



महाराष्ट्र शासन

उच्च व तंत्र शिक्षण विभाग, मंत्रालय विस्तार, कक्ष क्रमांक ४१८,
चौथा मजला, मादाम कामा मार्ग, हुतात्मा राजगुरु चौक, मुंबई-४०० ०३२



दूरध्वनी क्र.०२२-२२७९३१७९

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क्रमांक:- एनईपी- २०२२/प्र.क्र.१४६/विशि-३

दिनांक:- २८ ऑक्टोबर, २०२२

प्रति,

कुलगुरु,
सर्व अकृषी विद्यापीठे/ अभिमत विद्यापीठे

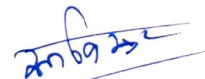
विषय- राष्ट्रीय शैक्षणिक धोरण, २०२० अंतर्गत दहावीनंतर तांत्रिक पदविका अभ्यासक्रम करणाऱ्या
विद्यार्थ्यांना अभियांत्रिकी पदवी अभ्यासक्रमाच्या प्रवेशासाठी धोरण निश्चित करणेबाबत.
संदर्भ- शासन निर्णय क्रमांक एनईपी-२०२२/ प्र.क्र.१४६/ विशि-३ दिनांक १ जून, २०२२

महोदय/ महोदया,

राष्ट्रीय शैक्षणिक धोरण-२०२० ची राज्यात अंमलबजावणी करण्याच्या दृष्टीने या धोरणाचा अभ्यास
करण्यासाठी दिनांक १६ ऑक्टोबर, २०२० च्या शासन निर्णयानुसार डॉ.रघुनाथ माशेलकर, माजी महासंचालक,
वैज्ञानिक आणि औद्योगिक संशोधन परिषद, नवी दिल्ली यांच्या अध्यक्षतेखाली स्थापन करण्यात आलेल्या कार्यबल
गटाने आपला अहवाल शासनास दि.३० जून, २०२१ रोजी सादर केला होता. दि.२७ जानेवारी, २०२२ रोजी झालेल्या
मंत्रिमंडळ बैठकीत डॉ.रघुनाथ माशेलकर समितीच्या अहवालातील शिफारशीप्रमाणे विभागाने सादर केलेल्या प्रस्तावास
मान्यता देण्यात आली होती.

त्यानुसार विषयांकीत प्रकरणी संदर्भाधीन शासननिर्णयान्वये गठीत करण्यात आलेल्या संचालक, तंत्रशिक्षण
संचालनालय, मुंबई अध्यक्षतेखालील समितीने आपला अहवाल शासनास सादर केला आहे. सदर अहवालाची प्रत
सोबत जोडली आहे. सदर अहवालातील शिफारशी शासनाने स्विकारल्या असून या शिफारशीची, विहित प्राधिकरणांची
मान्यता घेऊन, तातडीने अंमलबजावणी करण्याबाबत विद्यापीठांनी निर्णय घ्यावा.

आपला,


(अ.म.बाविस्कर)

सोबत- वरीलप्रमाणे

उपसचिव, महाराष्ट्र शासन

प्रत:-

१. संचालक, उच्च शिक्षण, महाराष्ट्र राज्य, पुणे
२. संचालक, तंत्र शिक्षण, महाराष्ट्र राज्य, मुंबई
३. संचालक, कला संचालनालय, महाराष्ट्र राज्य, मुंबई
४. संचालक, ग्रंथालय संचालनालय, महाराष्ट्र राज्य, मुंबई
५. निवडनस्ती (विशि-३)

Committee Report for deciding policy

for

**Direct Second year admission to
Engineering Colleges after Diploma**



**Directorate of Technical Education
Government of Maharashtra**

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Committee report for deciding policy for direct second year admission to Engineering colleges after Diploma

Government of Maharashtra has constituted a committee, vide Government Resolution dated 1/6/2022, to formulate a policy for admissions to Diploma students in engineering degree programmes. The committee consists of academicians having experience of degree and diploma engineering education and the industry experts as follows-

Sr. No.	Name & Designation of the Officials	Committee Designation
1	Dr. Abhay Wagh, Director, Technical Education, M.S.	Chairman
2	Dr. Vinod Mohitkar, Director, Maharashtra State Board of Technical Education	Member
3	Dr. Ajeet Singh, Regional Officer, Western Region, All India Council for Technical Education	Member
4	Shri. Ashok Shahane, Dy. Chief Executive Officer, National Skill Development Corporation, Ex-Vice President, L&T Mumbai	Member
5	Dr. P.M. Khodke, Principal, Government Engineering College, Yavatmal	Member
6	Dr. Umesh Kahalekar, Professor, Civil Engg., Government Engineering College, Aurangabad	Member
7	Dr. B.F. Jogi, Registrar, Dr. Babasaheb Ambedkar Technological University, Lonere	Member Secretary

The committee has been entrusted to dwell upon following points and submit its report to the Government.

1. To take review of existing policy for admission of diploma holders to engineering degree programmes and suggest revision, if necessary.
2. To prepare perspective plan for requirements of skilled human resource (diploma level) in industries, employment rate, available intake & pass outs of polytechnics and vacancies at Degree level institutions.
3. To prepare operational plan for striking a balance between human resource requirements (diploma and degree students) of industry and the pass outs from diploma/degree institutions.
4. To consider guidelines issued by UGC in this regard.
5. To prepare guidelines for implementation of recommendations of task force (Dr. Mashelkar Committee) in this regard.

The first meeting of the committee was held on 7/6/2022 wherein Hon. Principal Secretary, Higher & Technical Education guided the committee members regarding the expectation of the Government from the committee. He further advised to co-opt additional members particularly from the industry, if necessary in order to get the proper inputs on the subject matter.

