specific degree, such as four year B.A. (Honors/ Research)-Philosophy, B.A. (Honors/ Research)-History, B. Com. (Honors/ Research), B. Sc. (Honors/ Research)- Mathematics, B.Sc. (Honors/Research) Chemistry, B. A. (Honors/ Research)- Music and similar such programmes, DSCs shall be the core courses of Philosophy, History, Commerce, Mathematics, Chemistry and Music subjects respectively.

b) School Specific Core/ Major (SSC)

School Specific Cores (SSC) are more relevant to Honors degree programme in a 'Field of Multidisciplinary courses of Study' (choice of interrelated subjects rather than a single subject major) such as B.Sc. (Honors)- Life

Sciences, B.Sc. (Honors)- Mathematical Sciences, B.A. (Honors)-Social Sciences, B.A. (Honors)- Performing Arts. Thus, the SSCs shall comprise of core/major credit courses of more than one but interrelated subjects. For example, in a B.Sc. (Honors) Life Sciences programme, the student shall study credit courses of following disciplines: Botany, Zoology and Biochemistry/Microbiology. SSC 1 may be of Discipline A1 (Botany), SSC 2 may be of Discipline B1 (Zoology) and SSC 3 may be of Discipline C1 (Biochemistry/Microbiology). However, the fourth year of such honors/research degree programme shall be devoted to the study of only one subject and hence the SSC courses in the VII and VIII semesters shall be of Subject A/B/C and not a combination of these three subjects. Similarly, B.A. (Honors/ Research)-Performing Arts will involve combinations of Theatre Arts, Music and Dance for the first three years and specific core subject in the final year. B.A. (Honors/ Research)- Social Sciences will involve combinations of History, Sociology and Philosophy for first three years and specific core subject in the final year.

c) Faculty/Discipline Specific Core/ Major (FSC)

Faculty/Discipline Specific Cores (FSC) permits choice of two different subjects as core /major for first three years. These subjects are not necessarily interrelated like School Specific Core (SSC) but they belong to one faculty/Discipline. For example: Physics and Chemistry in Science Faculty; Sociology and Marathi in Humanity and Arts faculty etc. However, the fourth year of such honors/research degree programme shall be devoted to the study of only one subject out of the two subjects chosen by the student. Thus, the first subject (the one which is continued in final year) becomes major subject under FSC and the second subject (the one which is discontinued in final year) becomes auxiliary/ supplementary subject.

The choice of Department/Subject Specific Core (DSC) as Major is built on intensive specializations in Multidisciplinary domain while the choice of SSC as Major is based on School concept (i.e., interdisciplinary studies/ research in multidisciplinary domain). Thus, the choice of SSC as Major mandatorily requires choosing three inter-related subjects in that faculty/ discipline. On the other hand, FSC permits choosing any two subjects from that faculty/

Discipline which according to the student fulfills his/ her career aspirations. For example, a student, aspiring for career in Computational Chemistry, will select Chemistry as a major subject and Computer Sciences (or even Mathematics) as auxiliary/ supplementary subject.

d) Department/Subject Specific Electives (DSE), School Specific Elective (SSE) and Faculty Specific Electives (FSE)

There shall be a pool/ basket of DSEs/ SSEs/FSEs from which a student may choose a course of study. Thus, the Department/Subject Specific Electives (DSEs) shall be a pool/ basket of credit courses of that particular department/subject (single discipline course of study or specific subject course). The DSEs specified in the framework should be identified by the concerned Department as elective courses to be taught in a Programme. For example, to pursue B.Sc. (Honors/ Research) Physics, DSEs chosen should be from a pool/ basket of DSEs of Physics.

School Specific Elective (SSE) shall be a pool/ basket of credit courses from related disciplines (e.g., social sciences, life sciences, performing arts) for multidisciplinary programme of study. For example, to pursue B.Sc. (Honors) Life Sciences programme, the SSEs chosen should be a pool/ basket of courses of respective DSEs of Botany, Zoology and Biochemistry/ Microbiology/ Biophysics (the core subjects for this programme of study). However, to pursue Honors/Research degree programme such as B.Sc. (Honors/ Research) Life Science, B.A. (Honors/ Research) Social Sciences/Humanities, B.A. (Honors/ Research)- Performing Arts, in the fourth year of such honors/research degree programme in the VII and VIII semesters, the student shall be required to choose DSEs from any one of the subject courses A/B/C and not a combination of these three subjects.

Faculty Specific Electives (FSE) shall be a pool/ basket of credit courses of respective DSEs (i.e., DSEs of two subjects chosen under FSC) from concerned faculty (Science, Engineering, Humanities and Arts, Commerce, interdisciplinary etc.). However, the fourth year of such honors/research degree programme shall be devoted to the study of DSEs of only one subject out of the two subjects chosen by the student.

e) **Minor Courses**

Students are expected to gain in-depth multi-/ inter-disciplinary understanding through theoretical and practical experiences, as well as an adequate knowledge base through the choice of minor subject and discipline. A list of minors could be drawn out from pool/ basket of courses by bunching up to 6-8 courses of the particular subject/s of roughly two to four credits each leading to a Minor. Minors should be used to bring focus on multi-disciplinary education as envisaged in the NEP 2020. The student choosing Department/ Subject Specific core (DSC) may choose minors from faculty/discipline unrelated to the major but something that complements the major. For example, students opting for Botany as DSC may choose Horticulture/ Crop Science as elective/ minor. However, students choosing School Specific and Faculty Specific Major (SSC and FSC) will have to compulsorily choose a Minor from other faculty/discipline.

2.3 Award of Major and Minor Degree in four year Multidisciplinary Degree Programme

- a) A student pursuing four-year multidisciplinary UG programme in Department/Subject Specific Core (DSC) (Core/ Major Subject) shall be awarded an appropriate Honors/ Research degree with Major in the Subject on completion of VIII Semester, if he/she secures in that subject (or that DSC) at least 50% of the total credits for that programme. He/she shall thus study specific number of DSCs and DSEs in that subject in eight semesters so as to cover at least 50% of the total credits. In case of Research Degree, he/she shall pursue research project and write dissertation in that Major in the VII and VIII semesters. Thus, a student pursuing four-year multidisciplinary UG programme in Physics as DSC, covering at least 50% of the total credits of the Programme in Physics and undertaking research project in Physics in the VII and VIII semesters, shall be awarded B.Sc. (Research) (Physics Major) degree on successful completion of the four year Multidisciplinary Degree Programme with minimum of 160 credits.

- b) A student pursuing four-year undergraduate programme in School Specific Core/ Major (SSC) as Core (e.g., B.A. Social Sciences, B.Sc. Life Sciences, B.Sc. Physical Sciences, B.Sc. Mathematical Sciences, B. Com., B.A. Performing Arts and such other programmes) shall be awarded Honors/ Research degree with SSC-DSC (only subject continued in final year out of three SSC subjects) on completion of VIII Semester, if he/she secures in SSC at least 50% credits and in DSC at least 25% out of the total credits for that programme. He/she shall thus study specific number of SSCs and SSEs (i.e., DSCs and DSEs of the three subjects under SSC) in eight semesters so as to cover at least 50% of the total credits. He/she has to pursue studies in one DSC out of the three SSC subjects in the fourth year (Sem VII and VIII) and should secure at least 25% of the total credits in that DSC over a period of the four years. For instance, a student who pursues four-year B.Sc. (Honors) in Life Sciences (Biochemistry, Biotechnology and Microbiology) and studies Microbiology in fourth year, shall be eligible for the award of B.Sc. (Honors) [Life Sciences-Microbiology Major] degree on successful completion of four year Multidisciplinary Degree Programme with minimum of 160 credits, if he/she earns minimum of 50% credits in Life Sciences and minimum of 25% credits in Microbiology alone. If he/ she undertakes research project in that DSC (e.g., Microbiology in the above example) in the VII and VIII semesters, then a Research Degree will be awarded.
- If the student wishes to possess another Honors/ Research degree in the second SSC subject studied (e.g., Biochemistry or Biotechnology in above example), he/she must repeat the fourth year (VII and VIII semesters) with the second subject as DSC. Thus, to be eligible for the award of second degree of B.Sc. (Honors/ Research) [Life Sciences-Biochemistry Major], the student must repeat the fourth year (VII and VIII semesters) with Biochemistry as DSC and secure minimum of 25% credits of the total Programme Credits in Biochemistry alone.
- c) A student pursuing four-year undergraduate programme in Faculty/Discipline Specific Cores (FSC) as Core (e.g. For example: Zoology and Mathematics from Science Faculty; Economics and Hindi from Humanity and Arts faculty etc. and such other combinations belonging to the same faculty) shall be

awarded Honors/ Research degree with FSC-DSC (the subject continued in final year out of the two FSC subjects) on completion of VIII Semester, if he/she secures in FSC at least 50% credits and in DSC at least 30% out of the total credits for that programme. He/she shall thus study specific number of FSCs and FSEs in eight semesters (i.e., DSCs and DSEs of the two subjects in six semesters and DSCs and DSEs of one subject in remaining two semesters) so as to cover at least 50% of the total credits. He/she has to pursue studies in one DSC out of the two FSC subjects in fourth year (Sem VII and VIII) and should secure at least 30% of the total credits in that DSC over four years. For instance, a student who pursues four-year B.Sc. (Honors) with Physics as Major (i.e., he/she continues studies of Physics in fourth year) and Chemistry as Supplementary/ Auxiliary subject (i.e., he/she discontinues studies of Chemistry in fourth year), shall be eligible for the award of B.Sc. (Honors) [Physics- Major and Chemistry- Auxiliary] degree on successful completion of four year Multidisciplinary Degree Programme with minimum of 160 credits, if he/she earns minimum of 50% credits in Physics and Chemistry subjects together and minimum of 30% credits in Physics alone. If he/ she undertakes research project in that DSC (e.g., Physics in above case) in the VII and VIII semesters, then a Research Degree will be awarded.

If the student wishes to possess another Honors/ Research degree in the second FSC subject studied (e.g., Chemistry in above example), he/she must repeat the fourth year (VII and VIII semesters) with the second subject as DSC. Thus, to be eligible for the award of second degree of B.Sc. (Honors/ Research) [Physics and Chemistry-Major], the student must repeat the fourth year (VII and VIII semesters) with Chemistry as DSC and secure minimum of 30% credits of the total Programme Credits in Chemistry alone.

- d) A student may be awarded a Minor Degree under four year multidisciplinary degree programme. The student is eligible for the award of Minor Degree on successful completion of four year Multidisciplinary Degree Programme with minimum of 160 credits, if he/she earns 20-28 credits in that Minor Subject. Award of Minor Degree is independent of award of Major Degree (i.e., whether the student is pursuing DSC/SSC/FSC as core/ Major).

2.4 Generic/ Open Electives (GE or OE) and Baskets of Elective Courses in various faculties/ Disciplines

Generic or open Electives shall be a pool/ basket of courses which is meant to provide multidisciplinary or interdisciplinary education to students. GEs or OEs shall consist of a pool/ basket of courses offered by the various departments under different discipline/faculty of study, in groups of odd and even semesters, from which a student can choose the appropriate GE/OE (excluding the GEs offered by the parent DSC/SSC/FSC Departments) which fulfils his/her career aspirations. Students can choose GE or OE subject combinations across the streams/ disciplines/ faculties. For example, a student who desires to make Entrepreneurship as a part of his career, can pick the appropriate combination of courses of Generic Electives, Skill and Vocational Courses, Value Education Courses, and Internship /Apprenticeship which shall be offered in the form of various modules as specified in the scheme of studies.

In case a student opts for DSEs beyond his/her subject/ discipline/ faculty (or school) specific course(s) of study, such DSEs shall be treated as GEs for that student.

As per the AICTE's Approval Process Handbook-2020-21: Chapter VII- clause 7.3.2 (Page 99-101), all programmes of Engineering and Technology shall offer Elective Courses in the Emerging Areas viz., Artificial Intelligence (AI), Internet of Things (IoT), Blockchain, Robotics, Quantum Computing, Data Sciences, Cyber Security, 3D Printing and Design, Augmented Reality/ Virtual Reality (AR/VR), as specified in Annexure 1 of the Approval Process Handbook.

The GEs /OEs specified in the framework will be identified by the concerned Department/ School of the University/ College as GEs/OEs to be taught in a Programme and will be provided in the form of Basket of Elective Courses in Science Faculty, Basket of Elective Courses in Commerce, Liberal Arts basket, Basket of Electives/ Ability Enhancement Courses (AEC) in Language and Literature, Basket of Elective Courses in Education, Physical Education and Special Education, Basket of Elective Courses in Fine and Visual Arts, Basket of Courses in Life Skills and Value Education, Basket of Courses in Environmental Studies etc.

For example the Baskets of Elective courses in Science Faculty could comprise of following GEs /OEs identified by the different Departments/ Schools of the University/ College under Science Faculty as GEs/OEs to be taught in a Programme: Entrepreneurship Development, Introduction to Nanoscience and Nanotechnology, Basic knowledge in statistics, Statistical Packages, Astronomy and Astrophysics, Data

Science, Earth and Environmental Sciences, Data analytics, Data Mining, Artificial Intelligence, Basic IT/coding skills, Computer Vision and Image Processing, Cybersecurity and Machine Learning etc. The courses related to Natural Sciences will focus on the development of an understanding of the natural world through application of scientific method characterized by observation, the experimentation, and formulation, testing and establishment of hypotheses based on natural phenomena.

The Baskets of Elective courses in the Social Sciences could include courses related to Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. Social Sciences-related courses would focus on the study of the social behavior of individuals, groups, societies, nations, and states. Students will be introduced to the use of qualitative methods, such as ethnography, oral history, and descriptive analysis of archival materials and artifacts. They will also be introduced to the use of quantitative tools to collect and analyze data associated with social phenomena, and formulation of testable hypotheses based on social phenomena. They will provide opportunities to students to examine relationships among individuals, as well as relationships between groups of people and their societies.

2.5 Ability Enhancement Courses (AEC)-Languages, Literature, and Environmental Studies

AEC courses are the courses based upon the content that leads to knowledge enhancement through various areas of study. They are Language and Literature and Environmental Science and Sustainable Development which will be mandatory for all disciplines. Around 3-5 AEC courses will be offered in the first two years with a total of 6-10 credits. Students will pick up courses from the pool/ basket of Languages, Literature, and Environmental Studies.

As per section 22.4. of NEP 2020, language is inextricably linked to art and culture. Different languages 'see' the world differently, and the structure of a language, therefore, determines a native speaker's perception of experience. Art, in the form of literature, plays, music, film, etc. cannot be fully appreciated without language. The 22 languages of Eighth Schedule of the Constitution of India and dialects should be offered as language courses of 2-3 credits under AEC. Teaching and learning of Indian languages, dialects and comparative literature need to be integrated with school and higher education at every level. Government of Maharashtra, in line with NEP, should support HEIs to undertake the due initiatives for a steady stream of high-quality learning

and print materials in Marathi and other languages including textbooks, workbooks, videos, plays, poems, novels, magazines, etc. The Marathi and other Language Departments across state Universities in Maharashtra must come together to provide and disseminate widely the consistent official updates in language vocabularies and dictionaries, so that the most current issues and concepts can be effectively discussed in these languages. Language-teaching should be more experiential, and it must focus on the ability to converse and interact in the language in addition to the teaching of literature, vocabulary, and grammar of the language. Languages must be used more extensively for conversation and for teaching-learning.

In tune with the directions given by NEP for promotion of local languages' Mother Tongue, the HEIs in Maharashtra will facilitate, wherever possible, the use of Marathi as a medium of instruction in order to increase access and GER. In addition, some programmes can be offered bilingually to promote the strength, usage, and vibrancy of all Indian languages. Creating programmes and degrees in higher education across arts, languages, and humanities, will also come with expanded high-quality opportunities for employment that can make effective use of these qualifications for employment opportunities in academies, museums including virtual museums/e-museums, art galleries, and heritage sites as well as tourism industry. The Indian and Foreign Language Departments should also offer basic courses to fulfil the language literacy requirements as per the NEP guidelines.

Environmental Studies should be offered as one course under AEC to promote the knowledge of ecosystem that surrounds us and stress the necessity of preservation of the same based on Sustainable Development Goals (SDG). Environment education will include areas such as climate change, pollution, waste management, sanitation, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living. The Environmental Studies course will also deepen the knowledge and understanding of India's environment in its totality, their interactive processes, and effects on the future quality of people's lives.

Combination of courses on English, Indian language (Marathi/ Hindi/ Sanskrit or other regional languages if offered in that college) (4-6 credits each) and Environment Studies (2 credits) can be taken as an example on AEC courses.

2.6 Professional Ethics, Value Education and Life Skills courses (EVLS)

For the progress and development of a civil society, Human Values and Professional Ethics are inevitable. According to Second President of India Prof Sarvapalli Radhakrishnan, Education is not limited to the imparting of information or training of skills. It has to give the educated a proper sense of values. Thus, HEIs indeed have a responsibility to build a strong society. Therefore, Board of Studies (BoS) of HEIs should develop courses based on high quality practices and environment backed with human values and professional ethics as a part of four year multidisciplinary programmes in HEIs.

Value Education Courses are common pool of courses offered by different faculties/disciplines and are aimed at personality building embedding ethical, cultural and constitutional values promoting critical thinking and scientific temperament. Value-based education is expected to accomplish the development of humanistic, ethical, constitutional, and universal human values (UHV) of truth, righteous conduct, peace, love, nonviolence, scientific temper, citizenship values, and life-skills. Lessons in service and participation in community service programmes could also be included as an integral part of the holistic education. Global Citizenship Education and education for sustainable development will form an integral part of the curriculum to empower learners to become aware of and understand global and sustainable development issues and to become active promoters of more peaceful, tolerant, inclusive, secure, and sustainable societies.

Courses on Life skills should be added to increase the employability as well as self-esteem of the students. These may include communication and presentation skills, interpersonal skills, time management, team work, flexibility, problem solving, professional skills, decision making skills, leadership abilities and universal values among others.

