ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

A Comprehensive Training Policy for Technical Teachers

April, 2018

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1.0. Introduction

With rapidly changing technological scenario and ever-increasing global connectivity as well as competitiveness in modern times, the role of technical education in development has become very significant and challenging. Also, as a consequence of intensive technological developments, the concerns of sustainability, environmental degradation, resource depletion and inclusive growth have become more relevant. The need for well-qualified engineers/ professionals is more critical with complex problems that affect the quality of life of everyone everywhere and also for businesses seeking well-rounded engineers and professionals who can take on leadership roles. Further, the concerns for making the educational curricula and training more conducive to the national needs are becoming urgent.

In our country, we have observed that in the past few decades there has been a spectacular increase in the number of technical institutions. However, the thrust on improving the quality of education in such a wide spectrum of institutions has been lagging. A large number of technical institutions exist in the country where a huge number of teachers are employed and being recruited [Numbers available in AICTE website]. It is estimated that at present, around 30,000 teachers are being recruited afresh every year in these institutions.

The technical institutions provide the technical manpower needed to meet the requirements of the country. In these institutions, the most important component of the information-knowledge transition is facilitated by the teachers. The teaching professionals or teachers join this profession immediately after the completion of their post graduate or research degrees and then progress in their career. As of now, there is no training, which prepares them to take on the role in the teaching profession.

Another important issue worth pondering is that teaching profession in the technical education domain no longer attracts the best academic performer and many a time, it becomes the last choice. There is hardly any mechanism and opportunity to motivate

academically brilliant candidates to take up the jobs in the teaching profession and groom them for coping up with the quality of education. Needless to emphasize that with such a downside trend, a vicious cycle is created that continues to operate, resulting in further degradation of the quality of education.

Given the above scenario, the need for adequately augmenting the quality of technical education and making it more and more appropriate to the present requirements is becoming very acute and requires effort on the part of the monitoring agencies as well as the stakeholders. AICTE has been seriously concerned over this issue and has been adequately preparing itself to launch number of initiatives to cope with this.

The AICTE council in its 49th meeting held in March 2017 comprehensively deliberated on these issues and after several discussions held with stakeholders in technical education, approved a package of effective measures for improving the quality of technical education in the country. The measures include an exhaustive revision in the current curricula, training of teachers, mandatory student orientation program at the time of induction, examination reforms, mandatory accreditation, advance perspective planning etc. The most important among these is perhaps, to formulate and implement a comprehensive 'training policy for technical teachers'.

As a step forwards, the AICTE constituted a committee to suggest modalities for implementation of the Training Policy for Technical Teachers.

The committee had following experts as members.

1. Prof. H. P. Khincha — Chairman
   Former Vice-Chancellor, VTU,
   Bangalore
2. Prof. M. M. Malhotra — Member
   Former Director NITTTR Chandigarh
   Panchkula,
3. Prof. R P Dahiya — Member
   Retired Professor
   Indian Institute of Technology Delhi
   Hauz Khas, New Delhi-110016

4. Prof. R. R. Gaur — Member
   Professor of Mechanical Engineering (Retd.)
   Indian Institute of Technology Delhi
   New Delhi

5. Prof. V.H. Radha Krishnan — Member
   Professor of Curriculum Development (Engineering Fields)
   NITTTR Bhopal
   Bhopal

Terms of reference: To suggest modalities for implementation of the scheme of training policy for technical teachers and scheme for starting mandatory certificate course for teachers at entry level.

The Committee's mandate was to prepare a comprehensive Training Policy for Technical teachers which will include a training program as the induction level as well as propose suspensive training inputs at various stages of the teaching carrier.

The committee deliberated in detail on the different aspects involved in this important mandate and had several meetings over a long period. Also, the committee had discussions with the AICTE officials on the related aspects. There was a meeting of the Vice-Chancellors of universities called by AICTE in which the salient points of this report were presented and feedback and comments sought. Also, a special meeting was arranged to discuss the modalities with the Directors of NITTRs at AICTE headquarters, New Delhi. The committee deliberated on all the feedback and comments and suggestions and has incorporated them in the body of the report. The term 'technical education' in the context of this report includes the subject matters handled by AICTE including Engineering, Management, Pharmacy, Architecture etc. Even though the report refers substantially to the engineering subject component, similar conclusions can be drawn for other technical subjects and modifications and alterations can be worked out accordingly.