The second meeting of the committee was held on 15/6/2022 wherein Chairman of the committee explained the recommendations of task force (Dr. Raghunath Mashelkar committee). It was decided to form two sub committees, one for point no. 1, 4 & 5 and the second for point no. 2 & 3 of the scope of work of the committee. The subcommittees are as follows-

Subcommittee 1 - for Point No. 1, 4 & 5

1. Dr. Vinod Mohitkar, Director, Maharashtra State Board of Technical Education, Mumbai
2. Dr. Ajeet Singh, Regional Officer, Western Region, All India Council for Technical Education
3. Dr. P.M. Khodke, Principal, Government Engineering College, Yavatmal
4. Dr. B.F. Jogi, Registrar, Dr. Babasaheb Ambedkar Technological University, Lonere

Subcommittee 2 - for Point No. 2 & 3

1. Shri. Ashok Shahane, Dy. Chief Executive Officer, National Skill Development Corporation, Former Vice President, L&T Mumbai
2. Dr. Vinod Mohitkar, Director, Maharashtra State Board of Technical Education, Mumbai
3. Dr. P.M. Khodke, Principal, Government Engineering College, Yavatmal
4. Dr. Umesh Kahalekar, Professor, Civil Engg., Government Engineering College, Aurangabad
5. Dr. B.F. Jogi, Registrar, Dr. Babasaheb Ambedkar Technological University, Lonere

The meeting of the subcommittee 1 was held on 29/6/2022 wherein the statistical information about Diploma & Degree admissions and policy framework of AICTE in this regard was reviewed & discussed.

The meeting of the subcommittee 2 was held on 4/7/2022 with additional industry experts namely Mr. Dashrathi, MD, Rucha Ind. Auto Ancillary Unit, Aurangabad, Mr. V. Shrinivasa Reddy, Executive Director, Synergy Green Industries Ltd., Kolhapur and Mr. Karkhanis, BOSCH Nashik. The industry related data was diligently deliberated. Further, one more meeting with NASSCOM experts viz. Mr. Chetan Samant, Ms. Sridevi Sira and Mr. Sachin Maske was held on 8/7/2022. Both the meetings have been extremely useful to understand industry expectations and to identify remedial actions for bridging the gaps. The document so prepared was then shared with Mrs Sandhya Chintala, Executive Director, NASSCOM and Prof. Mangala Sunderan, Professor Emeritus, IIT Madras seeking their opinion on the report through email.

The third meeting of the committee was held on 19th July 2022 to deliberate on the draft report. The comments/ suggestions of the meeting have been incorporated in the report. As all the points of the scope of work are interrelated, the recommendations of both the subcommittees are combined together and a consolidated report is presented as under:

1.0 Review of current policy and relevant reports:

1.1 NEP 2020 and recommendations of Task Force

- NEP 2020 indicated that a very small percentage of the Indian workforce in the age group of 19–24 receives formal vocational education in India (as against developed countries) as India had focused largely on Grades 11–12 and on dropouts in Grade 8 and upwards for vocational education.
- Moreover, Vocational education is perceived to be inferior (in society) to mainstream education and meant largely for students who are unable to cope with the latter. This is a perception that affects the choices students make.
- This serious concern can only be dealt with by a complete re-imagination of how vocational education is offered to students in the future.
- Therefore, a policy (hierarchy) associated with vocational education is needed and requires integration of vocational education programmes into mainstream education in all educational institutions.
- While vocational education will be integrated in the educational offerings of all secondary schools, secondary schools are expected to collaborate with ITIs, polytechnics, local industry, etc.
- Report of the Taskforce for implementation of NEP 2020 in Maharashtra indicated need of special policy for Polytechnic as it has been immensely successful in Maharashtra but don't find a place in NEP 2020. It has been advised to approach Ministry of Education, Govt. of India for separate policy development mandate for polytechnics.

1.2 Admission Rules, vacancies:

- a. The guidelines for eligibility criteria for admission to degree and diploma engineering programmes as well as the criteria for number of seats (students to be admitted directly) for admission to Second year of degree Engineering after passing Diploma are provided by All India Council for Technical Education (AICTE) which are further adopted by the states. AICTE has also setup a separate board called National Board of Technician Education for diploma engineering to support AICTE in this regards. The national board has prepared the model curriculum for polytechnic education and is available in public domain.

b. Existing rules for admission

First year of diploma education: “passed 10th Std./ SSC examination with at least 35% aggregate marks with the state wide intake of 1,02,234.

First year of degree engineering: “Passed 10+2 examination with Physics/ Mathematics/Chemistry/Computer Science/Electronics/Information Technology/ Biology/Informatics Practices/Biotechnology/Technical Vocational subject/ Agriculture/ Engineering Graphics/ Business Studies/ Entrepreneurship and obtained at least 45% marks (40% marks in case of candidates belonging to reserved category) in the above subjects taken together.

OR

Passed min. 3 years Diploma examination with at least 45% marks (40% marks in case of candidates belonging to reserved category) subject to vacancies in the First Year, in case the vacancies at lateral entry are exhausted.

Second year degree engineering through lateral entry: “passed SSC or HSSC and also Diploma in Engineering/Technology or Bachelor of Science (and passed 10+2 exam with Mathematics) or Diploma of Vocation (D.Voc.) from recognised institution in Maharashtra state with at least 45% marks (40% marks in case of reserved category). The candidate can be admitted in any branch of Engineering”.

As per AICTE regulation, the intake for direct second year degree admission is 10% of first year intake and the number of available seats for admission is calculated by adding the vacant seats at first year level to 10% of intake.

- c. The details of students admitted to diploma institutions (data for five years) in first year in Maharashtra and pass outs after completing three years during the respective academic year are given below:

Academic Year	Intake	Admitted in first year	Passed in final/ third year*
2017-18	142719	61884	72817
2018-19	123509	51555	63518
2019-20	108041	55023	83596
2020-21	104335	62116	104079
2021-22	102234	69700	45998 (except autonomous institutes)

* The data for admission and pass out is not related to the same batch. Moreover, the pass out data is addition of students passing in winter and summer examination of the respective year.