Combination of courses on Constitution, Gender, Diversity, and Inclusion (2 credits), Ethics and Values (2 credits) Soft Skills (2 credits) can be taken as one example on EVLS courses.

2.7 Courses or modules on Indian Knowledge System (IKS)

As per NEP 2020, India, the world's third-largest economy on a purchasing power parity basis, is a nation with long civilizational history with more than 5000 years of

recorded history, abundant cultural and archaeological artifacts, literature, and social and community practices which defines the base for Indian Knowledge. The Board of Studies (BoS), while defining the curriculum for modules/ courses on IKS, should understand that the historical accounts of science in India are woefully inadequate and need to see beyond the colonial lens. India's sciences are based on fundamental principles, axioms, logical inference, and empirical observations and were generally written down in texts called 'sastras and sutras'. Panini's astonishing grammar describes the Sanskrit language in 4000 algebraic rules with a structure that is now compared to a computer program. Kanada's physics has its laws of motion, and it speaks of nine classes of substances, some of which are non-atomic and some atomic. The ancient Ayurveda texts include the notion of germs and inoculation and postulate mind- body connection, which has become an important area of contemporary research. Indian disciplinary knowledge systems include fields as diverse as philosophy, architecture, grammar, mathematics, astronomy, metrics, sociology, economy and politics, ethics, geography, logic, military science, weaponry, agriculture, mining, trade and commerce, metallurgy, mining, shipbuilding, medicine, poetics, biology and veterinary science. However, while designing the curriculum, it needs to be understood that the IKS is not about merely knowing some ancestral knowledge. If we closely follow the emerging patenting regime and the economic power arising out of a knowledge society, it becomes clear that the IKS is also about protecting received wisdom, economic security, and national pride. The patenting of traditional remedies from developing countries became a global issue after patents were granted for neem. After a legal battle for more than a year, Council of Scientific and Industrial Research (CSIR) has successfully forced the US Patent and Trademark Office (PTO) to revoke a contentious patent it granted two years ago to researchers in the United States on the use of powdered turmeric (*curcuma longa*) for wound healing. Thus, the IKS is a generic phrase that covers practically everything about India. Few courses in Indian Knowledge System, thus, may be offered in each Programme. For example, when the student selects Chemistry/ Material Science/ Metallurgical Engineering as DSC/SSC/FSC, then the courses of these subjects in first/ second year could include modules/ units on Rasa Ratna Samuccaya that details the complex Metallurgy, steel-making and zinc-smelting. The schools of thought, notably, Brahmasutra Bhashya by Sankaracharya, Sri Bhashya by Ramanujacharya, Gita Bhashya by Madhwacharya, Mulamadhyamakarika by Nagarjuna, and Pramana Samuccchaya by Dignaga could be included as modules in the

curriculum of philosophy. Similarly the various units/ modules of IKS that can be incorporated in different subjects could be as follows: Aryabhata and Varahamihira's Brithat Samhita and planetary movements, solar-centric world, shape and diameter of the Earth for Astronomy; Patanjali's Yogasutras for Yoga; Sushruta's Sushruta Samhita, surgical procedures, Health and Well-being, plants & herbs in Ayurveda, Kshemakulam on Dietetics and Well-being for Pharmacy, Medicine and Surgery; Narada's Shilpasartra, Mayamuni's Mayamata for Architecture and Civil Engineering; Bhoja's Yuktikalpataru for Ship-building; the discovery of zero, decimal system of numerals, and approximation algorithms for computation of Pi, Shulba Sutras on Geometry, Lilavati of Bhaskarcharya a treatise on Mathematics for Mathematics and Computing; Panini's Ashtadhyayi on Sanskrit Grammar Languages and Linguistics; Public Administration including Good Governance and Taxation for Civics and Politics, Sayana's Sayana Bhashya on Vedas, Bharata's Natyasastra for Dance; Kautilya Arthashastra for Economics; Vishnu Sharma's Pancha Tantra Stories for Moral Sciences/ Value Education, Gautama's Nyaya Sutra on Logic and Law, Kanada's Vaisesika Sutras for Ontology etc. (Reference: 'Introduction to Indian Knowledge System: Concepts and Applications', B. Mahadevan, Vinayak Rajat Bhat, Nagendra Pavana R.N., PHI Learning Private Limited, Delhi, 2022). Alternatively, the IKS can be offered as separate course of two credits. All India Council for Technical Education (AICTE), while revising the curricula in 2018, introduced a mandatory non-credit course on Indian Knowledge Systems (IKS) along with courses on the Constitution of India and Environment Science.

In addition, Sanskrit studies can be connected to other contemporary and relevant subjects such as mathematics, astronomy, philosophy, linguistics, dramatics, yoga, etc. for development of Modules in IKS. Departments of Sanskrit should conduct teaching and outstanding interdisciplinary research on Sanskrit and Sanskrit Knowledge Systems across the new multidisciplinary higher education system.

- 2.8 Cocurricular Courses on Sports, Fine/ Applied/ Visual Arts and Cultural Activities**
Cultural awareness and expression are among the major competencies considered important to develop in children, in order to provide them with a sense of identity and belonging, as well as an appreciation of other cultures and identities. The arts - besides strengthening cultural identity, awareness, and uplifting societies - are well known to enhance cognitive and creative abilities in individuals and increase individual happiness.

The happiness/well-being, cognitive development, and cultural identity of individuals are important reasons for Indian arts of all kinds to be offered to students at all levels of education. HEIs should invite outstanding local artists and craftspersons as guest faculty to promote local music, art, languages, and handicraft, and ensure awareness of the culture and local knowledge amongst the students. BoS of HEIs should develop high-quality courses in Translation and Interpretation, Art and Museum Administration, Archaeology, Artifact Conservation, Graphic Design, and Web Design to develop highly qualified individuals to curate and run museums and heritage or tourist sites. This will also vastly strengthen the tourism industry. HEIs should also undertake efforts for conservation of artifacts and development of high-quality materials in Marathi and other Indian languages.

Course components relating to health and wellness seek to promote an optimal state of physical, emotional, intellectual, social, spiritual and environmental wellbeing of a person. Sports and fitness activities will be organized outside the regular institutional working hours. Yoga education should focus on preparing the students physically and mentally for the integration of their physical, mental, and spiritual faculties, and equipping oneself with basic knowledge about one's personality, to maintain self-discipline and self-control, to learn to handle oneself well in all life situations. Sports and fitness components of the courses should focus on the improvement of physical fitness including the improvement of various components of physique and skills related to fitness like strength, speed, coordination, endurance and flexibility; acquisition of sports skills including motor skills as well as basic movement skills relevant to a particular sport; improvement of tactical abilities; and improvement of mental abilities. Following activities may be undertaken under cocurricular courses to be offered as a part of four-year multidisciplinary degree programme:

- i) Physical Education
- ii) Activities related to Yoga/ Sports and Games
- iii) Involvement in campus publication or other publications
- iv) Publication of articles in newspapers, magazines
- v) Community work such as promotion of values of National Integration, Environment, Human rights and duties, Peace, Civic sense etc.
- vi) A Small project work concerning the achievements of India in different fields
- vii) Evolution of study groups/seminar circles on Indian thoughts and ideas

- viii) Activity exploring different aspects of Indian civilizations
- ix) Involvement in popularization programmes such as scientific temper
- x) Innovative compositions and creations in dance/music/theatre and visual arts.
- xi) Any other activities such as Cultural/ Sports Activities as prescribed by the University.
- xii) Evaluation of Co-curricular and Extension Activities/ Courses shall be as per the procedure prescribed by the university.

2.9 Open and distance learning (ODL) and online education

Open and Distance Learning (ODL) Mode provides flexible learning opportunities by overcoming separation of teacher and learner using a variety of media, including print, electronic, online and occasional interactive face-to-face meetings with the learners or Learner Support Services to deliver teaching-learning experiences, including practical or work experiences. Online Education mode offers the flexible learning opportunities using internet, e-Learning Materials and full-fledged programme delivery through the internet using technology assisted mechanism and resources. As per section 12.5 of NEP 2020, the ODL and online education provide a natural path to increase access to quality higher education. Universities/ HEI should leverage the potential of ODL completely through concerted, evidence-based efforts while ensuring the adherence to the clearly articulated standards of quality. It should also ensure that ODL programmes are equivalent to the highest quality in-class programmes available. UGC (Open and Distance Learning Programmes and Online Programmes) Regulations, 2020 laid down the minimum standards of instruction for the grant of degrees at the undergraduate and post graduate levels and grant of post graduate diploma, through Open and Distance Learning (ODL) mode and Online mode.

The UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulations, 2021 permits up to 40 per cent of the total courses being offered in a particular programme in a semester through the online learning courses offered through the SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) platform. The courses hosted on SWAYAM are in 4 quadrants:

- (I) an e-Tutorial containing video and audio content in an organised form, animations, simulations, virtual labs;

- (II) an e-Content containing e-Books or glossary, case study, frequently asked questions transcriptions of video lectures and any other specially prepared reading or study materials that can be downloaded/printed;
- (III) a discussion forum, for discussion of doubts, opinions and comments with course-coordinators and others and
- (IV) a self-assessment process that shall contain multiple choice questions, problems, quizzes, assignments and solutions.

The schedule of the SWAYAM based online credit courses shall be aligned with the conventional education semester. The academic council of University will monitor the process of transfer of credit earned by the student at their parent institution. The academic council may allow the concerned Faculty Dean to approve the online credit courses of SWAYAM platform for credit transfer on the recommendation of the Head of the Department and Chairman, Board of Studies.

National Programme on Technology Enhanced Learning (NPTEL) (initiated by seven Indian Institutes of Technology (Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati and Roorkee) along with the Indian Institute of Science, Bangalore in 2003) provides quality MOOC in all major branches of engineering and physical sciences at the UG and PG levels and management courses at the PG level to anyone interested in learning from the IITs.

In addition, each state University may float individual Massive Open Online Courses (MOOCs) for enrollment by students outside the University for a fee to be decided by the University. These MOOCs must be developed as per the pedagogy following the four-quadrant approach.

2.10 Vocational Courses and Skill based Education

Vocational and Skill-based courses (VSC) in all disciplines/ faculties are aimed at providing hands-on-training, competencies, proficiency and skills to students. Every discipline may provide skill-based course, some of which may be offered to students of its discipline while the rest can be open to students of all other disciplines'.

The basic purpose of Vocational Courses is to enhance the skill and employability. The details on vocational courses and education are covered as a part of Professional Education in Chapter III while the mode of assessment of VSC are illustrated in Chapter IV. Skill supporting facilities and organizations are presented in Chapter VII. Besides vocational courses, some of the advanced lab courses in Chemistry/ Physics/

Electronics/Nanotechnology or similar skill-based courses under other subjects will also be considered as skill-based courses.

Few examples of Vocational Subjects are: Advertising, Computer Applications, Communicative English, Electronic Equipment Maintenance, Mobile, TV and Computer Maintenance, Analytical Instrumentation Operations, Entrepreneurship Development, Office/Home Management and Secretarial Practice, Sales Promotion and Management, Tax Procedure and Practice, Tourism and Travel Management, Hospitality, Solar System Maintenance, Agriculture (Organic Farming, Protected Cultivation, Production of Horticulture Crops, Floriculture, etc), Banking, Financial Services and Insurance, Construction, Health Care, Bakery Products, Dairy Technology, Soaps and Detergents, Cosmetic Formulations, Web design and animation, Media and Entertainment etc.

2.11 Internship, Apprenticeship, Field Projects, and Community Engagement Projects

a) Internship and Apprenticeship:

India is going to have the largest working age population in the world by 2030, but gainful employment for general stream students is a major challenge. Improving employability of these students requires a new vision with curricular support for employment. Apprenticeship/Internship has a prominent role to play in linking higher education with the requirements of the industry and the world of work. This is considered to be one of the most effective ways to develop skilled manpower for the country. It provides for an industry led, practice oriented and outcome based learning. Striving to fulfil this objective of improving employability and forming robust industry-academia linkage, the UGC has framed Guidelines for Higher Education Institutions to offer Apprenticeship/Internship embedded Degree Programme. All four year UG students must complete a 4-6 credit requirement of Internship / Project in each year where they are engaged in 4-6 weeks of structured summer internship in research institutions/ industries. This will focus on outcome-based learning in degree programme and will enable students to demonstrate workforce professional abilities for potential employment. Every University will undertake MoUs with industry for industry-institute linkage for promotion of apprenticeship/ internship/ research/entrepreneurship/employment opportunities. AICTE has created a portal on its website: <https://internship.aicte-india.org> to support students to find internships as well as to help organizations to find best interns on PAN India. While internship with an external organization is the most

desirable option, alternatively a student may undertake minimum of 4-6 weeks of Project Work either at University Research Centers or at any pre-approved external Research Institutions/ CSIR Laboratories.

b) **Community Engagement and field Projects:**

The field-based learning/project should attempt to provide opportunities for students to understand the different socio-economic contexts. It should aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situation in rural and urban contexts, and to observe and study actual field situations regarding issues related to socio-economic development. Students should be given opportunities to gain a first-hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They should have opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative practices required to generate solutions to the identified problems.

The curricular component of 'community engagement and service' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This component will include participation in activities related to National Service Scheme (NCC), National Cadet Corps (NCC), adult education/literacy initiatives and mentoring school students.

A minimum of 4-6 weeks of summer work, either on university campus in activities related to preservation of environment/biodiversity or community-based work in the neighboring community (through NSS unit) or field-level work with a recognized NGO or regional case studies programme at Villages may be undertaken as a part of Field projects.

As per UGC guidelines, Regional Case Study Course or Social Entrepreneurship Course, with 02 Credits, can be floated an optional mode or as add-on-credit with total duration of 30 hours. At least 50% of the course is to be done compulsorily in the field for all students.

c) **Study Tours:**

The NEP 2020 (Section 22.12.) recognizes that the knowledge of the rich diversity of India should be imbibed first hand by learners. This would mean including simple activities, like touring by students to different parts of the country, which will not only give a boost to tourism but will also lead to an understanding and appreciation of diversity, culture, traditions and knowledge of different parts of India. HEIs can plan study tours under 'Ek Bharat Shrestha Bharat' concept and send students to visit various important destinations and study their history, scientific contributions, traditions, indigenous literature and knowledge, etc., as a part of augmenting their knowledge about our country.

2.12 Learning outcomes-based approach to curriculum planning and development, Key Qualification Descriptors and Graduate attributes

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications such as a Bachelor's Degree programmes are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates, completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme. UGC report on Evaluation Reforms in Higher Education Institutions (2019) and UGC Draft on Curricular Framework and Credit System for the Four-Year Undergraduate Programme (2022) have delineated the Framework for Outcome based Education and Assessment. The learning outcomes-based curriculum framework is intended to allow for flexibility and innovation in (i) programme design and syllabi development by higher education institutions (HEIs), (ii) teaching-learning process, (iii) assessment of student learning levels, and (iv) periodic programme review within a broad framework of agreed expected graduate attributes, qualification descriptors, programme learning outcomes

and course learning outcomes. The overall objectives of the learning outcomes-based curriculum framework are to:

- i. help formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes that are expected to be demonstrated by the holder of a qualification;
- ii. enable students, parents, employers and others to understand the nature and level of learning outcomes (knowledge, skills, attitudes and values) or attributes. A graduate of a programme should be capable of demonstrating the skills/knowledge/understanding on successful completion of the programme of study;
- iii. maintain national standards and international compatibility of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility; and
- iv. provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

The graduate attributes reflect the particular quality and feature or characteristics of an individual, including the knowledge, skills, attitudes and values that are expected to be acquired by a graduate through studies at the colleges or universities. The graduate attributes include capabilities that help strengthen one's abilities for widening current knowledge base and skills, gaining new knowledge and skills, undertaking future studies, performing well in a chosen career and playing a constructive role as a responsible citizen in the society. The graduate attributes define the characteristics of a student's university degree programme(s), and describe a set of characteristics/competencies that are transferable beyond study of a particular subject area and programme contexts in which they have been developed. Graduate attributes are fostered through meaningful learning experiences made available through the curriculum, the total college/university experiences and a process of critical and reflective thinking. Learning Outcomes-based Curriculum Framework for Undergraduate Education is based on the premise that every student and graduate is unique. Each student or graduate has his/her own characteristics in terms of previous learning levels and experiences, life experiences, learning styles and approaches to future career-related actions. The quality, depth and breadth of the learning experiences

made available to the students while at the higher education institutions help develop their characteristic attributes. The graduate attributes reflect both disciplinary knowledge and understanding, generic skills, including global competitiveness in all students in different academic fields of study which they should acquire/attain and demonstrate. Some of the characteristic attributes that a graduate should demonstrate are as follows:

- i) Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.
- ii) Communication Skills: Ability to express thoughts and ideas effectively orally and in writing. Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
- iii) Critical thinking: Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
- iv) Problem solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
- v) Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
- vi) Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problematizing, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.
- vii) Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act

together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

- viii) Scientific reasoning: Ability to analyze, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
- ix) Reflective thinking: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
- x) Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources and use appropriate software for analysis of data.
- xi) Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
- xii) Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
- xiii) Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
- xiv) Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
- xv) Lifelong learning: Ability to acquire knowledge and skills, including 'learning how to learn', that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

Expected graduate attributes/profile at different levels on National Higher Education Qualifications Framework (NHEQF) are presented under section 4.2.2 of UGC Draft on NHEQF (2022). Linkage between NHEQF Level Descriptors and Programme Learning Outcomes are presented under section 4.2.6. of NHEQF. NSQF (National Skills Qualifications Frame work) Level Descriptors are presented in Annexure I of NHEQF document. The NSQF organises qualifications according to a series of levels of knowledge, skills, and aptitude. It comprises 10 levels, representing increasing levels of complexity in terms of the knowledge, competence and autonomy that must be demonstrated by the learner. Certificate /Diploma/ Degree is awarded to students who have demonstrated the achievement of the outcomes associated with the specific NHEQF level. Learning Outcomes Descriptors for higher education qualification at levels 4.5-8 on the NHEQF are presented in Annexure II of NHEQF document. As an example, in terms of the Knowledge and understanding at Level 5.5-basic three years Bachelor' s Degree, the graduates should be able to demonstrate the acquisition of:

- comprehensive, factual, theoretical, and specialized knowledge in broad multidisciplinary contexts with depth in the underlying principles and theories relating to one or more fields of learning.
- knowledge of the current and emerging issues and developments within the chosen fields of learning.
- procedural knowledge required for performing and accomplishing professional tasks associated with the chosen fields of learning.