1.1 The Rationale and need for the Training Policy

The committee highly appreciated the AICTE initiative towards framing and implementing a comprehensive training policy for technical teachers. It strongly concurs that there is an urgent need for doing this to bring tangible improvement in the quality of technical education in the country as well as to attract highly motivated and talented persons to this profession and to facilitate them to contribute to their full potential.

The trend in most of the technical institutions in the country, including even in the pace-setting institutions such as the IITs, NITs, IIITs etc., fresh technical graduates and the like do not undergo any training. By and large, fresh graduates after M.Sc., M.Tech, MBA or Ph.D are recruited as teachers and are left to fend for themselves in working out their profession with an expectation that they will become competent teachers by trial and error, totally un-mentored.

It may be easily appreciated that to be a proficient teacher in any field, one should have a sound knowledge of the subject. Also its application aspects in the prevailing practice scenario in real life and then, one should have the requisite teaching skills needed to communicate and share this knowledge with the students. This has to be done in a manner so that they are motivated and fascinated to acquire that knowledge and visualize its application, should helping them to become a competent professional capable of contributing effectively towards the welfare of the society and also their career development.

A faculty member who completes his/ her studies in a timely manner and joins the academic career normally enjoy 30-35 years. The first deliverable viz. 'outputs' is quantifiable in a short duration from the start of the academic career. The second deliverable viz. 'outcomes' comes in a medium duration say 10-15 years and the third namely 'impacts' in a long duration of say beyond 20-25 years. A faculty member is required to provide quality outputs in the short run so that they lead to meaningful outcomes for the disciplines in the medium duration which in turn cause a valuable impact for the nation in the long duration. Thus a faculty member is required to plan the efforts and their directions to make the academic carrier meaningful.

Truly speaking knowledge of practice helps to be a subject expert and, therefore, competent enough for teaching. Such situations are ensured in several other professions such as the medical profession, the legal profession etc. where the teachers are simultaneously the practitioners as well. In the domain of technical education, this condition is only very scantily catered to or is totally missing. Therefore, some ways and means need to be

evolved to provide such exposure to technical teachers. Guiding them into carrying out meaningful R&D, sponsored projects, consultancy etc. provides such an avenue to some extent for which proper training and exposure are required. Hence it is essential to have such skill and leadership enhancement programs for young professionals entering the profession and continuing after to be able to fulfil the expectation better and succeed.

There is another very important challenge for the present-day technical teachers. On the one hand, they have to keep abreast with the latest developments in their fields or the cutting edge technologies in an effort to be at par with the 'world-class' and on the other hand, it is equally important to develop the competence to visualize the indigenous needs creatively and to find appropriate solutions which are useful and user-friendly. To develop such competence and culture of creative innovation, one needs proper training and practice. Only when teachers themselves acquire the skill of proper need analysis, meaningful literature review, problem framework, and creative problem solving, they can carry out meaningful work and guide the students properly.

A core requirement for effective classroom interaction is that the teachers develop the art of preparing a systematic lesson plan and a lively classroom delivery. This is an area of basic teaching competence. Further, appropriate pedagogical techniques, modes of practice by the students as well as effective modes of evaluation of the desired learning outcomes are required to be mastered by the teachers to be successful. These skills have to form an important part of their training.

Each faculty member has to set the relative pace of the activities in their career. In the beginning, the faculty member is not comfortable with student engagement, Institutional development and teaching-learning activities. Then, when the faculty has become comfortable with student development activities and improved the competence in teaching learning and institutional development there in quantum improvement in the technology development, industry relevance and national and international levels and contribute actively to the student and Institutional development and industry relevance.

A need of new domain "teacher training" has also arisen because of increasing use of ICT tools in the modern teaching-learning process, in seeking information and in knowledge dissemination. There is a deluge of new softwares, online platforms, e-modes of teaching-learning, e-sources of information etc. and the teacher has to learn how to make judicious use of these without getting lost in the quagmire and also without becoming obsolete.