Similarly, the details of students admitted to first year of engineering degree, and students admitted through lateral entry to direct second year during the respective academic year (data for five years) are given below:

Academic Year	Intake	Admitted to 1 st Year	Vacancy in 1 st Year	10% intake for DSE	Available seats for DSE*	Admitted to 2 nd Yr
2017-18	138226	81776	56450	13822	--	--
2018-19	130356	73868	56488	13035	69485	41288
2019-20	127537	65923	61614	12753	69241	48699
2020-21	123895	76452	47443	12389	74003	55091
2021-22	125578	79571	46007	12557	60000	55832

*While calculating available seats for DSE in the above table, vacancies in first year of previous academic year have been considered. Hence available seats for DSE during academic year 2018-19 is addition of 10% of intake during 2018-19 (13035) and no. of first year vacancies during previous academic year i.e. 2017-18 (56450).

d. The statistics on admission reveal that:

- Intake for the engineering diploma institutions is reducing drastically while it is reducing slowly for degree institutions.
- The pass out data of diploma students in a particular year is addition of students passing in winter and summer examination of the respective year. However, the contribution of students passing in winter examination is comparatively less (around 6000 to 8000 per year). Moreover, the pass out data includes the regular students as well as the repeater students (few of them could also be doing job or own business). The results of diploma students can be seen improved drastically during 2019-20 & 2020-21 (pandemic period) which may be due to online examination and the result pattern during 2021-22 appears exactly reversed may be due to online teaching and offline examination.
- Quite a large number of seats (intake) sanctioned for engineering degree institutions remain vacant (37% to 49%) during first year admissions.
- Vacancies in engineering degree institutions at first year are getting filled by directly admitted diploma students at second year level to a larger extent.
- The number available seats for direct second year engineering (DSE) degree admissions not only depends on intake but also on the vacancies at first year level. The data for last five years indicates that the number of seats available for DSE varies between 60000 to 75000 and the number of students passing diploma varies between 63000 to 80000 per year. It indicates that the seats are available for every diploma pass out student for DSE degree admission. Hence, all the potential diploma students desirous of doing engineering degree get direct second year admission.
- Based on the number of students passing diploma per year and number of seats available for DSE in the respective academic year, it can be concluded that all diploma pass outs are not opting for degree admission. The placement data of polytechnics indicates that 16127 diploma students were placed in the industry from 2021-2022 batch in campus placement (as per the records, the placement number for B.E./ B.Tech. students during 2021-22 has been 62290). Assuming all such selected students joined industry, it is necessary to know whereabouts (status) of the remaining students.

1.3 National Skills Qualification Framework and Unified Credit Framework

- Govt. of India has constituted National Skill Development Agency (NSDA) as an autonomous body registered as a society under the Ministry of Skill Development and Entrepreneurship. NSDA anchors the National Skills Qualifications Framework (NSQF) and allied quality assurance mechanisms for synergizing skill initiatives in the country. NSQF is implemented through the National Skill Qualification Committee (NSQC).
- For integrating vocational and conventional education, the Skill Assessment Matrix for Vocational Advancement of Youth (SAMVAY) had been launched by MoE in November, 2013.

- The NSQF gazette notification dated 27th Dec 2013 defines Qualification as ‘a formal outcome of an assessment & validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards’. NSQF identifies 10 skill Levels as detailed below:

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 1	prepares person to/carry out process that are repetitive on regular basis require no previous practice	familiar with common trade terminology, instructional words meaning and understanding	routine and repetitive, takes safety and security measures.	Reading and writing, addition subtraction personal financing, familiarity with social and religious diversity, hygiene and environment	No responsibility always works under continuous instruction and close supervision
Level 2	prepares person to/carry out process that are repetitive on regular basis with little application of understanding, more of practice	Material tools and application in a limited context, understands context of work and quality	limited service skill used in limited context, select and apply tools, assist in professional works with no variables differentiate s good and bad quality	receive and transmit written and oral messages, basic arithmetic personal financing understanding of social political and religious diversity, hygiene and environment	No responsibility works under instruction and close supervision
Level 3	person may carry put a job which may require limited range of activities routine and predictable	Basic facts, process and principle applied in Trade of employment	recall and demonstrate practical skill, routine and repetitive in narrow application	Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment	Under close supervision Some Responsibility for own work within defined

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 4	work in familiar, predictable, routine, situation of clear choice	Factual knowledge of field of knowledge or study	recall and demonstrate practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool, using quality concepts	Language to communicate written or oral, with required clarity, skill to basic arithmetic and algebraic principles, basic understanding of social political and natural environment	Responsibility for own work and learning
Level 5	Job that requires well developed skill, with clear choice of Procedures in familiar context	Knowledge of facts, principles, Processes and general concepts, in a field of work or study.	arrange of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	Desired mathematical skill, understanding of social, political and some skill of collecting and organising information, communication.	Responsibility for own work and learning and some responsibility for other's works and learning
Level 6	Demands wide range of Specialised technical skill, clarity of knowledge and practice in broad range of activity involving standard non-standard practices	factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Reasonably good in mathematical calculation, understanding of social, political and, reasonably good in data collecting organising information, and logical communication	Responsibility for own work and learning and full responsibility for other's works and learning

LEVEL	Process required	Professional knowledge	Professional skill	Core skill	Responsibility
Level 7	Requires a Command of wide ranging specialized theoretical and practical skill, involving variable routine and non-routine context.	wide ranging, factual and theoretical knowledge in broad contexts within a field of work or study	Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	good logical and mathematical skill understanding of social political and natural environment good in collecting and organising information communication and, presentation skill	full responsibility for output of group and development
Level 8	Comprehensive, cognitive, theoretical knowledge and practical skills to develop creative solutions, to abstract problem. Undertakes self study, demonstrates intellectual independence, analytical rigor and good communication.			Exercise management and supervision in the context of work/study having unpredictable changes, responsible for development of self and others.	
Level 9	Advanced Knowledge and skill Critical understanding of the subject, demonstrating mastery and innovation, completion of substantial research and dissertation.			Responsible for decision making in complex technical activities, involving unpredictable study/ work situations.	
Level 10	Highly specialized knowledge and problem solving skill to provide original contribution to knowledge through research and scholarship.			Responsible for strategic decisions in unpredictable complex situations of work/ study.	

- National Skill Development Corporation (NSDC), a not-for-profit public limited company, is also incorporated by Ministry of Finance in 2008 with 49% of the share capital of NSDC of the Government of India through Ministry of Skill Development & Entrepreneurship (MSDE). NSDC aims to promote skill development by catalyzing creation of large, quality and for-profit vocational institutions. Further, the organization provides funding to build scalable and profitable vocational training initiatives. NSDC acts as a catalyst in skill development by providing funding to enterprises, companies and organizations that provide skill training. NSDC has also formed 38 Sector Skill Councils (SSCs) of which 16 SSCs are related to Engineering & Technology for training and assessment of relevant skills. SSCs are empowered to certify the skill levels. SSCs conduct the tests and offers three level certification (Gold, Silver & Bronze). Candidates scoring more than 90% are gold, between 75 to 90% are silver and between 50 to 70% are bronze. No certificate to the candidates scoring less than 50%. Therefore, SSCs are expecting 70% eligibility criteria, similar to their level certification criteria, for degree/ diploma engineering admissions.