One of the examples for the Programme Learning Outcomes (PLOs) for Generic Learning Outcomes in reference to Communication skills for physics (Annexure III NHEQF) could be the ability to communicate accurately the findings of the experiments/ investigations while relating the conclusions/findings to relevant theories of Physics. University BoS should refer NHEQF document and UGC Draft on Curricular Framework and Credit System for the Four-Year Undergraduate Programme (2022) for additional details on Outcome based Education.

2.13 Execution of design of Curriculum of multidisciplinary four year degree and five year integrated PG programme through University BoS and Academic Council and State Level Academic Bodies

The Maharashtra Public Universities Act 2016, through Sections 32 and 33 (Academic Council), 34 and 35 (Faculty), 36 and 37 (Board of Deans), 38 and 39 (Board of Sub-campuses), 40 and 41 (Board of Studies), 42 and 43 (Board of University Departments and Interdisciplinary studies), and 44 (Board of Post-Graduate Education in Colleges), describes the mechanism of curriculum development, upgradation/ revisions and reforms and the course syllabi, course structures and evaluation schemes of various courses so as to ensure that the university becomes a vibrant hub for promotion of teaching and learning, skill development, research and development, interactions and linkages with industries, cultivation of intellectual property rights and entrepreneurship and incubation of knowledge linked industries. Thus these statutory authorities are the principal bodies for the execution of rigorous research-based specialization and opportunities for multidisciplinary work and interdisciplinary thinking at the graduate, Master's and doctoral level education as recommended by NEP-2020. University BoS, while designing the curriculum of multidisciplinary four year degree and five year integrated PG programme, should pay attention to the following:

- i) Exit options are provided with certification, diploma and basic Bachelor's degrees to the students at the end of the second, fourth and sixth semester of a four year multidisciplinary degree programme. Students will receive a Bachelor's degree with Honors/ Research on successfully completing of all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.
- ii) The NEP 2020 envisages the revision of the Choice Based Credit System (CBCS) for instilling innovation and flexibility as the four year multidisciplinary curriculum combines conceptual understanding with practical involvement and thinking to impart applicable knowledge through theory knowledge, laboratory experiences, seminar presentations, field work, internships, workshops, and research projects.
- iii) Refer Chapter I for admission guidelines for normal progression and lateral entry Path for Multidisciplinary Four Year Degree and Five Year Integrated PG Programme in line with NEP-2020.

- a) The curricular system should have flexibility for learners to move from one institution to another to enable them to have a multi and/or interdisciplinary learning. Hence, the University/ College will have to work out prerequisites and entry norms for lateral admissions such as previous year CGPA, a written test and/or interview, requirement of bridge courses etc.
 - b) Lateral entry into the programme of study leading to the UG Diploma/ Three year UG Degree/ four year Bachelor's Degree with Hons./Research will be based on the validation of prior learning outcomes achieved, including those achieved outside of formal learning or through learning and training in the workplace or in the community, or through continuing professional development activities, or through independent/self-directed learning activities.
 - c) In case the lateral entrants is desirous of joining the four year degree programme different from his/her earlier Programme (i.e. with different combinations of Major and Minor), then the BoS of that HEI should decide the requirements of bridge courses, prerequisite courses and additional credit requirements for new combinations of Major and Minor which the lateral entrant must fulfil for the purpose of joining a new Programme. However, in terms of the admission eligibility requirements, the student must belong to the same faculty/ discipline in terms of Major Subject i.e., the Major subject of his/her earlier Programme and the Major subject of new Programme for which he/she is seeking admission must be from the same faculty/discipline.
- iv) Refer NHEQF document and UGC Draft on Curricular Framework and Credit System for the Four-Year Undergraduate Programme (2022) for working out the details on learning outcomes-based approach to curriculum planning and development.
- v) Specify for each academic programme considered at the Certificate / Diploma/Degree level (UG or PG level), the programme structure (core courses, optional courses, minor, ability enhancement courses, vocational courses etc and their year wise distribution), entry level requirements, minimum and maximum duration for successful completion, programme objectives, teaching-learning strategies (number of teaching hours/lecture hours, tutorial hours, practical conduct hours, etc involved) and evaluation components (Summative and Formative type of assessment, nature and number of

- assignments, tutorials, tests, etc.) for the entire programme. Identify also the modules / courses that may be studied either as part of the programme or may be taken up independently.
- vi) The HEIs shall offer different categories of subjects of study through every discipline/faculty, viz. Department/Subject Specific Core courses (DSCs) or School Specific Cores (SSC) or Faculty Specific Cores (FSC), Minor Subject courses and different categories of courses as Electives viz. Discipline/ Department/Subject Specific Electives (DSE) or School Specific Elective (SSE) or Faculty Specific Electives (FSE), and Generic/ Open Electives (GEs or OEs). Various combinations of Major and Minor should be worked out as per the guidelines given under Section 2.2 of this chapter so that the Learners will have the flexibility to choose their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests.
 - vii) Conduct a comprehensive survey and decide on courses to be offered through the baskets of Elective courses in Various Faculties/ Disciplines, understand the outcomes sought by industries and society at large around the university area and the state overall. Due attention be given to the international standard adopted in curriculum design by the universities across the globe.
 - viii) Work out details on ODL and online courses under SWAYAM in terms of choice of courses in line with curriculum requirement, permissible credits to be offered and mechanism of credit awards and transfer. This will facilitate switching to alternative modes of learning (face-to-face, ODL and On-line learning, and hybrid modes of learning).
 - ix) Ability Enhancement courses (AEC), Value Education courses, Vocational and Skill based courses, and courses on Indian Knowledge System, Sports and Culture shall be a pool of courses offered by all the Department in groups of odd and even semesters from which students can choose.
 - x) A summer term is for eight weeks, and summer term courses may be offered on a fast- track mode to enable students to complete the arrears and do a 0-99 or 100-199 level courses. The HEI BoS can decide on the kind of courses to be offered in the summer term.
 - xi) Internship / apprenticeship can be carried out during the summer term, especially for students who exit after two semesters or four semesters of study.

- xii) Courses such as Artificial Intelligence (AI), 3-D machining, big data analysis, and machine learning, in addition to genomic studies, biotechnology, nanotechnology, neuroscience, with important applications to health, environment, and sustainable living need to be woven into multidisciplinary UG education for enhancing the employability of the youth and preparing professionals in cutting-edge areas.
- xiii) Due stress should be given for diversity and local context in planning of all curricula, and pedagogy.
- xiv) Refer section 1.3 of Chapter I for Codes and Levels of Courses for UG, PG and Ph.D. Programme.
- xv) A course, as a component of programme, may be designed to comprise lectures/tutorials/laboratory work/ field work/outreach activities/project work/vocational training/viva/seminars/term papers/ assignments / presentations/self-study etc. or a combination of some of these.
- xvi) The courses should have well defined learning objectives and learning outcomes. Divide the syllabus of each course into smaller components called 'Units' and state the Specific Learning Outcomes (SLO) for each Unit.
- xvii) Define batch size for practical courses, class size for theory courses, total intake capacity and fee structure for each course (to be approved by Board of Deans, Fee Fixation Committee and Academic Council of respective Universities).
- xviii) Specify the objectives and prerequisites of each course for inclusion under different multidisciplinary four year degree programme.

In order to facilitate the exchange of philosophy of curriculum developments, uniform terminologies for Course Nomenclature and Common Academic Schedule/Calendar for admissions and examinations amongst the State Universities, a state level forum comprising of Deans and Chairman of Board of Studies of different Universities may be established.

A tentative curriculum structure and credit distributions four year multidisciplinary Degree Programme could be as given in Table 2.1 (individual state universities can vary credit structure within limits defined by Multiple Entry and Exit and NHEQF document).

Table 2.3 highlights proposed structure for level 4.5-8 Multidisciplinary Programmes [4 Year UG with SSC as Major, 5 Year Integrated PG and Ph. D.].

Table: 2.1 The credit distribution structure for four year multidisciplinary Degree Programme with Multiple Entry and Exit options

Sem.	Major (DSC / SSC / FSC, DSE / SSE / FSE)	Minor	Generic (GE/OE)	Vocational and Skill	AEC, IKS, EVLSC	Internship, Project, Cocurricular	Total, Min
I	4-6	4-6	3-4		4-6		20
II	6-8	6	3-4		4-6	2	20
III	6-8	6	4	4	4-6		20
IV	6-8	4-6	2-4	4-6		4-6	20
V	8-10	2-4		4		4-6	20
VI	10-12			2-4		6(DSC)	20
VII	14					6 (DSC)	20
VIII	10					10(DSC)	20
Total	64-76	22-28	14-16	14-16	12-14	32-34	160

Table 2.2 Proposed Structure for Four Year Multidisciplinary UG Program with DSC as Major (e.g. Four Year B.Sc. Honors/ Research Programme)

Level	Sem.	Faculty				Ability Enhancement Course (AEC)	Field Projects / Internship / Apprenticeship / Community Engagement and Services	Cumulative Credit
			Subject - 1	Subject - 2	Any Faculty			
			Minor	Major	Subject-3 Generic Elective Course			
Level 4.5	DSE	DSE	1 (6 Credits)	1 (6 Credits)	1 (4 Credits)	2 (L1, L2) (4 Credits)	NCC / NSS / Sports / Cultural (2 Credits)	44 =22 Certificate
		1 (6 Credits)	1 (6 Credits)	1 (6 Credits)	1 (4 Credits)	2 (L1, L2) (4 Credits)+1 (2 Credits) Environment		6+6+4+4+2 =22
Exit Option with Certificate with Additional 10 Credit Bridge Course Corresponding to Skill-based and Vocational Courses and Internship on DSC								
Level 5.0	3 (6 Credits)	1 (6 Credits)	1 (6 Credits)	1 (6 Credits)	1 (4 Credits)	1 (4 Credits)	NCC / NSS / Sports / Cultural (2 Credits)	6+6+4+4+2 =22 88 Diploma
		4 (6 Credits)	1 (6 Credits)	1 (6 Credits)	1 (4 Credits)	1 (4 Credits)	1 (2 Credits) Constitution of India	6+6+4+4+2 =22

Level	Sem.	Faculty	Any Faculty Subject -1	Skill Enhancement Course (SEC) / Vocational Course	Ability Enhancement Course (AEC)	Field Projects / Internship / Apprenticeship /Community Engagement and Services		Credits	Cumulative Credit
						Subject -2	Subject-3 Generic Elective Course		
						Major DSC	Minor DSE		
Exit Option with Diploma with Additional 10 Credit NSQF Course and Internship on DSC									
Level 5.5	5		1 (6 Credits)		1 (4 Credits)			1 Field Projects / Internship / Apprenticeship /Community Engagement and Services (6 Credits) Related to DSC	$6+6+4+6 = 22$
	6		1 (6 Credits)		1 (6 Credits) + 1 (4 Credits)			1 Field Projects / Internship / Apprenticeship / Community Engagement and Services (6 Credits) Related to DSC	$6+6+4+6 = 22$

Level	Sem.	Faculty		Any Faculty	Skill Enhancement Course (SEC) / Vocational Course	Ability Enhancement Course (AEC)	Field Projects / Internship / Apprenticeship / Community Engagement and Services	Cumulative Credit
		Subject -1	Subject -2					
		Major	Minor	DSE	Subject-3 Generic Elective Course			
Exit Option Three Year Bachelor of Science B.Sc. Additional 10 Credits Bridge Course Corresponding to Skill-based and Vocational Courses and Internship on DSC								
Level 6.0	7	1 (6 Credits)	1 (6 Credits)	1 Research Methodology (4 Credits)			Field Projects / Internship / Apprenticeship / Community Engagement and Services (6 Credits) Related to DSC	$6+6+4+6 = 22$
	8	1 (6 Credits)		1 (6 Credits)			1 Field Projects / Internship / Apprenticeship (10 Credits) Related to DSC	$6+6+10 = 22$
		48 Credits	22 Credits	34 Credits	16 Credits	12 Credits	28 Credits	132 Credits

Level	Sem.	Faculty	Any Faculty	Skill Enhancement Course (SEC) / Vocational Course	Ability Enhancement Course (AEC)	Field Projects / Internship / Apprenticeship /Community Engagement and Services		Credits	Cumulative Credit	
						Subject-3	Inter-intra Faculty			
7	Major	Subject -1	Subject -2	Generic Elective Course		1 Research Methodology (4 Credits)	1 Research Project / Dissertation (6 Credits) Related to Major Subject	6+6+4+6 =22	176 Four Year Bachelor Degree by Research in Main Faculty	
		DSC	DSE							
8	6.0	Subject -1	Subject -2	Subject-3		1 Research Methodology (4 Credits)	1 Research Project / Dissertation (10 Credits) Related to Major subject	6+6+10= 22	176 Credits	
		48 Credits		32 Credits	34 Credits	16 Credits	12 Credits	28 Credits	176 Credits	
				70 Credits						

Table 2.3: Proposed structure for Level 4.5-8 Multidisciplinary Programmes [4 Year UG with SSC as Major, 5 Year Integrated PG and Ph. D.]

Year (Level)	Sem.	Subject I	Subject II	Subject III	Subject IV	Vocational & Skills (VSC), Ethics & Value Ed. (EV), Life Skills (LS)	GE, AEC, Co-Curricular courses (CCC)	Internship / Regional Case Studies (RSC)/ Research Project		Cumulative Min. Credits Required for Award of Certificate/ Diploma/ Degree
								SSC	Min. Credits For the year (Sem)	
1 (4.5)	SSC-I	SSC-II	SSC-III	Minor Subject	2/3/4 Credits	3 Credits	AEC:2, GE:2 credits, CCC (Non-Credit Qualifying (NCQ))	2/4/6/12 Credits		
2 (5)	SSC-II	SSC-III	SSC-IV	Other Faculty	VSC, EV, LS		Inter/Intra Faculty related to SSC			
3 III	SSC-IV	SSC-V	SSC-VI	Humanities)			AEC: 2(2), CCC (NCQ)		44 (22+22)	Certificate in Faculty
4 IV	SSC-V	SSC-VI	SSC-VII				AEC: 1(2), GE: 1(2)			

Table 2.3 Continued

Year (Level)	Sem.	Subject I	Subject II	Subject III	Subject IV	Vocational & Skills (VSC), Ethics & Value Ed. (EV), Life Skills (LS)	GE, AEC, Co-Curricular courses (CCC)	Internship / Regional Case Studies (RSC) Research Project	Min. Credits Required for Award of Certificate/ Diploma/ Degree
		SSC-I	SSC-II	SSC-III	Minor Subject	2/3/4 Credits	3 Credits	AEC-2, GE-2 credits, CCC (Non-Credit Qualifying (NCQ))	24/6/12 Credits Inter/Intra Faculty related to SSC
		2/3/4 Credits	2/3/4 Credits	2/3/4 Credits	Other Faculty	VSC, EV, LS			
SSC& SSE: Interrelated subjects from Same Faculty (School concept: Botany, Zoology, Biochemistry under Science; Sociology, Political Science, Economics under Humanities)									
3 (5.5)	V	Th-2(4) or Th-[1(4)+1(2)] + Pr.-1(2)	Th-2(4) or Th-[1(4)+1(2)] + Pr.-1(2)	Th-1(4) or Th-1(3) + Pr.-1(1)	Th-1(4) or Th-1(3) + Pr.-1(1)	Th-2(4) or Th-[1(4)+1(2)] + Pr.-1(2)	VSC: 2(2)	Internship 1(4)	48 (24+24)
	VI	Th-1(4) or Th-1(3) + Pr.-1(1)	Th-1(4) or Th-1(3) + Pr.-1(1)	Th-1(4) or Th-1(3) + Pr.-1(1)	Th-1(4) or Th-1(3) + Pr.-1(1)			Internship 1(2), Research Project (4)	
4 (6)	VII	Th-4(3) or Th-2(4)+ Pr.-2(2)	Research Methodology 1(4)	Th-1(2) or Pr.-1(2)				Internship 1(2), Research Project (4)	
	VIII	Th-4(2) or Th-1(4)+ Pract-2(2)	Course Work 3 (4)	Th-1(2)				Research Project (12)	

Table 2.3 Continued

		Subject I	Subject II	Subject III	Subject IV	Vocational & Skills (VSC), Ethics & Value Ed. (EV), Life Skills (LS)	GE, AEC, Co-Curricular courses (CCC)	Internship / Regional Case Studies (RSC) Research Project	Cumulative Min. Credits Required for Award of Certificate/ Diploma/ Degree
		SSC-I	SSC-II	SSC-III	Minor Subject		SSC	Min. Credits For the year (Sem)	
2/3/4 Credits	2/3/4 Credits	2/3/4 Credits	2/3/4 Credits	2/3/4 Credits	3 Credits	AEC:2, GE:2 credits, CCC credits, (Non-Credit Qualifying (NCO))	2/4/6/12 Credits	Inter/Intra Faculty related to SSC	
Year (Level)	Sem.	SSC& SSE: Interrelated subjects from Same Faculty (School concept: Botany, Zoology, Biochemistry under Science; Sociology, Political Science, Economics under Humanities)		Other Faculty	VSC, EV, LS				
5 (7)	X	Th-4(4)+1(2) or Th-3(4) + Pr.-3(2) Th-4(4) or Th-3(4)+ Pr.-2(2)					Research Project (4) Research Project (6)	44 (22+22)	{230} Master in Faculty SSC1
Level 8	Course Work 3 (4)	Research Methodology' 1(4)	Education Course on Teaching Methodology 1(4)	Ph. D. Thesis	16 + Ph. D. Work	Ph. D. in Subject			

Chapter III

**Credit Structures and
Curriculum Development for
Professional Multidisciplinary Programmes
with NVEQF and AICTE / PCI / ACI / BCI /
NCT Guidelines**

Chapter III

Credit structures and Curriculum Development for Professional Multidisciplinary Programmes with NVEQF and AICTE / PCI / ACI / BCI / NCT Guidelines

The duration and specialisations have wide variations in the professional undergraduate (UG) and postgraduate (PG) education in engineering, medical, pharmacy, architecture, legal studies and Education. As per section 18.7 of NEP 2020, the professional councils, such as the All India Council for Technical Education (AICTE), National Council for Teacher Education (NCTE), Pharmacy Council of India (PCI), Council of Architecture (CoA), National Council for Vocational Education and Training (NCVET), Indian Council for Agricultural Research (ICAR), Veterinary Council of India (VCI), etc., will act as Professional Standard Setting Bodies (PSSBs). Members of the GEC will help in specifying the curriculum framework, within which HEIs may prepare their own curricula. Thus, PSSBs'will also set the standards or expectations in particular fields of learning and practice while having no regulatory role. All HEIs will decide how their educational programmes will respond to these standards, among other considerations, and will also be able to reach out for support from these standard-setting bodies or PSSBs, if needed.