1.1.1 Need for Orientation in Human Values

Another very important and yet grossly neglected area of teacher competence is in the domain of value inculcation, attitude formation and personality development. Realization of their social responsibility and the ethical conduct of the profession is becoming more and more significant.

It is not difficult to appreciate that there exists a strong complementarity between human values and skills. All the acquired skills are harnessed in accordance with the value perception. Unless a person inculcates a holistic perception and universal human values, all the skills are likely to get misused under the influence of greed, fear, selfishness, jealously etc. In the modern times, human beings have been able to empower themselves with sophisticated technology. Hence simultaneous enrichment with human values has become all the more important.

Training in human values through an appropriate process of self-exploration happens to be, by far, the most important component of the training of teachers. They must also be able to visualize the inter-relationship and interaction between science, technology and human values. During past two decades, some innovative experiments have been conducted towards integrating human values in technical education in some professional Institutions such as IIT Delhi, IIIT Hyderabad, IIT Kanpur, IIT BHU etc. and technical universities such as UPTU, PTU and others. These also include the development of effective teacher orientation programs and resource material which can be quite useful in providing this rather difficult constituent of teacher training. Needless to mention that the real foundation of sustainable development lies in the appropriate integration of science, technology and human values.

Teachers with sound value-orientation will also be effective mentors and counsellors for the young students, help create a value-centric environment in institutions and mould the thinking of the youngsters enabling a holistic development of their personality. Active academics alone cannot help build a nation of good citizen beings unless it is blended with due prepositive of passive academics consists of intelligent based and character based traits.

1.1.2 Continuous Teaching Learning

It may be pointed out that a teacher also has to learn the knack of continuous knowledge updation and life-long learning. Also at successive stages of the teaching career, training inputs about curricular development, infrastructure development, institutional development, disciplinary and other important aspects of educational administration and policy formulation etc. will also be needed.

The need and rationale explained above require the development of a comprehensive Training policy for young inductee teaches at different stages of their causes as well as meeting different needs. Considering the training needs and also the size of the problem in our country, the policy has to be comprehensive to be implementable on a large scale.

2.0 Some Previous Initiatives

Although the need for a mandatory training program for technical teachers has unfortunately not been appreciated in full seriousness in the past, there have been some sporadic initiatives launched with the intention of improving the quality of technical teachers. Among these, perhaps the more effective was in the domain of quality improvement programs (QIP). The main focus of QIPs has been to facilitate the enhancement of qualification of in-service teachers. In this respect, they have been helpful and therefore, need to be continued. However, the effort towards improving the teaching skills, ICT capabilities and more importantly the values and attitudes have been rather missing and need to be appropriately catered to.

In the early stages of technical education, i.e. in 1950s-60s, a three-year Technical Teaching Training program was launched by the Government of India in which brilliant and academically oriented B.Tech. graduates who wanted to go in for the academic profession were selected and provided with an enhanced stipend for doing Master degree programs along with some teaching assistance and orientation. However, this program catered to only a handful of prospective teachers and the emphasis on skills and value orientation was rather limited. The scheme was wound up after being in operation for about a decades or so.

Around the same time, four training-focussed national Technical Teacher Training Institutes (TTTIs) were established primarily targeted towards the training of Polytechnic teachers. These institutes have been actively engaged in training since then and been lately renamed as National Institutes of Technical Teacher Training & Research (NITTTRs) and are also carrying out the training of engineering college teachers along with Polytechnic teachers. They have also developed the necessary infrastructure and expertise for online modes of interaction. However, the training of this training, of course, these institutes have a long experience of technical teacher training which needs to be appropriately harnessed in the future after appropriate revamping and orientation. Similarly, number of Academic Staff Colleges (ASCs) were established by UGC for providing a general orientation and some refresher programs to the college teachers in general. However, these institutions are not very active at present, but their infrastructure and expertise can be well-utilized if properly assimilated in the comprehensive training policy being proposed.

As we are well aware, government agencies like MHRD, AICTE, UGC etc. do provide ample support for conducting short-term refresher courses, summer/winter schools and workshops etc. intended to improve the quality of technical teachers and also support training of teachers in industries and other research institutions but the programs need more systematic organization and monitoring after which these would also contribute to the in-service training programs.