- NEP 2020 envisaged further that the NSQF suggested by NSDA will be detailed for each discipline vocation and profession. Further, Indian standards will be aligned with the International Standard Classification of Occupations maintained by the International Labour Organization. This Framework will provide the basis for Recognition of Prior Learning. Through this, dropouts from the formal system will be reintegrated by aligning their practical experience with the relevant level of the Framework. The credit-based Framework will also facilitate mobility across ‘general’ and vocational education.
- It is further emphasized in NEP 2020 that a National Higher Education Qualification Framework (NHEQF) will be formulated and it shall be in sync with the NSQF to ease the integration of vocational education into higher education. Higher education qualifications leading to a degree/diploma/certificate shall be described by the NHEQF in terms of such learning outcomes.
- For complying NEP requirements, AICTE introduced Unified Credit Framework (UCF) for Engg. & Tech. programs to align NSQF (2014) with the objectives of NEP (2020),
- The credit framework (as follows) is now in operation which allows lateral and vertical mobility within the vocational educational system and between current education systems. It defines the rules for credit allotment and follows the National Skills Qualification Framework.

Sl. No.	Academic Level	Entry Qualifications at different levels.	Exiting Qualifications at different levels	NHEQF/ NSQF level	Unified Credit Level (UCF)
1	10th Std.		10th Standard	Level 2	3.0
2	11th Std./ 1st year Diploma	10th Completed	A candidate exits with 10+1 year of Diploma or equivalent with NHEQF/ NSQF level 3/ UCF level 3.5	Level 3	3.5
3	12th Std./ 2nd year Diploma	A candidate completing 10+1 year of Diploma or 11th std or equivalent vocational with NHEQF / NSQF level 3/UCF level 3.5/two year duration ITI	A candidate exits with 10+2 year of Diploma or equivalent with NHEQF/ NSQF level 4/ UCF level 4	Level 4	4.0
4	Final year Diploma	A candidate completing 10+2 year of Dip. or 12 th std or equivalent vocational with NHEQF / NSQF level 4/	Diploma	Level 5	4.5

		UCF level 4			
5	1st year UG Degree	12th Completed	Undergraduate Certificate	Level 5	4.5
6	2nd year UG Degree	A candidate with Diploma in appropriate branch of Engineering /Equivalent Vocational or Technical Program with NHEQF level 5/UCF level 4.5 completed	Undergraduate Diploma	Level 6	5.0
7	3rd year UG Degree	A candidate with 10+4/ 12+2 in appropriate domain with NSQF level 6/UCF level 5 completed	Bachelor of Vocational Education	Level 7	5.5
8	Final year UG Degree	A candidate with 3 years Bachelor degree in Vocational/B.Sc. in appropriate domain with NHEQF level 7/UCF level 5.5 completed	B.E./B.Tech.	UG Engineering Degree	6.0

- AICTE further suggests that at each entry, Institution/ University has to identify the educational gaps/ skill gaps and suitable bridge courses may be offered.
- To make the students employable after every exit, the skill component with progressive enhancement in skills in respective disciplines may be introduced in the curriculum right from the 1st year of the program by the concerned regulatory body/ University/ Technical Board, as the case may be

1.4 Industry 4.0:

It refers to a new phase in the Industrial Revolution that focuses heavily on interconnectivity, automation, machine learning, and real-time data. It is a digital transformation of engineering functions. The technologies include Web 3, IPv6 and the Internet of Things, Virtual stores and private products, Embedded systems and cyber-physical systems, Cloud Computing, , Cyber Security, AVR, RPA etc. Everything is getting smart (Smart industry, Smart manufacturing, smart machines), The resilient factory, Advanced manufacturing, Additive manufacturing, big data, AI & ML, NPL and predictive maintenance, interconnected supply chains, intelligent robots etc. In short we will experience digitally connects data, people, processes, services, systems, and IoT-enabled industrial assets across cyber and physical worlds. It refers to technical advancements in artificial intelligence, machine learning, 5G technology, the internet of things, robotics, biotechnology, quantum computing, and so on.

1.5 Other Points

- NEP-20 indicates that there is Exit after grade 10. Hence, SSC Board exam for grade 10 and 12 will be continued.
- The Approval Process Handbook for 2022-23 mentions the urgent need to review the curricula of Diploma programmes. However, the course entry, exit and its duration needs to be finalized first for the meaningful review of curricula.
- Strong industry linkage is expected from institutions for internship and projects.
- University Grants Commission (UGC) has issued guidelines for introduction of B.Voc. degree programme under NSQF.
- Right now, approval to D.Voc. & B.Voc. Courses is given by both AICTE & UGC. However, AICTE considers only AICTE approved institutions while UGC considers all universities and colleges included under Sections 2(f) and 12(B) of UGC Act.
- AICTE and UGC have prepared a sample list of B.Voc. & D.Voc. courses. There appears duplication in nomenclature of courses. However, the nomenclature given by AICTE may be considered appropriate for AICTE approved institutions.

2.0 Recommendations

2.1 General recommendations

1. The committee report & recommendations are proposed to be submitted to AICTE/ UGC through State Government to formulate policy for polytechnic (vocational) education.
2. The Polytechnic Education is recommended to be mandated with following objectives:
 - a. To provide vocational education, as envisaged in NEP 2020, catering skill requirements of relevant industries.
 - b. To provide judicious mix of skills relating to profession and appropriate contents of related technology.
 - c. Predefined entry and exit option points (Certificate & Diploma)
 - d. To ensure that students have adequate skills and relevant knowledge so that they are work ready at each exit points.
 - e. To provide vertical mobility to students coming out of Polytechnics and bringing them in either main stream of technical education or vocational education.

2.2 Eligibility Criteria & Intake

- a. As the number of seats available for DSE for lateral entry of diploma students are sufficient enough to accommodate all the diploma pass outs, committee felt no need to change the eligibility norms. However, in order to provide more flexibility to the candidates of other faculties, not only BSc students but Bachelor of any discipline (passed 10 + 2 exam with Mathematics and also B.Voc. 1st year students are recommended to be made eligible for direct 2nd year Degree admissions.
- b. Out of the students passing diploma every year, majority (65% to 75%) are opting for engineering degree admission and around 10% to 15% are taking up jobs. Remaining students may be advised to opt for vocational education. However, MSBTE may take

tracer studies through affiliated institution to know whereabouts of 10 to 25% diploma pass outs.