3.1 Technical Education

Technical education includes degree and diploma programmes in, engineering, technology, management, architecture, town planning, pharmacy, hotel management, catering technology etc., which are critical to India's overall development. Considering the technological development, the world is witnessing, there will not only be a greater demand for well-qualified manpower in these sectors, it will also require closer collaborations between Industries and HEIs to drive innovation and research in these fields. Furthermore, influence of technology on human endeavors is expected to erode the silos between technical education and other disciplines too. Technical education will, thus, also be offered within multidisciplinary education institutions and programmes to have a renewed focus on opportunities to engage deeply with other disciplines. India must also take the lead in preparing professionals in cutting-edge areas that are fast gaining prominence, such as Artificial Intelligence (AI), 3-D Machining, Big Data Analysis, and Machine Learning, in addition to Genomic Studies, Biotechnology, Nanotechnology, Neuroscience, with important applications to health,

environment, and sustainable living that will be woven into undergraduate education to enhance the employability of the youth.

At present, the duration of the Bachelor's and Master's degree programmes in technical education are four and two years, respectively. The Prerequisite School Education and/or vocational education for Engineering and Technology education with multiple entry-exit options, as per NHEQF and recently floated guidelines, are given in Table 3.1 & Table 3.2

Table 3.1: Prerequisite School Education and/ or Vocational Education for Professional Courses

Levels	Qualification title	Remark
3.0	10 th Standard	
3.5	11 th Std. or certificate of vocation	The subject with max. marks secured + bridge course on skills
4.0	12 th Std. or ITC	ITC+ Bridge course on PCMB 12 th Std.+ bridge course on skills

Table 3.2: Multidisciplinary Engineering and Technology Education with multiple entry-exit options

Levels	Qualification title	Credit requirements (min.)	Years/Sem	Remark
4.5	UG Certificate (Engg)	40	1 year, 2 Sem	The subject with max. marks secured + bridge course on skills
5.0	UG Diploma (Engg)	80	2 years, 4 Sem	by mapping credits and courses equivalent to Diploma secured after 10+2
5.5	Bachelor of Vocation (B.Voc.) Degree	120	3 years, 6 Sem	By mapping credits and specialized skill training on particular domain
6.0	B. Tech. (Degree in Engg. & Tech)	160	4 years, 8 Sem	Bachelor's Degree with specialization
6.5	PG Certificate/ M. Voc.	200	5 years, 10 Sem	Certificate on Specialization given after undergoing additional courses in blended mode
7.0	PG Degree/ M. Tech.	240	6 years, 12 Sem	PG Degree with specialization

The details on Honors and Minor Degree Programs in Engineering and Technology are presented in section 5.3 of Chapter V.

At each entry, the HEIs need to identify the educational skill gaps with suitable bridge courses designed on the basis of gap analysis. To make the students more employable after each exit, the skill component with progressive enhancement in skills in respective disciplines may be added by concerned BoS in the curriculum right from the first year of the programme. Academic Council of state universities may take initiatives to offer Technical and Professional Courses in State Language-Marathi. Lateral entry for Diploma holders (in the relevant subject) will be provided in the 2nd year of four-year Engineering and Technology.

3.2 Vocational Education

As per section 16.1. of NEP 2020, the 12th Five-Year Plan (2012–2017) estimated that only a very small percentage of the Indian workforce in the age group of 19–24 (less than 5%) received formal vocational education whereas, in countries such as the USA the number is 52%, in Germany 75%, and in South Korea it is as high as 96%. These numbers only underline the urgency of the need to hasten the spread of vocational education in India, an issue that has been addressed initially by launching the National Vocational Education Qualification Framework (NVEQF) which was later on assimilated into the National Skills Qualifications Framework (NSQF). It is a competency-based framework that organizes qualifications according to the series of knowledge, skills and aptitude. Subsequently UGC decided to implement the scheme of Community Colleges as one of its independent schemes. Another scheme of B.Voc. Degree programme was also launched to expand the scope of vocational education and also to provide vertical mobility to the students admitted into Community Colleges from Diploma programmes to a degree programme in the Universities and Colleges. All these schemes are merged into a single scheme for providing skill based education under National Qualification Framework. This policy aims to overcome the social status hierarchy associated with vocational education and requires integration of vocational education programmes into mainstream education in all education institutions in a phased manner. As per section 16.5 of NEP 2020, by 2025, at least 50% of learners through the school and higher education system shall have exposure to vocational education, for which a clear action plan with targets and timelines will have to be developed by each HEI. This is in alignment with Sustainable Development Goal 4.4 and will help to realize the full potential of

India's demographic dividend. Vocational education will be integrated in the educational offerings of all secondary schools in a phased manner over the next decade. Towards this, secondary schools will also collaborate with ITIs, polytechnics, local industries etc. Credits earned through their academic programmes need to be deposited at ABC. Skill labs will also be set up and created in the schools in a hub and spoke model which will allow other schools to use the facility. HEIs can offer vocational education either on their own or in partnership with industries and NGOs. The B.Voc. degrees introduced in 2013 will continue to exist, but vocational courses will also made be available to students enrolled in all other Bachelor's degree programmes, including the 4-year multidisciplinary Bachelor 's programmes. HEIs will also be allowed to conduct short-term certificate courses in various skills including soft skills. 'Lok Vidya', i.e., important vocational knowledge developed in India, will be made accessible to students through integration into vocational education courses. The possibility of offering vocational courses through ODL mode, different models of vocational education, and apprenticeships will have to be explored by HEIs. State Universities in Maharashtra have already established Incubation centers and their partnership with industries need to be strengthened. Further, Indian standards will be aligned with the International Standard Classification of Occupations maintained by the International Labor Organization. This Framework will provide the basis for Recognition of Prior Learning (RPL), allowing transition from non-formal to organized job market. The credit-based Framework will also facilitate mobility across "general" and vocational education. Table 3.3, on next page gives durations, and entry level qualifications, while Table 3.4 presents the credits for the vocational programmes. Figure 3.1 shows the Pathways for horizontal and vertical mobility in NVEQF. Table3.5 gives duration, and entry level qualifications for Skill Development Training Programmes conducted through NVEQF and community colleges.

Table: 3.3: Duration and Entry Level Qualifications for Vocational Programmes

Skill Certification Level	Normal Qualification	Case I		Case II	
		Vocational Qualification	Certifying Body	Vocational Qualification	Certifying Body
1	Secondary School Grade IX	Grade IX (Vocational)	School	Grade IX (Vocational)	School
2	Secondary School Grade X	Grade X (Vocational)	School	Grade X (Vocational)	School
3	Higher Secondary School Grade XI	Diploma (Vocational)	Board of Technical Education	Grade XI (Vocational)	School
4	Higher Secondary School Grade XII			Grade XII (Vocational)	School
5	1 st yr bachelors	Advanced Diploma (Vocational)	Board of Technical Education	Degree (Vocational)	University
6	2 nd yr bachelors				
7	3 rd yr bachelors				

Table: 3.4: Suggested Credits for Vocational Programmes

Qualification	Equivalence		Skill certification Level	Competency based Vocational skill Building (in Hrs.) (approximate)	General learning (in Hrs.) (approximate)	Total Hrs.
IX std.			1	250	750	1000
X std.	X (Vocational)	X (Vocational)	2	250	750	1000
XI std.		XI (Vocational)	3	400	600	1000
XII std.	Diploma (Vocational)	XII (Vocational)	4	450	550	1000
Year I			5	550	450	1000
Year II	Advanced Diploma (Vocational)	Degree (Vocational)	6	600	400	1000
Year III			7	750	250	1000

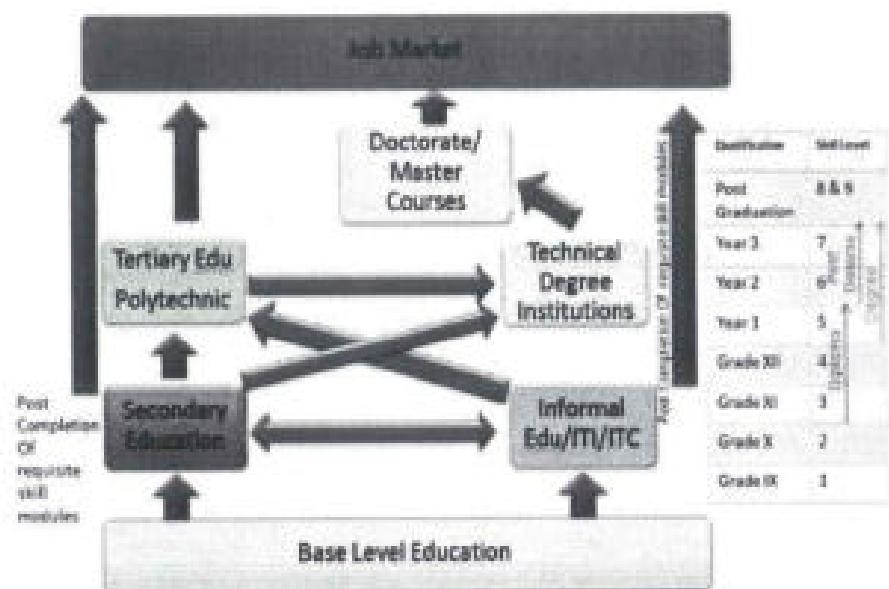


Table 3.5 Duration and entry level qualification for skill development training programme conducted through Community Colleges

NVEQF Certification Level	Community College Level	Competency Based Vocational Skill Building (in hrs)	General Education (in hrs)	Total (in hrs)	Who is eligible	What will be given (Certification) and who will provide
I	I	200	Communication Skills (250)	1000	Any	Polytechnics will conduct and Board will certify level I
II		300	Basic Sciences (250)			
III	II	400	Communication Skills (100)	1000	Above and any, provided the skills at I are certified	Polytechnics will conduct and Board will certify level II
IV		400	Basic Sciences (100)			
V	III	600	Computing skills (200) Any Foreign language or any other Indian language other than native: (200)	1000	Above and any, provided the skills at I, II are certified	Polytechnics will conduct and Board will certify level III
VI	IV	700	Basic accounting and Book Keeping skills (150) Entrepreneurial Skills, Setup small business etc. (150)	1000	Above and any, provided the skills at I, II, III are certified	Polytechnics will conduct and Board will certify level IV

NVEQF Certification Level	Community College Level	Competency Based Vocational Skill Building (in hrs)	General Education (in hrs)	Total (in hrs)	Who is eligible	What will be given (Certification) and who will provide
VII	V	800	Presentation, grooming and finishing skills (200)	1000	Above and any, provided the skills at I, II, III, IV are certified	Polytechnics will conduct and Board will award Community Skill Diploma

3.3 Teacher Education

As per section 15.1 of NEP 2020, Teacher education is vital in creating a pool of school teachers that will shape the next generation. Teacher preparation is an activity that requires multidisciplinary perspectives and knowledge, formation of dispositions and values, and development of practice under the best mentors. Teachers must be grounded in Indian values, languages, knowledge, ethos, and traditions including tribal traditions, while also being well-versed in the latest advances in education and pedagogy. As teacher education requires multidisciplinary inputs, and education in high-quality content as well as pedagogy, all teacher education programmes must be conducted within composite multidisciplinary institutions.

All multidisciplinary universities and colleges should establish education departments which, besides carrying out cutting-edge research in various aspects of education, will also run B.Ed. programmes, in collaboration with other departments such as psychology, philosophy, sociology, neuroscience, Indian languages, arts, music, history, literature, physical education, science and mathematics. The 4-year integrated B.Ed. offered by such multidisciplinary HEIs will, by 2030, become the minimal degree qualification for school teachers. The 4-year integrated B.Ed. will be a dual-major holistic Bachelor's degree, in Education as well as a specialized subject such as a language, history, music, mathematics, computer science, chemistry, economics, art, physical education, etc. Beyond the teaching of cutting-edge pedagogy, the teacher education will include grounding in sociology, history, science, psychology, early childhood care and education, foundational literacy and numeracy, knowledge of India and its values/ethos/art/traditions, and more. The HEI offering the 4-year integrated B.Ed. may also run a 2-year B.Ed., for students who have already received a Bachelor's degree in a

specialized subject. A 1-year B.Ed. may also be offered for candidates who have received a 4-year undergraduate degree in a specialized subject. HEIs offering teacher education programmes will ensure the availability of a range of experts in education and related disciplines as well as specialized subjects. Each higher education institution will have a network of government and private schools to work closely with, where potential teachers will teach students along with participating in other activities such as community service, adult and vocational education, etc.

Faculty with training in areas of social sciences that are directly relevant to school education e.g., psychology, child development, linguistics, sociology, philosophy, economics, and political science as well as from science education, mathematics education, social science education, and language education programmes will have to be attracted and retained in teacher education institutions, to strengthen multidisciplinary education of teachers and provide rigor in conceptual development.

In-service continuous professional development for college and university teachers will continue through the existing institutional arrangements and ongoing initiatives. These will be strengthened and substantially expanded to meet the needs of enriched teaching-learning processes for quality education. The use of technology platforms such as SWAYAM/DIKSHA for online training of teachers will be encouraged, so that standardized training programmes can be administered to large numbers of teachers within a short span of time.

3.4 Law Education

As per section 20.4. of NEP 2020, legal education needs to be competitive globally, adopting best practices and embracing new technologies for wider access to and timely delivery of justice. At the same time, it must be informed and illuminated with Constitutional values of Justice - Social, Economic, and Political - and directed towards national reconstruction through instrumentation of democracy, rule of law, and human rights. The curricula for legal studies must reflect socio-cultural contexts along with, in an evidence-based manner, the history of legal thinking, principles of justice, the practice of jurisprudence, and other related content appropriately and adequately. State institutions offering law education must consider offering bilingual education for future lawyers and judges - in English and in the language of the State in which the institution is situated.

Chapter IV

**Examination and Assessment Process
and Multiple exit path for
Four Year Multidisciplinary Degree and
Five Year Integrated PG Programme
in line with NEP-2020**

Chapter IV

Examination and Assessment Process and Multiple exit path for Four Year Multidisciplinary Degree and Five Year Integrated PG Programme in line with NEP-2020

As per NHEQF, Qualifications are formal ‘awards’ such as a certificate, diploma or a degree, awarded by a competent authority such as a college or a university in recognition of the attainment by students of the expected learning outcomes on the successful completion of a particular programme of study. Qualifications in the traditional sense implies that someone has successfully completed a prescribed programme of study or training programme offered by an educational institution.

4.1 Exit Path for Multidisciplinary four year Degree and five year PG Degree Programme:

a) 1st Year Exit 1 of Level 4.5:

A certificate will be awarded when a student exits at the end of year 1 (Level 4.5). The first year of the undergraduate programme builds on the secondary education and requires a min. of 40 credits during the first year of the undergraduate programme for qualifying for an undergraduate certificate. An exit 10- credit bridge course(s)lasting two months, including at least 6- credit job-specific internship/apprenticeship that would help the graduates acquire job-ready competencies required to enter the workforce would be an additional requirement for award of the undergraduate certificate.

b) 2nd Year Exit 2, Level 5.0:

At the end of the 2nd year, if a student exits, a diploma shall be awarded (Level 5). A diploma requires min. of 80 credits from levels 4.5 to 5.0, with a min. of 40 credits at level 5.0, followed by an exit 10- credit NSQF compliant skill-based course(s) lasting two months, including at least 6-credit job-specific internship/apprenticeship that would help the graduates acquire job-ready competencies required to enter the workforce.

c) **3rd Year Exit 3, Level 5.5:**

On successful completion of three years, a relevant degree shall be awarded (Level 5.5). A Bachelor's degree requires min. of 120 credits from levels 4.5 to 5.5, with a min. of 40 credits at level 4.5, a min. of 40 credits at level 5, and a min. of 40 credits at level 5.5, followed by an exit 10-credit bridge course(s) lasting two months, including at least 6-credit job-specific internship/apprenticeship that would help the graduates acquire job-ready competencies required to enter the workforce.

d) **4th Year Exit 4, Level 6:** On the successful completion of the fourth year, a student shall be awarded a degree (Honours/Research). A Bachelor's degree (Honours/Research) requires a minimum total of 160 credits from levels 5 to 8, with a min. of 40 credits at level 5, a min. of 40 credits at level 6, and a min. of 40 credits at level 7, and a min. of 40 credits at level 8. Bachelor's degree 'with research' would be awarded if the student completes a rigorous research project in her/his major area(s) of study in line with requirements specified under 2.3 of Chapter 2.

Thus, exit options are provided with certification, diploma and basic Bachelor's degrees to the students at the end of the second, fourth and sixth semester of a four year multidisciplinary degree programme. Students will receive a Bachelor's degree with Honors/ Research on successfully completing all eight semesters of the UG Program either at a stretch or with opted exits and re-entries.

A student will be allowed to exit only after the even semester and enter in odd semester.