Needless to emphasize that we should learn from the experience gained from earlier initiatives as well as use the infrastructure created and appropriately assimilate some of these in the comprehensive training policy being proposed.

3.0 Broad Objectives of the Training Policy

The committee deliberated in detail on the training need of teachers in there career and visualized two distinct categories of the training program:

- Faculty Induction Program (FIP) to be provided just after the recruitment of fresh teacher candidates.
- In-service training program catering to the specific requirement at various levels of the teaching career.

The committee proposes the following broad objectives of the training policy for inductee teachers

- To begin with clearly demarcate the training needs at different levels of career and for different categories of teachers, keeping in mind their present status the expectations from a good teacher and the ground reality of technical education in the country. This will naturally characterize the training needs at the time of induction as well as at the successive stages of the academic career.
- To prescribe the structure and contents of the training program at different levels.
- To propose a feasible mechanism to effectively implement the desired training program at a large scale throughout the country.
- To monitor, facilitate and successively improve the quality of training by proposing to develop suitable resource persons, resource material (both print and electronic) and carrying out action research.
- To recognize the salient implications of the proposed policy and to suggest ways to appropriately deal with these to establish a sustainable system for training of technical teachers.
- Continuous updating of Technical subject expertise by making mandatory, the successful completion of at least one subject course offer through technology-based means every year from anywhere in the world.

4.0 Training Needs during the Faculty Induction Program (FIP)

In this phase of training requirements of the faculty induction, of teaching skills, enhancement and leadership would be required in addition to general academic as well as specific requirements. This will need both instructional inputs as well as guided exposure to good practices and demonstrative situations. The committee after detailed deliberation has recognized the following requirements to be met in the training schedules.

- General orientation about the present scenario and challenges of technical education, the spectrum of duties and expectations.
- Basic understanding of the teaching-learning process, the psychology of learning and effective pedagogical techniques.
- Training in preparing a systematic lesson plan and effective classroom interaction developing competence in communication skills in various modes relevant to the technical profession.
- Inculcation of a holistic perception, professional values and ethical attitudes.
- Exposure to relevant ICT tools and aids for effective teaching-learning; and resources for lifelong self-learning.
- Training on appropriate use of various modes of evaluation.
- Training in creative problem-solving and research methodology; conduction and guidance of R&D projects.
- Guided exposure to good teaching practices, lab development etc.
- Training in miscellaneous aspects other than teaching and research such as administrative procedures, financial procedures and legal implication etc.

4.1 Some details of the proposed Faculty Induction Program (FIP)

As mentioned above, the first and a very significant training input proposed shall be in the form of a Faculty Induction Program (FIP) training be provided to fresh induction in the orientation.

The committee deliberated at length on the different aspects of this faculty induction program including contents, time duration, structure way of delivery, assessments etc., and suggest the following.

It is proposed that this phase of the Training Program for the teachers be provided in the one-year probation period of the teacher just after the selection. The instructional training can be in either classroom or technology-based mode.

The training program will be for the period spread over of two terms. The total contact hours proposed for the training would be in the range of 450-480 hours in the first term. This will be followed by the second term which would include- on the job training, training in industries/ R&D etc.

5.0 Broad Contents of the Instructor Modules to be delivered during the first term of FIPT

The modules and their content that follows in this section serve as a guide to provide an overall understanding of the topics to be covered. The minimum knowledge and skills that will have to be acquired upon course completion are also outlined.

5.1 MODULE 1: Orientation towards Technical Education & Curriculum aspects.

Rationale

To be responsive to internal requirements and to meet the challenges, it is important that various aspects of technical education system in the country are well understood by the young inductee teachers. The young teachers should understand the role and linkage of stakeholders and challenges/ issues affecting the quality of technical education. The technical teachers need to be also well conversant with the curricula aspects as it is the "key constituent" of any educational programs; hence approaches, implementation, monitoring and evaluation aspects are to be understood.