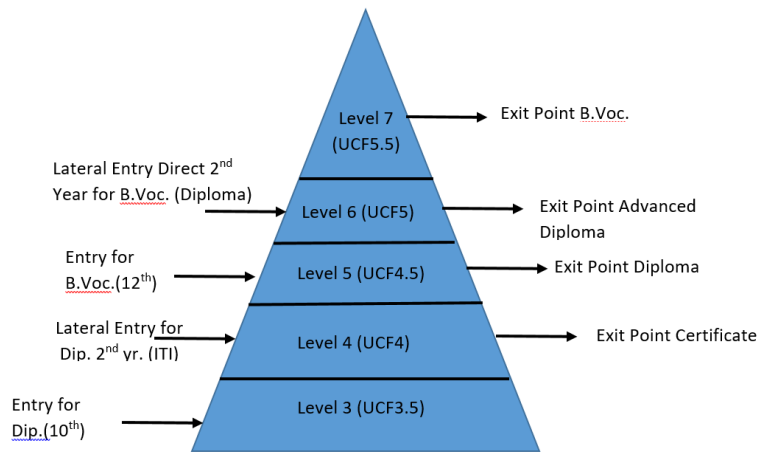
- c. Intake for direct second year degree admission: 10% of first year intake + the vacant seats at first year level may be retained except for outstanding institutions i.e. Institutes of state importance (ISI).
- d. The outstanding degree institutions may be decided on the basis of accreditation and autonomous status. The intake of lateral entry is proposed to be enhanced in such institutions from existing 10% to 20% owing to following reasons:
 1. As per the existing provision stipulated by AICTE, institutes can admit the Diploma holders to direct second year engineering equal to 10% of the sanctioned intake of degree courses plus vacancies at first year level.
 2. This intake was reduced by AICTE since academic year 2019-20 from 20% to 10%.
 3. As these are reputed institutions, no unfilled first year vacancies exist in such institutions. Hence, practically diploma students have only opportunities against only 10% seats which has resulted into restricting the entry of meritorious students from rural Maharashtra to well performing institutes.
 4. Though students have spent 3 years relentlessly in polytechnic, studied to his/ her best of abilities and also secured good marks but is missing entry into such quality engineering degree institutes by little margin and hence deprived of providing opportunity of education in reputed institution due to no seats available.
 5. In order to encourage institutes to deliver higher quality education (obtain accreditation and achieve autonomy), and also meritorious students, the lateral entry of 20% of the sanctioned intake of a particular degree programs or course/s may be provided to autonomous engineering degree institutes having valid NBA accreditation in that respective programs or course/s.

Bachelor of Vocation (B.Voc.):

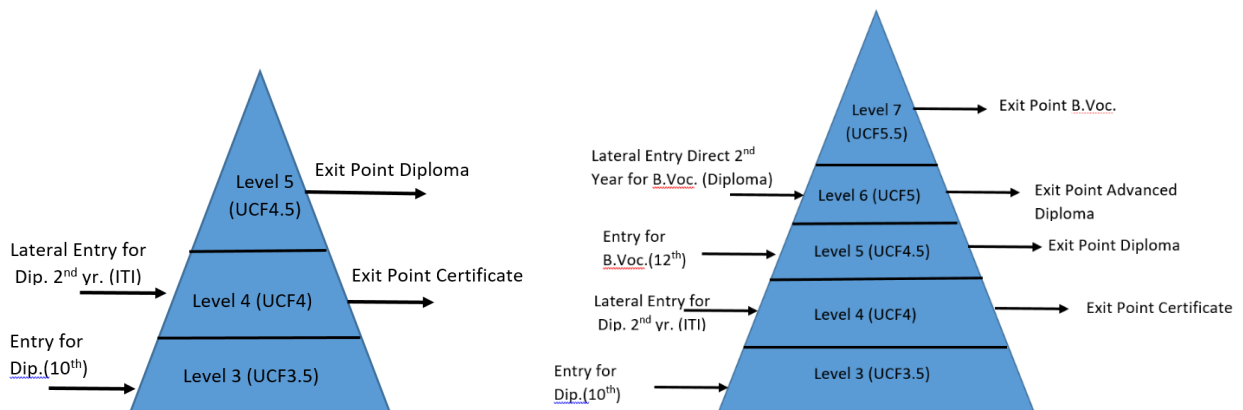
NEP 20 is giving more focus on vocationlization and it is expected that by 2025, at least 50% of learners through the school and higher education system shall have exposure to vocational education. In order to achieve this target, AICTE and UGC have developed a structure for Bachelor of Vocation (B.Voc.). The 145 institutions (AICTE 72 & UGC 73) from Maharashtra have been given approval to offer 362 (144 & 218) B.Voc. programs with an intake of 23830. As only 16% seats are filled in these institutions, following remedial actions are proposed:

- a. The following mandate for Objectives for B.Voc. may be issued:
 1. To provide judicious mix of skills relating to a profession and appropriate content of General Education.
 2. To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
 3. To provide flexibility to the students by means of pre-defined entry and multiple exit points.