An exit 10- credit skill-based bridge course(s) lasting two months are prescribed at different levels of exit to acquire job-ready competencies required to enter the work force. Table 4.1 presents the examples of skill -based bridge courses that can be suggested by HEI for multiple exits at different levels for a four year multidisciplinary B. Com. Degree.

Table 4.1: Examples of Skill -based bridge courses to be pursued for Exit at different levels for a four year multidisciplinary B.Com. Degree

1. Foundation Course on Share Market	38 Data Science and Machine Learning using Python
2. English Communication Skills	39 Ethical Hacking & Cyber Security (Foundation Program)
3. Personality Grooming	40 Fashion Design, Merchandising & Entrepreneurship
4. Foreign Language (German)	41 Photography for Fashion & E-commerce
5. Cyber Security	42 Event Management, Marketing & Public Relations
6. Management of E-Commerce Store	43 Fashion Modeling & Beauty Pageant Grooming/ Fashion Styling
7. Supply Chain Management	44 Interior Design & Architecture Planning
8. Blockchain Management	45 Filmmaking, Direction & Screenplay
9. Salon and Spa Management	46 Mass Communication & Digital Media Productions
10. Sports Commentary	47 Fine Arts and Digital Arts
11. Intellectual Property Rights	48 Photography (Still & Video)
12. ERP Management	49 Acting For Films, TV& Theatre
13. Franchise Management	50 Radio Jockeying, Anchoring, TV Journalism
14. Brand Building/Management	51 Animation, Motion Graphics & Video Editing
15. Direct Marketing	52 3d Animation & Video Editing
16. International Business Environment	53 Digital Marketing & Social Media Advertising
17. Information Technology in Business	54 Graphic Designing, DTP& Video Editing
18. Business Analytics	55 Insurance Marketing and Client Management
19. Financial Modelling	56 Life Insurance – Underwriting and claims
20. Corporate Governance	57 Business Analytics
21. Financial Management	58 Financial Modeling
22. Fundamentals of Quality Management	59 Tax Planning
23. Entrepreneurship Management	60 Green and Rural Marketing
24. Tax Planning	61 Logistic and supply Chain Management
25. Green and Rural Marketing	
26. E Business and Cyber Laws	
27. International Human Resource Management	
28. Financial Planning	
29. GST	
30 Advanced Excel and Tally	
31 Social Marketing	
32 Spanish / German/ French Language	
33 Data Analytics Web Designing and Animation	
34 Travel and Tourism	
35 Airfare and Ticketing	
36 Office Automation & E-Accounting	
37 Secretarial Practices and Administration	

e) **Learning Outcomes for Multidisciplinary four year UG Degree**

The NEP 2020 has proposed a renewed Graduate Student outcome and here the student is expected to be a well-rounded, self-driven knowledge seeking, innovative and creative researcher. A National Qualifications Framework (NQF) is an instrument for the classification of qualifications according to a set of criteria for specified levels of learning achieved, which would integrate and coordinate the qualifications from each education and training sector into a single comprehensive qualification framework. Qualifications such as Certificate, Diploma, Degree are awarded after an assessment and evaluation of learning levels that determine the achievement by students of the expected learning outcomes to the given standards. Qualifications can also signify the competence to follow an occupational practice. The pedagogy in a four year degree programme also has an increased emphasis on communication, discussion, debate, research, and opportunities for cross-disciplinary and interdisciplinary thinking. The Learning Outcomes for Multidisciplinary four year UG Degree, as per NHEQF, would be as follows

- i) have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study;
- ii) can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated by devising and sustaining arguments and solving problems within their field of study.
- iii) have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues.
- iv) can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
- v) have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.

f) Master's Programme Exit path: Exit 5, level 7and Learning Outcomes for PG Degree

For postgraduate programmes, there shall only be one exit point for those who join the two-year Master's programme, that is, at the end of the first year of the Master's programme. Students who exit after the first year shall be awarded the Post-Graduate Diploma (Level 6.5).

For Five-Years Integrated Master's Degree programme, students can have exit options at the end of the first year with award of Certificate, at the end of the second year with award of Diploma, at the end of the third year programme with award of Bachelor's degree and at the end of the fourth year with award of Bachelor's Honors/Research degree.

The Learning Outcomes for PG Degree as per NHEQF, would be as follows

- 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, and that includes 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.

4.2 Examination Approaches and Assessment of Learning Levels and Outcome

In India, the higher education has so far has been largely examination oriented. Examinations play a pivotal role and determine the degree of knowledge possessed. They are the deciding factors of career choice of students as well as the ability to pursue

the right higher qualifications. The conventional examination pattern that currently exists in a university structured test is memory learning with more focus on remembering and reproducing. The term-end examination is usually based on the question paper which tests only memory recall as a skill. This system, more often than not, insulates students from the quest of knowledge, excitement of discovery and joy of learning. On the other hand, demands from professions require students not just to possess information but an ability to apply to every situation either routine or complex. NEP expects evaluation and assessment of the students through execution of innovative trends in formative as well as summative examination modes for smooth success of four-year multidisciplinary degree programme with multiple entry and exit system. Thus, the third dimension of higher education must get due recognition in main stream education. The methods of assessment also have to be multipronged.

Thus, the parameters of examination, evaluation and assessment need review and reorientation so as to create the next generation knowledge workers. Of foremost concern is to ensure that the students are equipped with 21st century skills for the new age enterprises and to play lead roles in sophisticated ways of conduct of business. A whole new format of assessment tools using digital platforms need to be utilized to build the requisite skills that is required of a growing economy.

The UGC Report on 'Evaluation Reforms in Higher Educational Institutions' (2019) emphasizes the fact that to accomplish meaningful learning, the examination and evaluation should be linked to 'Learning Outcomes' and 'Institutional goals'. The essence of the report is that the assessment process should test the learning outcomes, knowledge gained, attitudes developed and skills mastered by a student during an academic programme. A Program Learning Outcome may lead to one or many different competencies and each competency may have one or more measurable components called Indicators/ Performance Indicators. The curriculum must be linked to the program objectives and outcomes and further the course level assessment strategies must be linked to identified program level assessment strategies. Examination and Evaluation types include-

- i) Summative (evaluation of students learning at the end of an instructional unit) and
- ii) Formative (informal and formal tests administered during the learning process).

These types of assessments are related to direct measurement of learning which is based on a sample of actual student work and it includes reports, exams, demonstrations, performances, and completed works. Thus, direct measurement of learning requires

students to produce WORK so that the teacher can assess how well the students' meet the expectations. Assessments must be continuous to include both formative (weekly class and home assignment, case studies, weekly/ interim quiz tests) and summative (class tests, Open Book Exams, Quarterly/ Mid-term Exam, semester end Exam) examination components in a timely fashion for continuous feedback.

a) **Summative Examination and Evaluation Strategies**

- i. **Class Tests:** These should be conducted 2-3 times in a semester including make-up test and must be designed to test all levels of cognitive domain. Marking Criteria be made known to the students. Teacher should discuss answers in the class.
- ii. **Open book Examination:** In real functioning beyond formal education, life is all about open book examination. In order to prepare students for real situations in actual work life, students must be prepared for open book examinations. In this examination, students are allowed to get books of their choice for reference. The questions need to be based not simply on retrieval of information but they ought to be creative. The exam measures what students can do with the available resources and not just what they can remember. One of the class tests or some class assignments (say 30%) could be of this type. It will also facilitate better understanding and application of the knowledge with a better potential for its positive impact.
- iii. **Spoken / Oral Examinations:** These types of examinations can be introduced with the support of new generation of technologies. They can make examinations faster and easier and be helpful to students with different abilities.
- iv. **Group Tasks- Group Discussion/ Fishbowl Technique / Role Play / Authentic Problem Solving:** It comprises small groups of 2 to 5 members who work on a task jointly. It encourages team work (collaboration and co-operation) and provides an opportunity for authentic skill development. Groups formed must be roughly equal in size, problems assigned should be similar and of same difficulty level and each team member must have a specific role. Rubrics for marking must be mutually decided and should include all domains of education. Such an approach is followed some times for projects and also for laboratory assessments. But it is generally not

- followed for theory type examinations. However, the group examinations, for theory papers, can improve the average performance of a class as students would be encouraged to share their knowledge with each other and it would also help them to improve their general understanding.
- v. **Semester End Examination:** It is traditional and requires essay type answers and it also has time- constrains. It tests memory most of the time more than higher level thinking. But the semester end question paper must be designed to test all levels of cognitive domain and should include all types of questions-essay, short answer, quantitative problems, objective type etc. Model Answers should be prepared for guidance in assessment of essay type answers so that subjectivity in evaluation is minimized. Marking Criteria should be made known to students.

b) **Formative Evaluation Strategies**

- i) **Portfolios:** This method monitors the growth and learning of students. It can contain many different forms of assessments as it is a collection of student's work. These methods are followed usually in practical courses to display an overview of the sectional work or some creative endeavor. It can contain evidence of a wide range of skills and attributes and can be very effective in combination with a quick viva exam.
- ii) **ePortfolio**, a comprehensive assessment tool, showcases the students learning progression. It is not only a compilation of a few best assignments and the activities of a learner throughout the programme, but it is also his/her reflections about the assignments, experiences and challenges faced during the process of working on these assignments, overall approach, attitude, philosophy towards life as a learner and also his/her academic resume. ePortfolio is which becomes a mirror to the learner for the world.
- iii) **Classroom/Online Quizzes/ Objective Tests / Recognition Type (such as MCQs; True or False; Matching; Classifying) /Recall Type -Filling Blanks; One word / Phrase Answers:**
These are short duration structured Tests and can be used to test interpretation and decision skills. Teachers need to be trained in construction of such Tests. It also needs careful planning to ensure that the answer choices are clear. Paper-pencil tests and over-use of question-answers may be discouraged for

formative assessments. They may be conducted at a frequency of four per semester including one for Makeup and one for Surprise Quiz. A few ICT tools for quizzes and games can be used for formative assessment.

iv) Assessment Rubries:

A rubric for assessment, also called a scoring guide, is a tool used to interpret and grade students' on any kind of work against criteria and standards. An assessment rubric provides the means to increase objectivity in assessment and reduce subjectivity. It also presents a clear expectation on the assessments, and relates it to learning outcomes and ensures consistency, transparency, efficiency and fairness in the evaluation process across course instructors for uniform assessment with same scores assigned to answers having same/similar values for a large group of students. It defines clear guidelines for moderation and provides more objective data for analytics. Usually in the form of a grid, a grading/ marking/ scoring rubric combines the elements of performance, criteria and descriptors to create an assessment tool for the course instructor. The assessment criteria defines the characteristics or traits, to be judged, which should be derived from the course learning outcomes and indicate what is expected to be demonstrated. Level of performance is the rating or measure on the degree of achievement on a particular criterion as specified by the rubric, i.e., excellent/good/satisfactory/poor etc. Descriptors identify the qualities required to demonstrate the achievement of each level of performance for each criterion. Listed in the form of short explanations, they provide guidance on the actual judgement on the assessment to match students' performance.

v) Other Approaches

An indirect method of examination and evaluation is based upon a report of perceived student learning which include surveys, exit interviews, and focus groups. In addition, the assessment components may include exercises for soft skill development and reading-analyzing-interpretation-presentation ability enhancement (self-study, article/book Review, seminars, paper/poster presentations, group discussions, viva/ oral exam), work-based training (craft work, field work/ assignments, internship, projects) and solving techniques (tutorials).

The assessment tools (internal and external) for each course must be mapped to the revised Bloom's taxonomy action verbs (refer <http://thesecondprinciple.com/teaching-essentials/beyond-bloom-cognitive-taxonomy-revised/>) to help measure student performance. Appendix 2 under 2.5 of the UGC Report on 'Evaluation Reforms in Higher Educational Institutions' provides the detailed process of determination of attainment of Program Education Objectives while Appendix-3 provides the critical overview of Assessment Types along with learner attributes.

4.3 Evaluation and Assessment under multidisciplinary four year degree program

Assessment is an integral part of the teaching learning process. A multidisciplinary program requires a multidimensional assessment to measure the effectiveness of the diverse courses. The assessment process acts as an indicator to both faculty and students to improve continuously. Evaluation and Assessment should be a combination of continuous formative evaluation and an end-point summative evaluation. A range of tools and processes for evaluation and assessment, as illustrated in previous section, should be used (e.g., open book tests, portfolios, case study/assignments, seminars/presentations, field work, projects, dissertations, peer and self-assessment) in addition to the standard examination modes. Paper-pencil tests should be designed rigorously using a range of tools and processes (e.g., constructed response, open ended items, multiple-choice with more than one correct answer). Faculty may provide options for a student to improve his / her performance in the continuous assessment mode. It is possible to administer many or one type of assessment at regular intervals or choose the best out of the many. This will encourage a student to improve on skills and performance.

Artificial Intelligence (AI) tools can be used for Proctoring as well as many more assessments like, attention levels, speed of learning, level of learning etc. Hence new tools should be experimented with for examinations and assessments.

Based on the types of assessment and triangulation of assessments, University/Autonomous College BoS, BOEE, and AC can work out various models of Assessment for theory courses, practical courses, vocational/ skill-based courses, internship, regional case studies, cocurricular courses, and research project/dissertations with due focus on continuous assessments, mixing types, so that ongoing feedback is obtained for both the teacher and the student. The following paragraph provides the mechanism of evaluation

and assessment used for courses on Life Skills, Vocational courses, MOOCs, and Field Projects.

a. **Assessment of Life Skills**

The Life Skill course requires active participation of the students and the faculty as Facilitator, Mentor and Trainer. For this purpose, various activities are required to be incorporated into the courses - oral presentations, impromptu speaking, quiz, debates, case studies, creative thinking, team building exercises, field visits, projects, psychometric analysis etc. These are required to be assessed using innovative techniques.

b. **Assessment of Skill component of the vocational courses**

The Skill component of the vocational courses will be generally assessed by the respective Sector Skill Councils (SSC). In case, there is no SSC for a specific trade, the assessment may be done by an allied Sector Council or the Industry partner or a recognized Skill University. Further, if the SSC in the concerned/relevant trade has no approved Qualification Pack/set of competencies, which can be mapped progressively or due to any other reason the SSC expresses its inability to conduct the assessment or cannot conduct the skill assessment in stipulated time frames as per an academic calendar, the institutions may conduct the skill assessment through a Skill Assessment Board by "Certified Assessors" as per the provisions enumerated in MoE Skill Assessment Matrix for Vocational Advancement of Youth (SAMVAY). The Skill Assessment Board may have a Vice-Chancellor / Principal / Director / Nodal Officer / Coordinator of the programme/center, representatives of the partner industry(s), one nominee of the Controller of Examination or his/her nominee of the university/autonomous college and at least one external expert.

c. **Evaluation and certification of credit-based MOOCs on SWAYAM platform**

As per UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulations, 2021,

- i. The HEI and the course-coordinator shall be responsible for evaluating the student registered for the credit-based MOOCs offered on SWAYAM platform.
- ii. The final evaluation of a course shall be based on internal assessment and semester end examination and the internal assessment (with a maximum of

- 30% marks) based on instruments such as discussion forums, quizzes, assignments, sessional examinations and the complete evaluation scheme of a course shall be announced at the time of launch of the course.
- iii. Online semester end examination shall be the preferred mode provided that the course-coordinator shall be authorized to decide on the mode of conducting the final examination, either through online mode or pen and paper mode and this shall be announced in the overview of the course at the time of offering of the course.
 - iv. The term end proctored examination for all the SWAYAM based credit courses shall be conducted either by the SWAYAM Board or by any other agency authorized by the GoI in the MoE, across the country.
 - v. After conduct of the examination and completion of evaluation, the course-coordinator, through the HEI, shall award marks or grades, as per the evaluation scheme announced.
 - vi. A certificate regarding successful completion of the SWAYAM based credit course shall be signed by the National Coordinator and authorized signatory of the HEI and shall be made available on SWAYAM platform within four weeks from the date of declaration of the semester end examination result.
 - vii. The HEI shall incorporate the marks or grades obtained by the student in the marks sheet that counts for final award of the certificate or diploma or degree by the university.
- d. **Evaluation of Field Projects**

The field-based learning/project attempts to provide opportunities for students to understand the different socio-economic contexts and observe situation in rural and urban contexts. Hence the mode of assessment of progress of Field Projects would be different and will follow steps as illustrated in Table 4.2.

Table: 4.2 Evaluation of a Regional Case Study Course or Field Projects

Module	Unit	% Distribution of Credit
1	Basic structure of society, key definitions of problem area, analysis of preliminary data	30
2	Classroom-work - correspondence, formats, interactions, liaising	10
3	Field-work and data gathering	30
4	Analysis and Reporting	20
5	Feedback to Community	10

For effective assessment of the various courses under four year degree program, the student assessment should be as comprehensive as possible and provide meaningful and constructive feedback to faculty and student on the teaching-learning process. Assessment tasks need to evaluate the capacity to analyze and synthesize new information and concepts rather than simply recall information previously presented. The process of assessment should be carried on in a manner that encourages better student participation and rigorous study.

e) **Continuous Assessment Tests (CAT) and End Semester Examinations**

Total marks for each course shall be based on continuous assessments and semester end examinations. It is necessary to have uniform pattern of 40 : 60 for Continuous Assessment Tests (CAT) and Semester End theory examinations respectively and 50 : 50 for CAT and Semester End practical examinations respectively, in all the Universities, their Affiliated and Autonomous Colleges across Maharashtra State.

Three CAT, each of 20% marks, would be conducted at different phases (25%, 50% and 75% of completion of syllabus or 25, 50, and 75 working days out of 90 working days of Semester) throughout the Semester. Each concurrent assessment (CAT- I, II, III) will be mapped to relevant course learning outcomes. Total Performance in CAT (i.e., 40%) would be based on best two out of three CAT examinations.

Course Teacher will have the liberty to choose from a variety of assessment tools/ methods (class test, assignment, Record book, Tutorials, Seminar, Case study, Field work, Project work, Quiz) which may be deemed to be appropriate for assessing the relevant course outcome.