Contents:

- Overview of technical education, - the present scenario and emerging challenges; excellence in technical education – criteria for quality education.
- Domains of Learning-Cognitive, Affective and Psychomotor; Revised Bloom's Taxonomy, cognitive processes dimension and knowledge dimension, Program objectives and learning outcomes at different levels;
- Psychology of learning and motivation; principles of instruction and learning, understanding the teaching-learning process;
- Four pillars of learning proposed by UNESCO- learning to know, learning to do, learning to be & learning to live together;
- Interpreting curriculum and its characteristics, curriculum and instruction, curricular and extra-curricular modes of student-teacher interaction; alternative modes of learning; curriculum implementation monitoring and evaluation.
- Need for co-relating knowledge to professional practice, research & development

Expected understanding

- Analyze the issues and challenges in the domain of technical education especially concerning quality and excellence.
- Formulate learning outcomes at different levels in all domains of learning and explain the application of cognitive process and knowledge dimensions.
- Apply the concepts, principles and processes of instructions and learning to ensure effective implementation of the curriculum.

5.2 MODULE 2: Professional Values, Ethics, Ecology & Sustainable Development

Rationale

The technical education system should be able to equip the student with not only technical/ managerial competency but also professional values, ethics and moral values. Professional ethics also bring function of sustainable developments to be inculcated in inductee teacher who should be a role model to peer and students.

Contents

- Understanding the essential complementarities of 'Values and Skills'
- Understanding the human reality correctly and the inherent interconnectedness and order in the whole existence;
- Developing a holistic perception of human happiness, prosperity, life-goals, needs and relationships; ethical human behaviour;
- Mentoring and counselling; personality development;
- Understanding ecology and basic parameters of sustainable development;
- Salient values and attitudes for professional excellence and personality development; Social responsibility as good citizens and also as technical professionals.

Expected understanding

- Develop an adequate appreciation of the essential complementarities of Values and Skills and a better understanding of the human reality vis-à-vis co-existence in rest of Nature.
- Comprehend the prime basis of values, relationships and the holistic perception and their significance in the profession.

- Demonstrate ethical and responsible professional behaviour in the performance of his or her duties and roles.

5.3 MODULE 3: Communication skills and Modes and Knowledge Dissemination

Rationale

Effective communication is the lifeblood of education, and hence teacher needs the ability to transfer ideas, views, attitude and feeling etc., effectively and efficiently, through all formats speaking in reading writing listening etc. The young teacher should be made aware of nuances of communication skills and strategies to implement them as knowledge dissemination is affected by the communication media and hence effective using instructional is also critical to utilization, delivery.

Contents

- Basic concepts, models, verbal and non-verbal, and written communication: Importance of communication skills in the teaching-learning process and in knowledge dissemination; barriers in communication,
- Different modes of communications and respective media
- Application of principles of communication to improve the instructional process and for effective professional interaction with peers, superiors and subordinates.
- Proficiency in oral communication, logical discussion and presentation, use of dialogue mode: right pronunciation and command of language;
- Various modes of written communication – research papers, articles, technical reports, project proposals/reports, themes, manuals etc. Learning to write minutes, a summary of deliberation, executive summary etc. in an effective manner; Non-technical communication, official correspondence, file notes etc.;
- Introduction to modern media & methods, appropriate use of Educational Technology (ET) and audiovisual aids.

Suggested understanding

- Develop requisite competence in communication skills and use of various modes of knowledge dissemination needed by a technical teacher.

- Communicate effectively and clearly in the language of instruction, both orally and in writing, using correct grammar, in various contexts related to teaching-learning and assessment.

5.4 MODULE 4: Instruction Planning & Delivery

Rationale

This is one of the core skills for effective delivery in the learning process. The inductee teacher should be able to appreciate the process of human learning and curriculum design philosophies to interpret it rightly and deliver it effectively and efficiently. This would help the teacher attain the planned outcome of the teaching-learning experiences.

Contents

- Interpretation of learning outcomes, a clear grasp of the subject matter and learning outcomes objectives; preparing the
- Preparation and effective implementation of the lesson plan for systematic presentation in the classroom;
- Effective board work, the right pace of delivery, use of interactive mode; frequent recapitulation and summing up the key points;
- Co-relating lecture inputs effectively with tutorial exercises, home assignments and lab work as well as indicating relevance to prevailing practice;
- Supplementing with brief handouts/ class-notes and references for detailed study
- Appropriate instructional strategies and suitable teaching methods), and media for effective instruction and learning of students appropriate to the subject matter/course content.
- Feedback mechanisms for continuous improvement in the teaching-learning process.