4. To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
 5. To provide vertical mobility to students coming out of 10+2 with vocational subjects.
- b. As Polytechnics are involved in vocational education, it is recommended that the diploma students may be permitted to continue their education further for 2 more years in the polytechnic for award of B.Voc. as per UGC guidelines. Considering the present system of Diploma to Degree education of 10+3+3 and direct Degree education of 12+4, the committee members from industry opined that proposal of Vocational Degree with Diploma + 2 years (10+3+2) or 12+3 will be welcome step for the industry.
 - c. Considering the credit framework mentioned in the AICTE Approval Process Handbook for the year 2022-23, the existing deserving Polytechnics may be upgraded to award of vocational degree (B.Voc.) of 3 years with entry level qualification of 12th and the students opting out after completion of 1 year may be awarded Diploma Vocation certificate (D.Voc.) and after 2 years may be awarded Advanced Diploma Vocation (A.D.Voc.). The deserving polytechnics will be able use existing infrastructure effectively. The option of providing B.Voc. is recommended to be given to the deserving Polytechnics only with the identified potential areas and not to be made applicable to all.
 - d. The deserving polytechnic shall remain affiliated to MSBTE for the award of diploma (Engineering) and those selected for offering B.Voc. programs need to take affiliation from the University concerned (preferably Dr. Babasaheb Ambedkar Technological University Lonere). The state government will issue necessary direction to the University concerned.
 - e. The criterion for selection of polytechnics eligible to offer B.Voc. may be decided by constituting a separate committee (may be at MSBTE level or at DBATU). The AICTE guidelines for starting B.Voc. programmes including nomenclature may be used.
 - f. In order to make these course popular, it is necessary ensure employability (placement) of these courses. Hence, it is recommended to introduce any specific D.Voc & B.Voc. courses in consultation with industry (either respective SSC or Industry associations) only. The courses so introduced should be given wider publicity among the concerned industries by the SSC/ industry associations so that the employee industry is made aware about the availability of manpower. The role of concerned SSC is of prime importance to make course popular ensuring job placement.
 - g. The proposed structure for B.Voc. embed with current diploma education is as follows:



- h. Though all exit options are provided in the structure designed by UGC/ AICTE, multiple entry options at UCF 4 and UCF 5 need to be provided so as to make these options available.
- i. The proposed Vocational Degree needs to be integrated with the apprenticeship at appropriate levels. The industries are in need of apprenticeship and prefer it, in order to get the trained manpower at later stage in respective industrial setups.
- j. The Diploma and with the options of lateral entry to Vocational Degree will be a win-win situation for candidates desiring to pursue the higher education related to the industrial setups.
- k. The Diploma and Vocational Degree route will be more acceptable to the students from social and economical weaker section who cannot continue the professional degree at one go.
- l. The Diploma and Degree pass outs are large in number. However, its employability is the major issue of concern. With the vocationalisation, internships, apprenticeship, and involvement of sector skill councils in certification of levels, the issue of employability will be addressed to certain extent with hands on work exposure to the Diploma and Degree holders.
- m. It may be recommended to AICTE that B.Voc. degree offered under Engineering & Technology may be named as B.Voc. (Engg & Tech)
- n. Structure for Diploma Engg./ D.Voc. & proposed B.Voc (after up gradation of polytechnic)

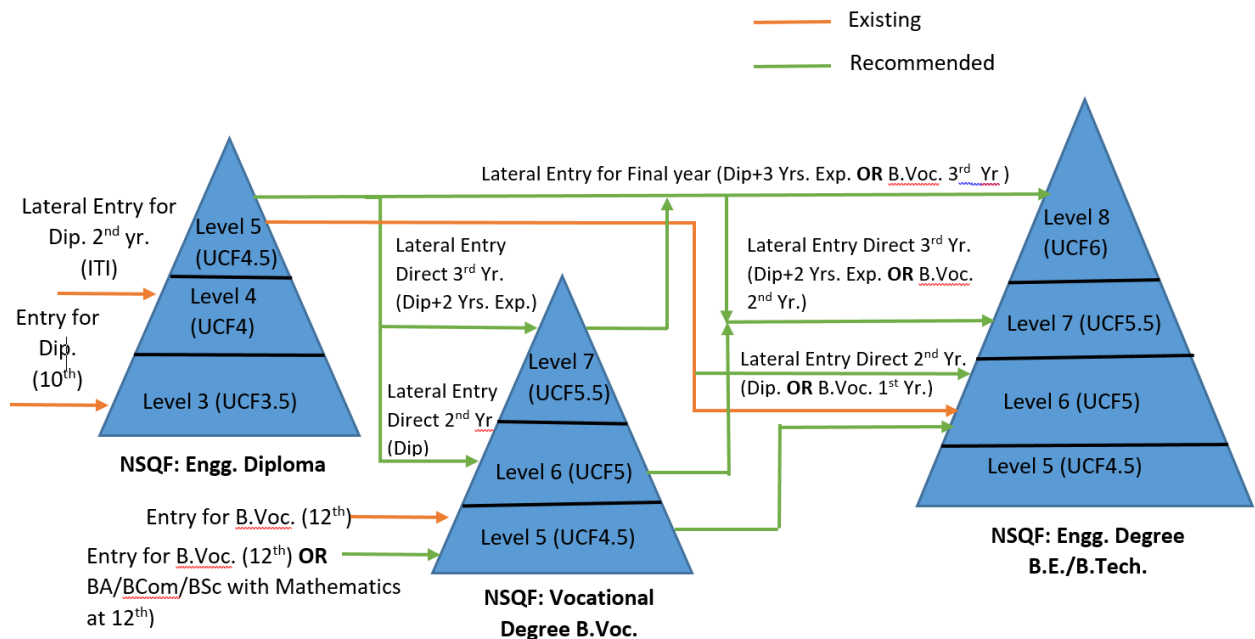


2.3 *Lateral Entry/ Exit:*

NEP 2020 envisaged an imaginative and flexible curricular structure enabling creative combinations of disciplines for study offering multiple entry and exit points, thus, removing currently prevalent rigid boundaries and creating new possibilities for life-long learning. The undergraduate degree needs to be provided with multiple exit options within this period, with appropriate certifications or a diploma for exit at different point of time.

Though multiple entry at second year of diploma as well as second year of Degree Engineering (B.E.) are available, the connectivity between Diploma (Engg.), B.Voc. and B.E./ B.Tech. is not clearly elaborated. The detailed recommendations in this regard are as follows:

- a. The diploma education should have proper connection with mainstream education as well as vocational education with multiple entry and multiple exit option well defined and imbibed and documented in the curriculum structure.
- b. A successful diploma student securing 45% marks (40% marks in case of reserved category) may be made eligible for lateral entry at 2nd year of 3 year vocational degree (B.Voc.).
- c. Diploma (Engg. & Tech.) + 2 years of experience having level certified by SSC may be given lateral entry at Third Year of B.Voc. Within sanctioned intake
- d. It is also recommended to make B.A. and B.Com. students with at least 45% marks (40% marks in case of reserved category) eligible for admission to vocational degree (B.Voc.) programs provided that they have acquired skill sets of the level 2 through NSQF provisions and passed SSC with Mathematics (the levels are to be certified by respective sector skill council).
- e. The drop outs from B.A., B.Com., B.Sc. may be considered as a lateral entry to Diploma and Vocational Degree at appropriate level considering the acquisition of credits by the respective candidates at the level of drop out.
- f. If a student completes Diploma successfully in a specific branch of engineering with additional course on future skills (basket of courses/ subjects for future skills to be decided by subject experts), such diploma student may be awarded Diploma (Hons) certificate.
- g. A successful diploma students having obtained industrial experience (working as a regular employee) of 2 years (equivalent NSQF level 6 to be certified by SSC concerned with the industry/ program or industry) may be provided lateral entry at 3rd year of B.Voc. program as well as engineering degree (B.E./ B.Tech.) program and those having 4 and more years of experience (working as a regular employee) (equivalent NSQF level 7 to be certified by SSC concerned with the industry/ program or industry) may be provided lateral entry at 4th year of engineering degree (B.E./ B.Tech.) program.
- h. The consolidated pathways for multiple entry and multiple exit along with NSQF & corresponding UCF levels for diploma students to B.Voc. & BE/ B.Tech. programs are symbolically depicted below:



2.4 Student Pathway:

Student Pathways for D.Voc. and Diploma Engg. to B.Voc. courses and from B.Voc. to B.E. / B.Tech. programs

S. No.	D.Voc. & B.Voc. Specialization – Courses	Diploma/ Degree Engg. courses eligible for lateral entry
	↔	
1	3D printing	Mechanical Engineering
2	AI & Robotics	Mechanical Engineering, Electronics engg.
3	Architectural Drafting and Basic 3D design	Civil Engineering
4	Artificial Intelligence, Machine Learning & IoT	Computer Science Engg, Electronics engg., Information Technology, Mechanical Engg.
5	Artificial Intelligence and Data Science	Computer Science Engineering, Electronics engg.
6	Big Data Analytics	Computer Science Engineering
7	Block Chain	Computer Science Engineering, Information Technology
8	Virtual Reality and Augmented Reality	Computer Science Engg, Electronics engg.
9	Cyber Security and Digital Forensics	Computer Science Engineering, Instrumentation Engg.
10	Industrial Automation and Robotics	Mechanical Engineering, Instrumentation Engg.
11	Internet of Things	Computer Science Engg, Electronics engg.
12	Architecture Assistantship	Civil Engineering
13	Automotive Manufacturing Technology	Mechanical Engineering, Automobile Engg.
14	Automobile Servicing	Mechanical Engineering, Automobile Engg.
15	Biogas Technologies	Mechanical Engineering
16	Building Materials and Construction Skills	Civil Engineering
17	CNC Programming and Operation	Mechanical Engineering
18	Construction Technology	Civil Engineering
19	Design and Development of Electronic Devices	Electronics Engg., Electrical Engg.
20	Digital Manufacturing	Mechanical Engineering
21	Electrical Skills	Electrical Engg.

S. No.	D.Voc. & B.Voc. Specialization – Courses	Diploma/ Degree Engg. courses eligible for lateral entry
22	Electronics Manufacturing Services	Electronics Engg., Mechanical Engineering
23	Hospital Instrumentation and Management	Instrumentation Engg. & Electronics Engg.
24	Industrial Electronics	Electronics Engg.
25	Industrial Microbiology	Biomedical Engg
26	Industrial Tool Manufacturing (ITM)	Mechanical Engineering & allied branches
27	Marine Technologies	Marine Engg.
28	Manufacturing Skills	Mechanical Engineering & allied branches
29	Mechanical Manufacturing	Mechanical Engineering & allied branches
30	Mechatronics	Mechanical Engineering & allied branches
31	Metal Construction and Fabrication	Mechanical Engineering & allied branches
32	Mobile Communication	Electronics Engg. & allied branches
33	Piping Technology	Mechanical Engineering & allied branches
34	Printing Technology	Printing & Packing Tech.
35	Production Technology	Mechanical Engineering
36	Production - Tool and Die Manufacturing	Mechanical Engineering
37	Production-Press Tool and Die Maintenance & Stamping	Mechanical Engineering
38	Refrigeration and Air-Conditioning Skills	Mechanical Engineering
39	Repair and Maintenance of Electric Vehicles	Mechanical Engineering, Electrical Engg.
40	Rubber Technology	Rubber Technology
41	Small Hydropower Technologies	Civil Engineering, Electrical Engg.
42	Solar and Renewable Energy	Mechanical Engineering, Electrical Engg.
43	Solar PV Systems: Operation and maintenance	Mechanical Engineering, Electrical Engg.
44	Solar Technology	Mechanical Engineering & allied branches
45	Solar Thermal Systems: Operation and Management	Mechanical Engineering
46	Technology Aided Chip Design	Electronics Engg. & allied branches
47	Telecom and Electronics Skill	Electronics Engg. & allied branches
48	Telecommunications	Electronics Engg. & allied branches
49	Textile Manufacturing	Textile Engineering
50	Tractor Repair and Servicing	Mechanical Engineering & allied branches
51	Unmanned Aerial Vehicles	Electronics Engg., Mechanical Engg.
52	VLSI Design Skills	Electronics Engg. & allied branches
53	Welding Technology	Mechanical Engineering
54	Wind Power Technologies	Mechanical Engineering
55	Green House Technology	Civil Engg.
56	Animation and Graphic Design	Computer Engg
57	Computer Hardware	Computer Engg
58	Computer Networking	Computer Engg
59	Computer-Aided Design	Mechanical Engineering
60	Data and Web Analytics	Computer Engg
61	Digital Media and Animation	Computer Engg
62	Forensic Science and Data Analytics	Biomedical Engg.
63	Geoinformatics	Civil Engg.
64	Graphics and Multimedia	Computer Engg. Electronic & allied branches
65	Hardware and Networking	Computer Engg & Electronic & allied branches

S. No.	D.Voc. & B.Voc. Specialization – Courses	Diploma/ Degree Engg. courses eligible for lateral entry
66	Information Technology	Information Technology
67	Software Development	Computer Engg, Information Technology
68	Web Design and Mobile Application Development	Computer Engg, Information Technology
69	Web Designing, Animation & Graphics	Computer Engg, Information Technology

A comparison of General Education, Vocational Education and Professional Education on a time scale which may help to understand the educational path way and also interlinking of these systems is as given below:

Time Scale	General Education	Vocational Education	Professional Education	
X Std.	SSC Level 2 (UCF 3.0)			
X+1			First Year Diploma Engg Level 3 (UCF 3.5)	
X+2= XII	HSC		Second Year Diploma Engg Level 4 (UCF 4)	
XII+1		B.Voc. I yr. D.Voc. Level 5 (UCF 4.5)	Diploma Level 5 (UCF 4.5)	First Year UG Engg Level 5 (UCF 4.5)
XII+2		B.Voc. II yr. Advanced Diploma Level 5 (UCF 4.5)		Second Year UG Engg Level 5 (UCF 4.5)
XII+3	Graduation (BA, BCom, BSc, BJ)	B.Voc. III yr. Level 7 (UCF 5.5)		Third Year UG Engg Level 7 (UCF 5.5)
XII+4				B.E./ B.Tech. UCF 6.0

2.5 Role of MSBTE

- As per the New Education Policy, Board exam for 10th & 12th is proposed to be continued and exit after 10th has also been provided. Considering this scenario, the present system of Diploma education of 3 years after 10th should have more focus on vocationalization (skilling) so as to fulfil the expectations envisaged in NEP 2020. The detailed recommendations in this regard are given in this section. The recommendations regarding curriculum and examination and assessment are also applicable to the affiliating Universities in the state. Hence it is recommended to inform MSBTE as well as Universities to initiate the processes immediately.
- MSBTE is mandated to regulate Diploma level Technical Education in the State of Maharashtra by an act of Government of Maharashtra. It formulates curriculum of new diploma/ certificate courses and also undertakes the periodic revision of various courses offered with the help of industry experts.

- c. While Universities in the state are mandated by University Act to award Degree, Post graduate Degree and Doctoral degree to the deserving students from the affiliated institutions.
- d. In view of NEP 2020, MSBTE has to revise its curricular structure to enrich vocationalization as well as to facilitate multiple entry and multiple exit options, teaching learning process needs to be rejuvenated drastically to incorporate online/ blended learning and hands-on training and finally the evaluation methodology need to be revamped right from question paper setting so as to suit it to outcome based education.

I. Curriculum:

1. The curriculum of diploma education should be designed in a manner that at the end of year-1, year-2 and year-3, students are able to meet NSQF level 3, 4 and 5 respectively in order to comply with the objective of polytechnic education mentioned at para (2.1) above.
2. The curriculum in each of the years of the programme would be a suitable mix of general education and skill development components, preferably 40% knowledge plus aptitude and 60% skills.
3. Skill Development Components:
 - a. The focus of skill development components shall be to equip students with appropriate knowledge, practice and attitude, so as to become work ready.
 - b. The skill development components should be relevant to the industries as per their requirements.
 - c. The curriculum should necessarily embed within itself, National Occupational Standards (NOSs) of specific job roles within the industry sector(s). This would enable the students to meet the learning outcomes specified in the NOSs. (iii) The overall design of the skill development component along with the job roles selected should be such that it leads to a comprehensive specialization in one or two domains.
 - d. The curriculum should also focus on work-readiness skills in each of the three years.
 - e. Adequate attention needs to be given in curriculum design to practical work, on the job training, development of student portfolios and project work.
4. The emphasis should be on learning outcome and not the input, output and processes. The general education component of the curriculum may be transacted in any mode without compromising on quality. However, the practical/hands-on portion of the skills development components of the curriculum should be transacted normally in face to face mode, either within the institution or at a specified industry partner location. However, if the industry prescribes its acquisition through blended or distance mode, the same may be followed.
5. As per Industry 4.0, Digital Excellence will be the New Normal. Key soft skills for Digital Age need to be a part of curriculum. These skills include Problem Solving, Communication skills, Social Skills, Data Analytics & interpretation, Active learning, resilience, flexibility, Digital Dexterity, Analytical and Critical thinking, Knowledge

Management, Strategy & planning, Teamwork & Adaptability, Ethics & responsibility, The Nation needs to transition to a new digital environment.

6. Emerging areas that require a constant push to seal India's position in the global market are Data Science, Artificial Intelligence, Natural Language Processing, Technical skills in demand, Python Programming, Neural Networks, Cloud Computing, Supply Chain, General Statistic etc.

II. Examination and Assessment

1. The BTE has to necessarily establish a credit based assessment and evaluation system for the diploma and Vocational programmes.
2. The assessment for the general education component should be done by the BTE as per prevailing standards and procedures.
3. The assessment for the skill development components should necessarily focus on practical demonstrations of the skills acquired. The BTE may like to consult the respective Industry or Sector Skill Council for designing the examination and assessment pattern for the skill development components.
4. The BTE may also consider using the designated assessors of Sector Skill Councils/ industry associations for the conduct of practical assessment.
5. The BTE may design necessary Rubrics for outcome assessment.
 - a) In view of vocationlization, the practical aspects, internship & apprenticeship needs to be integrated in curriculum structure and assessment for imparting the skills at large & evaluation has to be planned accordingly.
 - b) MSBTE will have to closely work with SSC for assessment, evaluation and in some cases certification of students for implementation of multipoint entry & exit systems in Diploma level Technical Education.
 - c) Faculty Training: Faculty training being the most vital aspect, key faculty members need to be trained under "Train the trainer" program who in turn will train their colleagues in respective departments.

2.6 Faculty Development:

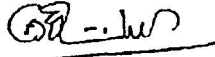
- In view of vocationalization of entire education system, vocational courses are aiming to find important positions. In order to inculcate skills in the students, wide spread training (pedagogy & technical) of the faculty will be needed. MSFDA may be entrusted the task of scheduling such training programs not only for Govt. & aided institutions but also unaided institutions too. MSBTE may assist MSFDA in arranging training programs for polytechnic faculty.
- In line with the state government budgetary provision policy for govt. & aided institutions under faculty development, the unaided institutions may also be asked to keep 10% of fees for faculty development. The budget can be used for faculty training conducted by MSFDA, industry exposure (one semester hand on in the industry) etc.
- 360 degree feedback system may be made mandatory for unaided institutions also.

References:

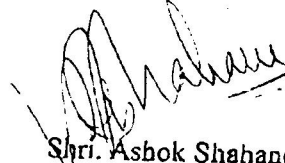
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