The question paper for Semester End Examination must be designed to test all levels of cognitive domain and should include all types of questions- essay, short answer, quantitative problems, objective type etc. Model Answers for marking essay type questions should be prepared for minimizing subjectivity in evaluation. Marking Criteria should be made known to the students.

Repeat End Semester Examinations within 15 days/one month of regular even semester examinations and On demand examinations: With advent of new methods which are technology based and also blending of teaching-learning and examinations in new form, it would be a good approach and practice to offer

Repeat End Semester Examinations within 15 days/one month of regular even semester examinations and Examination on demand to offer more flexibility and student centricity.

4.4 Determination of CGPA, and grading and declaration of results

a) Computation of SGPA and CGPA

The UGC (UGC Draft on Curricular Framework and Credit System for the Four-Year Undergraduate Programme, 2022) 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 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:

$$\text{SGPA } (S_i) = [\sum (C_i \times G_i)] / (\sum C_i) \text{ where } C_i \text{ is the number of credits of the } i^{\text{th}} \text{ course and } G_i \text{ is the grade point scored by the student in the } i^{\text{th}} \text{ course.}$$

- ii. The 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.

$$\text{CGPA} = [\sum (C_i \times S_i) / (\sum C_i)] \text{ where } S_i \text{ is the SGPA of the } i^{\text{th}} \text{ semester and } C_i \text{ is the total number of credits in that semester.}$$

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

b) Grading and Declaration of results

Currently the title/nomenclature and programme duration of Bachelor's and PG degree are as follows:

- Bachelor of Arts (B.A.), Bachelor of Science (B.Sc.), Bachelor of Commerce (B.Com.), Bachelor of Vocation (B. Voc.), Bachelor of Business Administration (BBA). Programme duration: Three years (six semesters).
- Bachelor of Education (B.Ed): Programme duration: Two years (four semesters) after completing a Bachelor's degree programme)
- Bachelor of Education (B.Ed.). Programme duration: One year (two semesters) after completing a Bachelor's degree (Honours/Research) or Master's degree.
- Integrated Teacher Education Programme (ITEP): Programme duration: Four years (eight semesters).

- Bachelor of Engineering (B.E), Bachelor of Technology (B.Tech.). Programme duration: Four years (eight semesters).
- Bachelor of Architecture (B.Arch.); Five years (ten semesters).
- Bachelor of Pharmacy (B.Pharm.); Four years (8 semesters).

The declaration of result is based on the Semester Grade Point Average (SGPA) earned towards the end of each semester or the Cumulative Grade Point Average (CGPA) earned at the completion of all the eight semesters of the programme and the corresponding overall alpha-sign or letter grades as given under NHEQF. If some candidates exit at the completion of first, second or third year of the four years Undergraduate Programmes, with Certificate, Diploma or the Basic Degree, respectively, then the results of successful candidates at the end of second, fourth or sixth semesters shall also be classified on the basis of the CGPA obtained in the two, four, six or eight semesters, respectively for award of

- Certificate in Arts/ Science/ Commerce
- Diploma in Arts/ Science/ Commerce
- Bachelor's Degree in Arts/ Science/ Commerce
- Bachelor's Degree with Honors in DSC/SSC/FSC.
- Bachelor's Degree with Research in DSC/SSC/FSC

In addition to what is stated above, successful candidates at the end of tenth semester of the integrated Master's Degree Programmes, shall also be classified on the basis of CGPA obtained in the ten semesters of the Programmes. Likewise, the successful candidates of one year or two semesters Master's Degree Programme are also classified on the basis of CGPA of two semesters of the Master's Degree Programme.

Table 4.3: Letter Grades and Grade Points

Semester GPA/ Program CGPA Semester/Program	% of Marks	Alpha-Sign / Letter Grade Result
9.00-10.00	90.0-100	O (Outstanding)
8.00-<9.00	80.0-<90.0	A+ (Excellent)
7.00-<8.00	70.0-<80.0	A (Very Good)
6.00-<7.00	60.0-<70	B+ (Good)
5.50-<6.00	55.0-<60.0	B (Above Average)
5.00-<5.50	50.0-<55.0	C (Average)
4.00-<5.00	40.0-<50.0	P (Pass)
Below 4.00	Below 40	F (Fail)
Ab (Absent)	-	Absent

4.5 Credit Transfer Mechanism-Academic Bank of Credits (ABC)

Credit transfer is the key to successful interdisciplinary/multidisciplinary academic mobility of students across the HEIs in the country. In order to pave the way for seamless student mobility between or within registered degree-granting HEIs through multiple entry and exit options at the multidisciplinary four year UG and Master's levels, the Academic Bank of Credits (ABC), the virtual storehouse drafted on the lines of the National Academic Depository (NAD), will work as academic service mechanism through a formal system of credit recognition, credit accumulation, credit transfers, and credit redemption to promote distributed and flexible teaching-learning. The UGC Regulations on ABC has elaborated these terms as given below:

"Credit accumulation" means the facility created by ABC in the 'Academic Bank Account' opened by students across the country in order to transfer and consolidate the 'credits' earned by them by fully or partially completing "courses" in any of the eligible and registered HEIs.

"Credits recognition" would mean the credits earned through eligible/partnering HEIs and transferred directly to the ABC by the concerned HEI.

"Credit redemption" means the process of commuting the accrued 'credits' in the 'Academic Bank Account' of the students maintained in ABC for the purpose of fulfilling the 'credits requirements' for the award of Certificates / Diplomas/ Degrees etc., by the degree-awarding HEIs.

"Credit-transfer" means the mechanism by which the eligible HEIs registered (RHEI) with ABC are able to receive or provide prescribed 'credits' to individual registered ABC account in adherence to the UGC credit norms for the 'course/s' registered by the desirous students in any eligible HEI within India.

HEIs offering programmes with the multiple entry and exit system need to register in the ABC to enable acceptance of multidisciplinary courses, credit transfer, and credit acceptance. ABC will facilitate students to become its academic account holders across the country to transfer and consolidate the credits earned by them by fully or partially completing courses in any of the eligible HEIs. Courses undergone by the students through the online modes are also accepted. Credits from skill courses can be earned from RHEI offering vocational courses. The ABC shall maintain a dynamic online directory of RHEIs which satisfy the eligibility criteria stipulated under regulation. With the approval of its statutory authorities, a RHEI shall be encouraged by ABC to allocate

the structure of courses offered by it as core courses or core electives or open electives or skill enhancement electives or ability enhancement electives etc. with appropriate credit requirements, in order to promote multi-disciplinary or interdisciplinary higher education. Credits earned and deposited with ABC shall be valid to a maximum duration of seven years. Credits earned and deposited with ABC shall be valid for the purpose of redemption for fulfilling the credits requirements for the award of certificate/diploma/degree/PG Diploma/ PG Degree by the authorized HEIs for varying duration as specified by the credit awarding and credit accepting HEI subject to a maximum duration of seven years. Upon collecting a certificate, diploma or degree, all the credits earned till then, in respect of that certificate, diploma or degree, shall stand debited and deleted from the account concerned.

The State Universities in Maharashtra are uploading the data of all students who are graduating from their institutes in Digi locker facility which allows the storage of soft copies of relevant documents. The facility is equipped with security features and can be accessed by stake holders, especially by students, 24 x 7. Digi lockers can be personalized and protected with a password.

Chapter V

Multidisciplinary Dual, Joint and Twinning Degree Programme and Internationalization of Higher Education

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NEP 2020 emphasizes the need to facilitate multiple pathways to learning involving both formal and non-formal education modes. NEP 2020 also underlines the need of offering the students, a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects to make them thoughtful, well-rounded, and creative individuals. It also stresses the need of enabling an individual to study one or more specialized areas of interest at a deep level. With the rapid increase in demand for higher education and limited availability of seats in regular stream, several Higher Education Institutions (HEIs) have started a number of programmes in Open and Distance Learning (ODL) mode to meet the aspirations of students. Thus, implementation of Multidisciplinary Dual/ Joint/ Twinning Degree Programme at Maharashtra State HEIs, in both formal and non-formal education modes, assumes major significance.

5.1 Multidisciplinary Dual Degree Programme

UGC has recently asked all HEIs to make appropriate changes to enable students to pursue two degrees simultaneously and issued guidelines for students desirous of pursuing two academic programmes simultaneously:

1. A student can pursue two full time academic programmes in physical mode provided that in such cases, class timings for one programme does not overlap with the class timings of the other programme.
2. A student can pursue 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.
3. 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.
4. Degree or diploma programmes under these guidelines shall be governed by the Regulations notified by the UGC and also the respective statutory/professional councils, wherever applicable.

These guidelines shall be applicable only to the students pursuing academic programmes other than Ph.D. programme. Based on the above guidelines, the state universities in

Maharashtra can devise mechanisms, through their BoS, BoD and Academic Council, to allow their students to pursue two academic programmes simultaneously.

Students enrolled in one University/ College can take up the first degree at the host institution and the second degree at the partnering institution leading to dual degree. Pursuing two degrees simultaneously will improve students' employability potential, problem solving ability, and appreciation of different perspectives. For example, a student of M. Sc. (Maths) may additionally do a B.Sc. (Life Sciences/ Biological Sciences) for a career in the specialization of Computation Biology. Thus, the choice of second degree should be made depending on what the student wants to do in future. To encourage Dual Degree Programme across Multidisciplinary domain, HEIs need to make appropriate changes with respect to admission policy and academic rules and regulations. The students should also need to understand the policies of each HEI before making the decisions about pursuing dual degree programme. The collaborating HEIs shall ensure that the credits earned by the students shall not be from the overlapping course contents/curriculum, and the student shall submit to only one examination and evaluation process for each of the courses by the institutions in which he/she has registered for that course. The collaborating HEIs shall make provisions for exit pathways for students who are unable to complete the Dual Degree programme with clear specification with respect to future acceptance of credits earned by the students.

5.2 Multidisciplinary Joint Degree and Twinning Degree Programme

Joint Degree Programme curriculum shall be designed jointly by the collaborating Higher Educational Institutions. Students enrolled in one University/ College can pursue some semesters at the host institution and remaining semesters at the partnering institution leading to a joint degree. A student can thus pursue part of the academic programme in the host Institution and remaining part of the other programme in the partnering institution with due credit transfer mechanism. Credits earned for the course(s) in an institution shall count towards the degrees jointly awarded by both the institutions. On completion of the programme, the degree shall be awarded by both the participating educational institutions with a single certificate.

The Twinning Programme shall be collaboratively designed by two HEIs. Under a Twinning arrangement, students are enrolled with a State Public Universities in Maharashtra but they complete part of their programme at a partnering institution/University in India complying with relevant UGC regulations. The credit

transfer mechanism under twinning arrangement will have to be worked by the collaborating HEIs through entering into MoUs. However, the degree under Twinning arrangement shall be given solely by the host HEI (e.g. State Public Universities in Maharashtra). The partnering HEIs shall ensure that the credits earned by the students shall not be from the overlapping course contents/curriculum.

5.3 Honors and Minor Degree Programs in Engineering and Technology

Honors and Minor Degree Programs in Engineering and Technology are already ongoing at IITs. Besides regular B. Tech. wherein students specialize in single stream, B. Tech. with Honors, which enables students to take up five-six extra courses in the same specialization and B. Tech with Minors, where students would take up five-six additional courses in another specialization offered. On similar lines and with a view to enhance the employability skills and impart in depth knowledge in emerging areas which are usually not being covered in UG Engineering and Technology Degree credit framework, AICTE has come up with the concept of 'Minor Degree' in emerging areas and 'Honors Degree' as presented in their Approval Process Handbook (APH) for the academic session 2020-21. Minor Degree will carry 18 to 20 credits in addition to the credits essential for obtaining the UG Engineering Degree in Major Discipline (i.e. 160 credits usually). Keeping in mind the need for manpower in emerging areas, AICTE with the help of industry-academia experts, has framed the curriculum for seven Minor Degrees:

- Artificial Intelligence and Machine Learning
 - Blockchain
 - Cyber Security
 - Data Science
 - Internet of Things (IoT)
 - Robotics
 - Virtual and Augmented Reality
- a) UG Engineering Honors Degree in Emerging Areas (Artificial Intelligence (AI), Internet of Things (IoT), Blockchain, Robotics, Quantum Computing, Data Sciences, Cyber Security, 3D Printing and Design, Augmented Reality/ Virtual Reality) shall be allowed as specialization from the same Department. The minimum additional Credits for such Courses shall be in the range of 18-20 and the same shall be mentioned in the degree, as specialization in that particular area.

For example, doing extra credits for Robotics in Mechanical Engineering shall earn B.E./ B.Tech. (Hons.) Mechanical Engineering with specialization in Robotics.

- b) Minor specialization in Emerging Areas in UG Engineering Degree Courses may be allowed where a student of another Department shall take the minimum additional Credits in the range of 18-20 and get a degree with Minor from another Department. It is also made very clear by AICTE that areas in which Minor Degree/Honors may be offered are numerous. It is up to the Universities with the help of their BoS, BoD and Academic Council to decide whether Minor Degree/Hons. is to be offered or not in any particular area, which is not covered under AICTE Approval Handbook. AICTE approval is not required for offering Minor Degree/Honors in any such area, however the criteria 'Minor Degree or Hons. will cumulatively require additional 18 to 20 credits in the specified area. In addition to the credits essential for obtaining the UG Degree in Major Discipline (i.e. 160 credits)' needs to be precisely followed.

5.4 Internationalization of Higher Education

Internationalization of higher education promotes sharing of best academic and research practices through interactions between diverse education systems, and helps in developing global citizens through mobility of students and scholars. Internationalization of Higher Education should be seen as the catalyst to spur Maharashtra State Universities to position themselves strategically to cater to the needs of the global knowledge society. As per section 12.8 of NEP 2020, India should be promoted as a global study destination providing premium education at affordable costs thereby helping to restore its role as a Vishwa Guru. The Internationalization of higher education requires collaboration/ linkages between foreign universities and Indian universities /institutions for promoting exchange of faculties for teaching and student exchanges between Indian institutions and global institutions as well as establishing international partnerships for research and the feasibility of carrying credits across institutions in multiple countries. Credits acquired in foreign universities will be permitted, where appropriate, as per the requirements of each HEI, will be counted for the award of a degree. The dual/ joint/ twinning degree system can be adopted for stronger academic linkages and facilitation of student and faculty mobility. The advantage of this way of entry to foreign universities is that it will encourage capacity

enhancement of collaborating Indian Universities/Institutions. Research/teaching collaborations and faculty/student exchanges with high-quality foreign institutions will have to be facilitated, and relevant mutually beneficial and functional MoUs with foreign Universities will have to be signed and executed.

In order to improve the access of meritorious students of Maharashtra from economically and socially weaker sections to global education, Government of Maharashtra/ GoI will have to develop additional schemes of financial assistance to these students through institutionalization of scholarships, fellowships and other funding support mechanism. The state Universities in Maharashtra, in turn, must make concerted efforts towards the Internationalization of higher education and increasing the intake of foreign students. The Universities, with due support from Government of Maharashtra and GoI, can devise ways to attract foreign students from developing countries by offering them the scholarships and fellowships to make it possible for them to afford the education at our universities and providing quality residential facilities to ensure effective living conditions and learning environment for them. An International Students Office at each HEI hosting foreign students is required to be set up to coordinate all matters relating to welcoming and supporting students arriving from abroad. This office shall function as single point of contact and will undertake liaising with regulatory/statutory bodies and shall be responsible for carrying out all collaborative activities. In addition, the state universities, with due permissions from Government of Maharashtra, UGC and GoI, may explore the option of setting up campuses overseas. International dimension to curriculum, international offering in educational activities, international competencies in our faculty and students etc. will propel our institutions towards internationalization of higher education. The areas of strength in India such as science, technology, engineering and mathematics (STEM), computer science, gaming should be tied up with internship and apprenticeship to make them attractive for foreign students. Short-term non-degree niche courses to create global perception about our core competencies in Yoga/Philosophy / Ayurveda/Health/Sanskrit can be designed to attract foreign students. These would widen the outreach of state universities among international students and improve the global ranking in internationalization indicators. With the vision of increased internationalization of higher education in India, University Grants Commission has formulated and released Guidelines in July 2021 for the Internationalization of Higher Education within the framework of NEP 2020. These Guidelines will provide a broader roadmap and enable the HEIs in transforming the

higher education system in critical areas of internationalizations. Besides this, the UGC regulations (2022) on Academic Collaboration between Indian and Foreign Higher Educational Institutions lay down the minimum standards for offering Twinning, Joint Degree and Dual Degree Programmes. Any Indian HEI which is accredited by NAAC with a minimum score of 3.01 on a 4-point scale, or which figures in the top 1000 of Times Higher Education or QS World University ranking, or which figures in the top 100 in university category of NIRF at the time of application and any Foreign HEI figuring in top 1000 of Times Higher Education or QS World University ranking at the time of application shall be eligible to offer Twinning, Joint Degree and Dual Degree programmes.

a. **Dual / Joint Degree Programme with foreign HEIs**

The dual degree programme shall be jointly designed by both the Indian HEI and foreign HEI in the same disciplines or subject areas and at the same level. The degrees for such programmes shall be conferred by the Indian and Foreign HEIs, separately and simultaneously, upon completion of degree requirements of both the institutions. As per UGC regulations, this shall not in any way be construed as two degree programmes in separate disciplines or subject areas and/or levels being pursued simultaneously. The students must earn at least 30 percent of total credits from the Indian institution. Credits to be earned by the Indian students from the foreign institution and credits earned by the foreign students from Indian institutions shall be obtained through conventional mode.

As per UGC regulations, Joint Degree Programme curriculum shall be designed jointly by the collaborating Indian and Foreign HEIs. The students must earn at least 30 per cent of the total credits from each of the Indian and Foreign HEIs. Credits to be earned by the Indian students from the foreign institution and credits earned by the foreign students from Indian institutions shall be obtained through conventional mode. Upon completion of the joint degree programme, the Degree is awarded by the Indian HEI and the collaborating Foreign HEI with a single Certificate. Each HEI shall issue a transcript for their respective courses, with a remark indicating that the student has taken certain modules at the partner institution. The collaborating Indian HEIs, including state Universities in Maharashtra, shall make provisions for exit pathways for students who are unable

to complete the Joint Degree programme with clear specification with respect to future acceptance of credits earned by the students.