Suggested understanding

- Develop requisite/learning context or materials and methodologies that are appropriate to the level of students and the subject content, forwards accomplishment of learning outcomes and development of the competencies in students as targeted in the program of study, applying the principles related to:
  a. Learning and instruction;

b. Instructional planning and delivery;
c. Practicum in the Engineering classroom.

- Organize and deliver class/laboratory/workshop based and industry/service sector-oriented instruction and learning to promote students' overall ability, personality and social development.

5.5 MODULE 5: Technology Enabled Learning and Life-long Self-learning

Rationale

With the explosion of data and information and also the evolution of new technologies including internet & other ICT techniques, technology-enabled or enhanced learning can make teaching-learning process more efficient and effective. The young inductee teachers should know about the necessity of technology in the learning process and make effective use of technology in self-learning. The teacher shall be able to develop contents for such mediums by appreciating the effectiveness of new technology paradigms.

Need and importance of emerging systems of instructions like ICT based Online learning platforms, e-sources of information and other open learning systems; Various ICT modes and educational technology (ET) aids and their effective usages:

Contents

- Suitable online and offline techniques and tools for assessment of appropriate learning outcomes;
- Effective use of library facilities, use of research journals and classified research material
- Need for life-long learning- through own experience and by interaction through seminars, workshops, conference and refresher courses etc.; Continuous updating of knowledge.

Suggested understanding

- Integrate information and communications technologies in preparation and delivering of teaching/ learning online and offline, print and non-print

instructional/ learning material and activities and for instructional management and professional development purposes

- Engage in continuous professional development. (of self through developing lifelong learning skills)

5.6 MODULE 6: Effective Modes of Student Assessment and Evaluation

Rationale

The assessment and evaluation for the effectiveness of the teaching-learning process should have the characteristics of validity, reliability and objectivity, to match the needs of society. The content should enable the young teacher to scientifically design various tools of assessment and also, sensitize towards the guidelines for evaluation and assessment.

Contents

- Clear identification of outcomes expectations;
- Concepts, principles, characteristics and processes of student evaluation in the process of education;
- Assessment tests and performance measures, rubrics etc. to assess cognitive, psychomotor and affective learning outcomes using scientific principles of evaluation;
- Valid and reliable schemes and tools for student assessment; Effective design of question paper;
- Evaluation through written tests, evaluation through quizzes and objective questions, evaluation through viva-voce, evaluation through home assignment,
- Evaluation through minor projects, case-studies etc.
- Mechanism for project and thesis evaluation.
- Relevance of alternative modes of evaluation;
- Student self-assessment tools
- Analysis, interpretation and reporting of test data

Suggested understanding

- Evaluate student progress in learning the subject and mastering the related competencies.

- Devise and use suitable online and offline techniques and tools for assessment of appropriate learning outcomes.

5.7 MODULE 7: Creative Problem Solving, Innovation and Meaningful R&D

Rationale

Increasing creativity and innovation are the hallmark of development of the institution, society and nation. The trainee teacher should be able to increase own attitude towards creativity and innovation and also that of the students. Therefore, the trainee should comprehend the fundamentals of creativity and innovation, and apply them in research and development undertaken.

Contents:

- Introduction to creative problem-solving process– needs analysis, problem formulation, innovative concept generation, feasibility analysis, detailed design etc.
- Hunting for innovative solutions; design and development
- Understanding different research designs including methodologies and their appropriateness to problems action research proposal– problem identification, literature review, research instruments appropriate to the research problem, steps of analysis and synthesis, presentation of results and conclusions etc.; action research report
- Guidelines for developing a research field for oneself
- R & D through teamwork

Suggested understanding

- Developing/ develop an understanding of creating problem-solving processes and research methodology and action research including a familiarity with the reference sources and their use.