All other provisions related to offering of Dual and Joint Degree Programme shall be decided mutually by the participating institutions conforming to the respective rules, regulations and laws of their respective institution and country.

b. The Twinning Degree Programme and Credit Recognition under Twinning Arrangement

The Twinning Programme shall be a collaborative arrangement whereby students enrolled with an Indian HEI may undertake their programme of study partly in India, complying with relevant UGC Regulations, and partly in the Foreign HEI. The Twinning Programme thus shall be collaboratively designed by Indian and foreign universities. However, the degree under Twinning arrangement shall be given solely by the Indian HEI including State Public Universities in Maharashtra. Each institution shall issue a transcript for their respective courses, with a remark indicating that the student has taken certain modules at the partner institution, wherever applicable. The idea behind Twinning programme is holistic development of the learners with the help of cultural exchanges and social cohesion. Mobility under Twinning programme will equip the learners with best practices, approaches and methods of teaching and learning in foreign institutions/ Universities. This will aid in capacity building of our institutions and help our students in career choices. In this, the existing curricula may be supplemented by the additional curricula of the collaborating universities. The joint course structure can be worked out on the basis of need assessment and to complement the course structure of the corresponding semester.

Credit Recognition and Transfer arrangement will be worked out in conformity with the provisions of section 22 (3) of the UGC Act, 1956. Credit Recognition and Transfer means ‘Credit’ conferred by a Foreign Higher Education Institution to be recognized, quantified and included towards the credit requirements for a programme delivered by an Indian HEI under a mutual twinning arrangement. The collaborating State Public Universities in Maharashtra will enter into Agreement/MoUs with foreign HEI for recognition of credits under twinning arrangement. However, credits earned by the student from the Foreign HEI shall not exceed 30 per cent of the total credits for the programme. The collaborating

HEIs shall make provisions for exit pathways for students who are unable to complete the Twinning programme with clear specification with respect to future acceptance of credits earned by the students.

Chapter VI

Ph.D. Programme and Promotion of Research and Innovation Culture

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Ph.D. Programme and promotion of Research and Innovation Culture

Level 8, in NHEQF, defines Doctoral Degree with minimum prescribed credits for course work and a thesis with published work. Codes 700-799 and above will include courses for doctoral students. Admission to a Ph.D. programme in particular subject (Level 8.0) shall require either a Master's degree with compulsory Project Work in the same subject or a four year multidisciplinary Bachelor's degree with Research in same subject. Students, who wish to pursue a Doctorate in a subject other than the major/core subject studied by him/her in four year multidisciplinary UG programme, must take additional course/s of equivalent credits of that subject, which are not pursued in the previously completed UG programme for the purpose of admission eligibility. In addition, student desirous for Ph D admission in Indian universities, has to qualify National Eligibility Test (NET)/JRF (Junior Research Fellowship), conducted by the National Testing Agency (NTA)or an Entrance test conducted at the level of individual universities. The University must adhere to the National/State-level reservation policy, as applicable. The UGC, through the recently circulated 'Draft UGC (Minimum Standards and Procedure for Award of Ph.D. Degree) Regulations, 2022' has revised the rules for admission to PhD programmes by including an entrance test for admission, apart from qualification through the NET. The draft covers the Eligibility criteria and Procedure for admission to the Ph.D. programme, guidelines for the Allocation of Research Supervisor and the Supervisor's obligations, Credit and other requirements for the Course Work, Evaluation and Assessment Methods, minimum standards/credits for award of the degree, and other related procedural aspects.

As per section 15.9. of NEP 2020, all fresh Ph.D. entrants, irrespective of discipline, will be required to take credit-based courses in teaching/education/pedagogy/writing related to their chosen Ph.D. subject during their doctoral training period. Exposure to pedagogical practices, designing curriculum, credible evaluation systems, communication, and so on will be ensured since many research scholars will go on to become faculty or public representatives/communicators of their chosen disciplines. As suggested by Maharashtra State Task Force, all Ph.D. entrants may also be oriented for teaching profession through the credit courses leading to Theory Credits (TCs) and Role-Based Credits (RBCs). This will enable Teaching Methodology to be added into the course of study for all Ph.D. students making them teaching-ready, should they choose to align their careers to HEIs. Ph.D. students will

also have a minimum number of hours of actual teaching experience gathered through teaching assistantships and other means. Ph.D. programmes at universities around the country will be re-oriented for this purpose. Thus the Doctoral students should engage in teaching as a substantial part of their learning experiences. They should at least engage teaching of one-semester theory /Laboratory course.

As per UGC (Academic Collaboration between Indian and Foreign Higher Educational Institutions to offer Twinning, Joint Degree and Dual Degree Programmes) Regulations, 2022, the collaborating Indian and Foreign HEIs can design joint Ph D degree programme and, upon satisfactory completion of the programme, the Degree is awarded by the Indian HEI and the collaborating Foreign HEI with a single Certificate. For execution of joint doctoral degree programme, the students must have a supervisor at each HEI. The student shall spend a minimum of one semester in each of the collaborating institutions during the study programme. However, the student shall submit a single thesis adhering to a framework jointly devised by the participating institutions.

National Education Policy (NEP) 2020 envisages the promotion of quality research within the Higher Education System. The Doctoral degree qualifies students who can ask relevant and new questions and develop appropriate methodologies and tools for collecting information in pursuit of generating new knowledge and new data sets and apply a substantial body of knowledge to undertake research and investigations to generate new knowledge, in one or more fields of inquiry and scholarship or professional practice. Graduates at this level are expected to have systematic and critical understanding of a complex field of learning and specialized research skills for the advancement of knowledge and/or professional practice and to make a significant and original contribution to the creation of new knowledge related to a field of learning or in the context of an area of professional practice.

In addition to Ph D Programme, all the state universities in Maharashtra must encourage researchers to undertake research in post-doctoral programmes. The government and the universities should roll out scholarships and fellowships for promoting such post-doctoral research.

To make India a global knowledge superpower, India has to be at the forefront of knowledge creation, research, innovation, and entrepreneurship. Promotion of research and creation of knowledge emerge from conducive and all-level academic development. To further promote research in all the fields of education, the NEP-2020 has proposed the National Research Foundation (NRF) that will nurture the culture of research among learners as well as HEIs.

The Foundation will create a global quality research ecosystem by providing merit-based competitive funding with sustainable incentives and recognition of outstanding research.

NEP-2020 aims at creating a conducive ecosystem to catalyze and energize research and innovation in HEIs. The UGC has launched an initiative to establish a Research & Development Cell (RDC) in HEIs with a mandate for promoting quality research that contributes meaningfully towards the goal of a self-reliant India ("Atma-Nirbhar Bharat"), aligned with the provisions of NEP-2020. The RDC will help in creating a research ecosystem for reliable, impactful, and sustained research output. The essential elements of such an ecosystem, viz., generation of knowledge and facilitation of research, innovation and technology development for industrial & societal benefits, are defined by human resources (researcher & faculty), intellectual capital (knowledge & skills), governance (regulation & policies) and financial resources (funding & grants). Regular initiatives by RDC will ensure that researchers understand the importance of integrity and ethics and comply with ethical codes of research and publishing practices at institutional, national, and global levels. A standard plagiarism check should be mandatorily implemented and the requisite software in this regard should be made accessible to all researchers. In addition, the RDC will sensitize the research community about dubious research and publishing practices and predatory journals. The HEIs should put in place a Research Information Management System (RIMS) to collect and manage research-oriented information, databases, publications, research projects, fellowships, collaborations, patents, thrust areas, innovations etc. aligned with the institution's research policies.

RDC at University will identify potential collaborators from industry, research organizations, academic institutions and other stakeholders for cooperation and synergistic partnerships and liaison between researchers and relevant research funding agencies, extend guidance in preparation and submission of project proposals and post-sanctioning of the grants to oversee adherence to timelines. The Start-Up ecosystem with the promise to open new career and entrepreneurship opportunities for students and youth in India should be well promoted through the Incubation Centers established in State Universities of Maharashtra. Thrust areas for Research in an HEI should be identified, underpinning the societal needs and the availability of key resources, including in-house human resources, faculty research competencies, and support systems. This would enable HEIs to consider establishing a Center of Excellence (CoE) in these identified contemporary areas of research. CoEs' can serve as Incubation Centers to transform innovative ideas into processes and products administered and monitored by the University RDC.

In order to support and monitor the activities of University level RDC, Government of Maharashtra should constitute Maharashtra State Research and Innovation Council (MSRIC) as recommended by Task Force headed by Dr R. A. Mashelkar. It will work together with societal actors (researchers, citizens, policy makers, business, third sector organizations, etc.) during the whole research and innovation process to align both the process and its outcomes with the values, needs and expectations of society.

Chapter VII

Overall Roadmap for Implementation of NEP-2020 in Reference to Level 4.5-8 Multidisciplinary Programmes at Different Universities in Maharashtra State

Chapter VII

Overall Roadmap for Implementation of NEP-2020 in Reference to Level 4.5-8 Multidisciplinary Programmes at Different Universities in Maharashtra State

All HEIs providing UG, PG, and doctoral programmes ranging from traditional disciplines of the humanities, social sciences, and pure sciences to various professional, technical, and vocational disciplines, have to impart holistic and multidisciplinary education to the students across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world in order to ensure the unity and integrity of all knowledge. NEP-2020 envisions that holistic and multidisciplinary education is the need of the hour, to produce well-rounded individuals, rooted in Indian culture, with capabilities to keep pace in an integrated manner, with the demands of the 21st century. All the major higher education providers across the globe are operating a system of credits in multidisciplinary environment. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc are examples of these.

In India, Karnataka is the first state to execute the recommendations of NEP 2020 followed by states such as UP and MP. These states have approved state level Regulations Governing the Scheme with Multiple Entry and Exit Options in the Undergraduate and Post-graduate Degree Programmes. Central Universities such as Hyderabad University has prepared NEP-2020 Implementation Plan for Phase-I. The Jawaharlal Nehru University (JNU) has approved the exit option for engineering students of Dual Degree programme. Students admitted to Delhi University in the 2022-23 academic year will be the first batch to study the four-year undergraduate curriculum.

7.1 Transformation of HEIs into Multidisciplinary Institutions

A substantial number of HEIs in India, in general, and Maharashtra state, in particular, are either single stream institutions or multidisciplinary institutions with rigid disciplinary boundaries. Large multidisciplinary HEIs to be established in or near every district by 2030 is one of the most significant recommendations in the NEP 2020. A multidisciplinary institution should not only have different departments covering

multiple disciplines, but also should have innovative programmes of a multi- and interdisciplinary nature to help widen learners' thinking and learning capability and enable students to become well-rounded individuals. The UGC Report on 'Transforming Higher Education Institutions into Multidisciplinary Institutions' (Sept. 2022) has suggested multiple ways such as Academic collaboration between institutions, through HEI clusters, leading to multidisciplinary education and research in different modes; and Merger of single-stream institutions with other multidisciplinary institutions under the same management or different managements to achieve the characteristics of a multidisciplinary institution. The multidisciplinary Teaching-intensive Universities (TUs) and Research-intensive Universities (RUs) will be universities with 3,000 or more students. Given that by 2035 all affiliated colleges should become degree-awarding multidisciplinary autonomous institutions, it is necessary to develop a road map to transform all affiliated colleges to attain the status, either alone or through collaboration with nearby institutions in the form of clusters or by becoming a constituent part of a university as envisioned in NEP 2020. The affiliated colleges need to achieve the degree-awarding status by becoming large multidisciplinary autonomous colleges or by becoming part of the cluster to become a large multi-disciplinary HEI. The overall higher education sector will be an integrated higher education system, including professional and vocational education. The policy also suggests strengthening of institutions by opening departments needed for multidisciplinary subjects, including: Languages, Literature, Music, Philosophy, Indology, Art, Dance, Theatre, Education, Mathematics, Statistics, Pure and Applied Sciences, Sociology, Economics, Sports, Translation and Interpretation. The teaching-learning has to be linked to life, community and the world of work, including the environment across all disciplines/ fields of study, including STEM education. The NEP 2020 visualizes establishment of one Education Department in colleges/ universities/ HEIs to contribute to multidisciplinary and holistic education and to contribute to research and development in these areas.

Under the collaborative arrangement, the single-stream institutions can integrate their programmes with those of nearby multidisciplinary institutions to enhance what they can offer with their programmes. B.Ed. course, integrated with a B.A./ B.Sc./ B.Com. programme gives the Integrated Teacher Education Programme (ITEP), and combination of B.A.-B.Ed., B.Com.- B.Ed. and B.Sc.-B.Ed. with multiple entry and exit options. Similarly, the Management Institutions can collaborate with Science, Arts and Commerce Colleges to offer integrated programme such as B. Sc. MBA., B.A. MBA

and B.Com. MBA. Thus, collaboration between two HEIs for the award of dual degree facilitates students enrolled in an HEI to take up the first degree at the host institution and the second degree at the partnering institution.

Single-stream institutions and multidisciplinary institutions with poor enrollment, due to lack of employment-oriented, innovative multidisciplinary courses and lack of financial resources to maintain and manage the institutions can improve enrolment by becoming members of cluster and by offering multidisciplinary programmes. The clustering of colleges may help in securing good grades in NAAC accreditation.

Government of Maharashtra has already constituted the Committee to frame appropriate rules/policies to transform HEIs into multidisciplinary institutions.

Of the existing State Universities and Deemed to be Universities in Maharashtra, the Government of Maharashtra should immediately begin the process of identifying the Universities which can be categorized as Type 1: Research-intensive Universities (RUs) and Type 2: Teaching-intensive Universities (TUs). NEP 2020 suggests that the GER should reach 50% by 2035 for which a large University is required in every district of the Maharashtra state; the State would achieve the target if it can immediately identify one HEI in every district that can be turned into a large multidisciplinary University.

7.2 Key Result Areas (KRA) and Key Performance Indicator (KPI) for transformation of HEI into NEP compliant HEI

Besides transformation as Multidisciplinary HEI, the State Universities should undertake the execution of following Key Result Areas (KRA) as a part of successful implementation of NEP 2020. They must define Targets/ Key Performance Indicator (KPI) for each KRA and undertake periodic review of these KPI so as to achieve due compliance/ readiness for implementation of NEP in its true spirit.

a) Institutional Development Plan

As per section 12.3 of NEP 2020, each HEIs will integrate its academic plans ranging from curricular improvement to quality of classroom transaction - into its larger institutional Development Plan (IDP). The HEIs must undertake the framing of IDP for phase wise implementation of NEP and adoption of different Guidelines of UGC. All HEIs will develop IDPs to assess human resources requirements, in terms of faculty and administrative staff shortages, the physical infrastructural facilities, ICT related technology requirements, Learning infrastructure such as

labs, libraries, CPD requirements, Student Support related areas and Teaching infrastructure. The IDP could be long-term (10-15 year), medium-term (5 years), short-term (1-3 years) and could have details such as educational and research outcomes, quality and capacity parameters including those related to equity and inclusion, human resource and organizational development plans, along with financial support and mentoring required for the foregoing. All HEIs will develop a CPD plan for the faculty and determine the process for its implementation. The plan should include capacity development in the field/discipline, pedagogical capacities, research, and contribution to practice. The IDP should be used as basis for measure of HEI's progress against the IDP and funding support by RUSA. The IDPs will form the basis of the graded accreditation (GA) of HEIs with concomitant graded autonomy. This phase wise empowerment of HEIs is the path towards complete autonomy as suggested by the policy.

b) NAAC Accreditation, Academic Audit and IQAC

University must motivate the non-accredited affiliated colleges to be accredited and Colleges with NAAC A grade to become autonomous. As a quality assurance mechanism, every accredited HEI should establish an Internal Quality Assurance Cell (IQAC) as a post-accreditation quality sustenance measure. Since quality enhancement is a continuous process, the IQAC functions as a part of the institution's system and work towards realization of the goals of quality enhancement and sustenance. The prime task of the IQAC is to develop a system for conscious, consistent, and catalytic improvement in the overall performance of HEI. The HEIs must undertake Administrative and Academic Audit on regular basis as per UGC Norms.

c) Registration of HEI at ABC, and design of NHEQF aligned Multidisciplinary Programme with Multiple Entry and Exit options

NHEQF outlining the learning outcomes associated with certification /diploma/ degree shall be the guiding document for curricula across all disciplines and fields, which do not have their individual PSSBs. HEIs offering programmes with the multiple entry and exit system need to register in the ABC to enable acceptance of multidisciplinary courses, credit transfer, and credit acceptance.

- d) **Internationalization of Education and establishment of Office of International Affairs**

Refer section 5.4 of Chapter V for additional details.

- e) **Offering of ODL and Online programmes**

NEP 2020 has set the ambitious target of achieving 50 per cent GER by 2035. To achieve this target, Online learning is one of the ways. Hundreds of online courses recognized by UGC including those available in the SWAYAM portal can provide an ideal platform to enable multidisciplinary education by HEI. Number of students completing the MOOCs and SWAYAM courses as a part of credit requirement of the Degree could be the KPI for HEI. For proper and smooth conduct of the online learning of credit course offered on SWAYAM platform, the HEI shall ensure that the physical infrastructures viz, computer facilities, library, etc. essential for pursuing such courses are made available for free and in adequate measure.

- f) **Offering of Professional Courses in Indian languages-**

No. of Courses (particularly Technical and Professional Courses) offered in Local Language will be the KPI.

The Maharashtra State Universities and Colleges offering courses and programme in all classical languages, dialects and literature, should undertake strong research efforts to collect, preserve, translate, and study the manuscripts that have not yet received their due attention. Marathi, Hindi, Sanskrit, English and all other Indian language institutes and departments across the state should provide adequate training to large new batches of students to study, in particular, the large numbers of manuscripts and their interrelations with other subjects.

- g) **Embedding IKS in curriculum-**

No of Courses or modules on Indian Knowledge System (IKS) will be the KPI. Refer section 2.7 of Chapter II for additional details on IKS

- h) **Establishment of Research and Development Cell (RDC)**

The KPIs could be the Cumulative Research Grant from Government and Private Agencies sanctioned to HEI as well as number of active start-ups promoted by HEI Incubation Center. Refer Chapter VI for additional details on RDC and

initiatives for promotion of Research and Innovation Culture.

- i) Offering of apprenticeship/ internship embedded degree programme, Employability/ Skilling Centric Initiatives, Alumni Connect, Central Training and Placement Cell (CTPC) and Industry-Institute Linkage

HEIs are required to develop KPI in terms of no. of Academic Programmes having internship/apprenticeship, On-job Training, and Field Projects as a part of curriculum, Percentage of program curriculum with skill/vocational courses, Percentage of graduating students placed through Placement Cell, and No of MoUs with Industries for Industry-Institute linkage for apprenticeship/ internship/ research/ entrepreneurship/ employment. HEIs can register on portal- <https://internship.aicte-india.org> created by AICTE to support students to find internships. Initiatives for Alumni connect to connect with alumni (of Indian origin living abroad and foreign alumni) will play an important role for the overall growth of their alma mater.

The National Policy on Skill Development and Entrepreneurship, 2015 laid out Skill India Mission, and envisaged the creation of Sector Skill Councils (SSCs) by National Skill Development Corporation (NSDC). Priority sectors have been identified based on the skill gap analysis. The SSCs can support HEIs in identification of skill development needs of students including the types, range and depth of skills for specific domain and conduct of assessment and certification of vocational and skill-based courses. Due stress is required to be given for the skilling needs of ST/SC, differently-abled and minority groups.

Center of Excellences established under TEQIP project at various Engineering Institutes in

Maharashtra, Skill Development Institutes in various Universities (e.g., Garware Institute of Career Education and Development (GICED) at University of Mumbai) and recently established Skill University in Maharashtra can play a major role in promoting Skill Centric Initiatives.

Global Capability Centers (GCCs), which have a rich developmental history built across the past two and a half decades of their existence in our country, presents a very good employability opportunities for students equipped with necessary skillsets. India is home to 1300+ GCC organizations, employing more than 1.3 million in workforce and contributing US\$33.8 billion in gross revenue, as of

financial year 2020 (<https://nasscom.in/knowledge-center/publications/gcc-value-proposition-india>) through the value addition generated by this sector across six core dimensions- economic, human capital development, innovation and ecosystem nurturing, social progress, environmental sustainability, and reputational positioning. NASSCOM has partnered with ANSR to conduct a study on the "Evolution of Retail/CPG Global Capability Center (GCCs) in India". This report (<https://nasscom.in/knowledge-center/publications/evolution-retail-cpg-gccs-india>) shares insights on various aspects of the Retail/CPG GCC's evolution in India, and a promising outlook in the future. The findings present the current status of Retail/CPG GCCs and their growth, their core value proposition, operating models, sustained expansion and transformation beyond delivering cost efficiencies, and strategic plans to emerge as the digital transformation and talent hub for the global enterprise in the future.

Appointment of Professor of Practice and Associate Professor of Practice at different HEI, as per UGC Norms, could be one of the important steps in promoting Industry-Institute interactions.

Refer section 2.20 and 2.11 of Chapter II and section 3.2 of Chapter III for additional details on Vocational Education and Internship.

7.3 HEI Governance and Infrastructure Upgradation

Internal governance of HEIs needs to be more autonomous, accountable, decentralized, and transparent. A flexible pattern of governance, which is responsive to the changing needs of society, global trends, and knowledge, can be a powerful factor in accelerating progress. In the wake of the internationalization of education, coupled with globalization and competition, the HEIs need to be managed more professionally. To deal effectively and efficiently with the new, more complex academic environment to be ushered in by the implementation of NEP-2020 provisions, every University/College must develop proper governance mechanism.

For effective implementation of NEP, every state university/ college must undertake expansion and reinforcement of existing laboratory spaces, upgrade instrumentation and equipment infrastructure, and equip classrooms for blended/hybrid mode of instruction. The faculty strength be increased to maintain the Teacher-student ratio (TSR) in tune with the number of teaching programmes offered and the intake capacity of the programme.

It is essential to strengthen the e-governance system to effectively manage the new, complex academic environment and develop IT based tracking system for following the progress of learners at various levels. HEIs should undertake augmentation of IT infrastructure and facilitate use of Technology in Educational Planning, Teaching, Learning and Assessment, Administration and Management, Increasing Access for Disadvantaged Groups, developing Divyang Friendly Education Software, developing e-Content in Regional Language and removing language barriers, setting up of Virtual Labs, and digitally Equipping Teachers and Students. End to end Digitization and its augmentation is very much essential with respect to execution of various administrative processes connected to smooth running of four year Multidisciplinary Degree Programme.

One of the many disruptions aggravated by the Covid-19 pandemic is the rapid and massive digitization of education. Under COVID pandemic, India's educational system started equipping itself with an increasingly digitalized environment. It accelerated the demand for applying technology in a wide range of areas requiring data, most importantly computers, laptops, SMART classrooms and smartphones. India's smartphone penetration is growing at an especially rapid pace, with an estimated 750 million users in 2022, out of which 80% with units possessing 5G capabilities, and also we have witnessed the fastest growth in rural India. Digital revolution and Information and Communication Technology (ICT) has ushered in new possibilities in process and delivery of higher education. ICT can lead the way in providing career opportunities for socially and economically disadvantaged groups by providing opportunities to students to learn what they want to learn at different levels, places and times. Artificial Intelligence (AI) can be a key engine of innovation in supporting education sector. The global AI in the education market is projected to reach \$ 3.68 billion by 2023. Leveraging AI can enhance the personalized learning experience of students through adjusting to each student's learning needs, pace and styles. By utilizing rich content, adaptive quizzes, live courses and interactive gamified simulation training (GST), AI based learning platforms can provide tailored training for both teachers and students and furnish detailed analysis of the students' performances. The e-learning tools and applications will thus provide opportunities for remote, self-paced learning anytime and anywhere. This implies that there will be individual learning processes for each student which will result in a better understanding of the concepts and an overall better result. It

will also help teachers to identify the strengths and weaknesses of each student individually and guide them accordingly.

7.4 Student Centric Initiatives and Learner Support System

Multiple student centric initiatives are essential to promote inclusive education policies. The Task Force for Implementation of NEP 2020 in Maharashtra has proposed the initiative of accelerating the Movement towards Ensuring that 'No One is Left Behind'. The report has recommended to set up a special cell for continuous monitoring and evaluating the performance and attainment of outcomes; a committee which will use empirically evidenced methodology, going into the data-based evaluation of what has and hasn't worked for whom and where; suggest new missions/ schemes to take the agenda of inclusion forward and an Equal Opportunity Office (EOO) at the Apex as well as at HEI level. HEIs should implement these recommendations.

The HEI must undertake frequently the updating of website with respect to all statutory details (Programme details and Course fees Structure, examination and assessment pattern, teaching staff with qualification, SSR, AQAR etc). There has to be Budgetary support for providing scholarship and various support schemes for socially and economically weaker students. Thus Scholarships for meritorious and socially weaker students will have to be offered for the purpose of attracting outstanding candidates to the 4-year UG and 2-year/1-year PG programmes. The infrastructural facilities must be upgraded for better access to physically challenged students.

Each institution will be committed to the holistic development of students and create strong internal systems for supporting diverse student cohorts in academic and social domains both inside and outside formal academic interactions in the classroom. The HEI must support for promotion/ enhancement of Sports, Cultural, Extracurricular Activities and Curriculum as envisaged by NEP 2020. For example, all HEIs will have mechanisms and opportunities for funding of topic-centred clubs and activities organized by students with the help of faculty and other experts as needed, such as clubs and events dedicated to science, mathematics, poetry, language, literature, debate, music, sports, etc. Such activities could be incorporated into the curriculum as a part of cocurricular courses. Faculty will have the capacity and training to be able to approach the students not just as teachers, but also as mentors and guides. As per section 12.4 of the NEP-2020 policy document, students from socio-economically disadvantaged backgrounds require encouragement and support to make a successful transition to

higher education. Universities and colleges will thus be required to set up high-quality Learner Support Centres and professional academic and career counselling system to ensure physical, psychological and emotional well-being of students.

7.5 Faculty Support and Training

Multidisciplinary degree programmes punctuated with internship, community service and engagement and skill courses need substantial orientation for teachers. Capacity-building for faculty to teach, train and to do research in multidisciplinary academic programmes need adequate focus. Initiatives like Annual Refresher Programme in Teaching (ARPIT) need to be utilized for additional capacity-building. Institutional structures have to be expanded to strengthen capacity of faculty to use effective pedagogical approaches and design learning assessment methods and tools.

The section 13.1 of National Education Policy (NEP) 2020 specifies that the most important factor in the success of higher education institutions is the quality and engagement of its faculty, while section 15.1.1 of presents that Teacher education is vital in creating a pool of teachers that will shape the next generation. The 4 year degree graduate is expected to be part of a learning system that is multidisciplinary as well as research intensive. The graduates will often have individualized learning plans rather than standard curriculum teaching plans. Assessing such graduates means that even the Teaching talent will have to be enabled to be open and equally prepared to assess with new approaches that will be more continuous rather than end term basis through exams alone. Thus, the teacher preparation is an activity that requires multidisciplinary perspectives and knowledge, formation of dispositions and values, and development of practice under the best mentors. Teachers must be grounded in Indian values, languages, knowledge, ethos, and traditions including tribal traditions, while also being well-versed in the latest advances in education and pedagogy. In order to fulfil these objectives, Government of Maharashtra has established Maharashtra State Faculty Development Academy (MSFDA) under Section 8 of Companies Act, 2013 to impart training to the faculty of Higher and Technical Education Institutions of Maharashtra. MSFDA has entered into MoU with various Universities and Institutes in Maharashtra State for promoting training on Teaching Pedagogies.

As suggested by Maharashtra State Task Force, Maharashtra State Faculty Development Academy (MSFDA) may be entrusted with the role of nodal agency with adequate financial support to design, develop and launch the online or blended credit courses in

teacher education for in-service teachers of HEIs. This may be done in close collaboration with HRDCs in the universities. UGC-HRDC in various state Universities should promote continuous capacity-building of faculty members, especially those in the early part of their careers. A novel academic and business model to revitalize HRDCs as Centers of Excellence for Teacher Education in emerging knowledge society may be conceived and implemented.

7.6 Common Academic Calendar for Universities across Maharashtra State, Faculty-Student ratio (FSR), Credit-hours for different types of courses, and Teaching Workload calculations

a. Common Academic Calendar for Universities across Maharashtra State

In order to facilitate the flexibility of pursuing different courses from different Institutes for students as well as lateral entry at different levels in reference to multiple entry and exit options, it is essential to have **Common Academic Calendar for Universities across Maharashtra State** in terms of the more or less uniform schedule for Admission and Enrolment, Teaching and Learning sessions, Examination Time Table, Evaluation Period and Result Declaration. JBVC can be the right forum for deciding the **Common Academic Calendar** for every academic year. The Registrar and DBOEE across State Universities should ensure strict implementation of common academic calendar.

b. Faculty- Student ratio (FSR)

The Task Force for Implementation of NEP 2020 in Maharashtra has identified the shortages of teachers in colleges and universities as critical problem affecting the quality of education. State Governments should therefore take initiatives to appoint and increase the faculties in colleges and universities as per the student: teacher ratio proposed by UGC and in tune with the teaching-learning-evaluation requirements of Multidisciplinary Degree Programme. Thus Government of Maharashtra should support the HE's to achieve the Faculty/ Teacher - Student Ratio (FSR or TSR) as recommended by IDP document of UGC:

For Under Graduate Courses (FSR):

- Social Sciences (1:30); Sciences (1:25); Mass Media (1:15); Commerce/Management (1:30); Professional Courses (1:25); Vocational Course (1:30), Engineering & Pharmacy-1:15, Architecture and Design Streams-1:10
- Autonomous degree-granting College can be given the flexibility of not more than 10-15% in STR
- The Elective courses, SEC, and AEC courses are undertaken as per the preference of the student. Hence, they can have variable STR. The minimum number of students in a Class shall be 20.
- For Practical/Experiment classes, the proposed STR is 1:15
For Post Graduate Courses (FSR):
 - Science 1:10
 - Humanities 1:15
 - Commerce/Management 1:15
 - Mass Media 1:10
 - Professional Courses 1:10
 - Engineering & Management- 1:10
 - Architecture & Design: 1:5
 - Pharmacy 1:5

c) Credit-hours for different types of courses, and Teaching Workload calculations

A semester consists of 90 working days and an academic year is divided into two semesters. Each working week will have 40 hours of instructional time. The old method of calculating teaching workload must be replaced by the Credit based calculations of teaching Workload and essential requirement of TSR/ FSR.

One credit means the standard methodology of calculating one hour of theory or one hour of tutorial or two hours of laboratory work, per week for a duration of a semester (13-15 weeks) resulting in the award of one credit. Credits for internship shall be one credit per one week of internship, subject to a maximum of six credits. Each of the core/interdisciplinary courses will require specific number of hours of teaching/guidance, in any of the modes of learning, and laboratory/studio/workshop activities, field-based learning/projects, and

internships/ community engagement and service. The Teaching Workload determination will thus include calculations based on TSR and Credit.

The following types of courses/activities constitute the programmes of study. Each of them will require specific number of hours of teaching/guidance and laboratory/studio/workshop activities, field-based learning/projects, and internships, and community engagement and service in reference to credit requirement.

- i. **Taught courses:** A minimum of 15 hours of teaching per credit is required in a semester along with 30 hours of out-of-class activities such as preparation for class /lessons, completing assignments which form a part of the course work, and independent reading and study. The total learner engaged time for a one credit taught course would be 45 hours. The out-of-class activities may not be measured and quantified for purposes of grading of the credit but shall be reasonably included in the calculation of teaching workload.
- ii. **Laboratory work/activities:** A course requiring students to discover/practice application of a scientific or technical principles/theories. The course may require scientific, or research focused experiential work where students observe, test, conduct experiment(s) or practice application of principles/theories relating to field of learning, work/vocation or professional practice. A minimum of 30 hours in the laboratory activities per credit in a semester along with 15 hours of out-of-class activities such as preparation for the practicum, completing assignments which form a part of the course work, and independent reading and study. The total learner engaged time for a one credit laboratory work/activity would be 45 hours.
- iii. **Studio activities:** Studio activities involve engagement of students in creative or artistic activities. Every student is engaged in performing a creative activity to obtain a specific outcome. Studio-based activities involve visual- or aesthetic-focused experiential work. A minimum of 30 hours in the studio activities per credit in a semester along with 15 hours of out-of-class activities such as preparation for the studio activity, completing assignments, and independent reading and study. The total learner engaged time for a one credit-hour studio activity would be 45 hours.

- iv. **Workshop-based activities:** Courses involving workshop-based activities require engagement of students in hands-on activities related to work/vocation or professional practice. Every student is engaged in performing a skill-based activity related to specific learning outcome(s). A minimum of 30 hours of workshop-based activities per credit in a semester along with 15 hours of out-of-class activities such as preparation for the workshop activity, completing assignments, and independent reading and study. The total learner engaged time for a one credit-hour workshop activity would be 45 hours.
- v. **Seminar:** A course requiring students to participate in structured discussion/conversation or debate focused on assigned tasks/readings, current or historical events, or shared experiences guided or led by an expert or qualified personnel in a field of learning, work/vocation or professional practice. A minimum of 15 hours of participation in seminar activity per credit in a semester along with 30 hours of out-of-class activities such as preparation for the seminar, completing assignments, and independent reading and study.
- vi. **Practicum:** A course requiring students to participate in an approved project or practical activity that applies previously learned/studied principles/theory related to the chosen field of learning, work/vocation or professional practice under the supervision of an expert or faculty in the field of learning, work/vocation or professional practice.
- vi. **Internship:** A course requiring students to participate in professional employment-related activity or work experience, or cooperative education activity with an entity external to the education institution, normally under the supervision of an employee of the given external entity. A key aspect of the internship is induction into actual work situations. Internships involves working with local industry, businesses, artists, crafts persons, etc. and opportunities for students to actively engage with the practical side of their learning. Credits for internship shall be one credit per one week of internship, subject to a maximum of six credits.

- vii. **Field-based learning/ Practices:** A minimum of 30 hours of learning activities in a semester along with 30 hours of out-of-class activities such as preparation for the field projects, completing assignments which form a part of the course work, and independent reading and study.
- Courses requiring students to participate in field-based learning/project generally under the supervision of an employee of the given external entity. 30 hours per credit in a semester along with 15 hours of activities such as preparation for the field projects, data analysis, preparation of reports etc., and independent reading and study
- viii. **Community engagement and service:** Courses requiring students to participate in field-based learning/project generally under the supervision of an employee of the given external entity. The curricular component of ‘community engagement and service’ will involve activities that would expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. 30 hours of contact time per credit in a semester along with 15 hours of activities such as preparation for the community engagement and service, preparation of reports etc., and independent reading and study.
- ix. **Hybrid courses involving a mix of taught courses and practicum:** A 4-credit course involving 75% of face-to-face teaching and 25% field-based learning/project or lab work, or workshop activities will have a total of 75 hours of instructional time during a semester, and 105 hours of out-of-class activities such as preparation for the courses of study, completing assignments and independent reading and study. Thus, the total learner engaged time would be 180 hours for a 4-credit course.
- x. **Learner engaged time for a 4-credit course involving 50% practicum:** A 4-credit course involving 50% face-to-face teaching and 50% field-based learning/project or lab work, or workshop activities will have a total of 90 hours of instructional time during a semester, and 90 hours of out-of-class activities such as preparation for the courses of study and practicum, completing assignments and independent reading and study. Thus, the total learner engaged time would be 180 hours for a 4-credit course.

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