5.8 MODULE 8: Miscellaneous Aspects (Institutional Management & Administrative Procedures

Rationale

A teacher should be aware of the basic skills required to emerge as a leader and execute tasks as a manager, and contribute to the growth and development of the institution. The teacher should also have a basic understanding of the administration, finance and legal requirements. The need for well qualified professional could not be more critical when the country is faced with complex problem that affect the quality of life of everyone, everywhere and businesses are seeking more well-rounded engineers and professionals who can take on leadership role.

The public perception of engineering profession is also on a downward spiral as is the enrolment of young in professional schools. The teacher is the cornerstone of engineering institution, responsible for inculcating management and leadership skills also, in the students. In most of the professional programs such as legal, medical, accountancy etc fresh entrants are required to go through a skills enhancement program of different forms, before entering the profession. In the professions of engineering and also it's teaching, there is no such practice, and hence it is felt essential to have such skills and leadership enhancement program for young professionals, to be able to fulfil expectations better and successfully.

Contents

- Familiarization with the institutional vision framework and administrative procedures; financial and purchase procedure, relevant legal matters etc.;
- Modes of interaction with external organizations;
- Feedback from alumni and prospective employers etc. for continuous improvement.

Suggested understanding

- Describe the purpose and meaningfulness of institutional vision, missions; administrative, financial, purchase and management processes in institutional functioning.
- Relate to alumni and employers for continuous development and improvements.

5.9 Details of the second term of FIP Training

In the second term of the training suggested, the teacher is expected to work under a mentor at the institution. He/she will be teaching one subject and also one laboratory course under the guidance of a senior teacher as a mentor. In these course modules, the teacher will

practically implement the learning acquired under the course studied in the first semester. The mentor will assist the teacher in his/ her endeavour to pick up the right practices on curriculum implementation, evaluation, delivery etc. The teacher in the laboratory course handled will have to understand the lab class handling and also develop new experiments and understand the working of lab equipment, processes of lab experiments and recording. The faculty, in this term, will also be required to practice communication skills by preparing and presenting a paper on state-of-the-art of a subject chosen together (with mentor). The trainee will also be expected to prepare a mock funding proposal for a research project to be submitted to a funding agency.

The trainee will also be expected also to spend 2-3 weeks as part of training in an industry/ research lab/ government labs/ NGO etc as decided by the mentor.

6.0 Training Needs during In-service at Various Levels

Continuous knowledge updating through suitably designed refresher courses will always be needed at all levels of the teaching career. These will mostly be subject-specific in the area of specialization. Also, it will be required to provide requisite training modules to train the in-service teachers for the responsibilities required to be carried out in their next professional cadres and also for the specialized inputs such as IPR issues, sustainable development, action research, curricular review, infrastructure development etc.

6.1 Some Details of the In-service Training Programs at Various Stages of Teaching Career

(a) **Stage 0** – Faculty Induction Program (already described above)

(b) **Stage 1** – During Lecturer/ Assistant Professorship – around 5-10 years

- Refresher Modules for knowledge updating, newer developments and thrust areas in the concerned fields.
- Training for research guidance, sponsored project planning and conduction, consultancy etc.
- Training for lab development.
- Training on IPR issues, patenting, technology transfer/dissemination and ethical issues in R & D.
- Training on organization of conferences, workshops, symposia etc.

(c) **Stage 2 –** During Associate Professorship – around 10-12 years

- Refresher Modules for knowledge updating, newer developments and thrust areas in the concerned fields.
- Training on curricular development, resource material development and good practices in teaching and research.

(d) **Stage 3** – During Professorship/HOD- around 20-30 years

- Refresher Modules for knowledge updating, newer developments and thrust areas in the concerned fields.
- Training on collaborative research with industry, institutions, government agencies and NGOs.
- Planning for departmental growth, motivation and efficiency.
- Removal of obsolescence and planning for continuous growth of the departments and the institution.
- Effective interaction with monitoring and collaborating agencies.
- Facilitating a value-based ethical environment in the institution
  Handling of disciplinary issues.
- Liaison with governmental monitoring/ regulatory bodies.

7.0 Mode of conduction and evaluation

The training program will be coordinated and supervised by the respective teacher training centre to which the institution of the trainee teacher is associated (see section 9.0 for more details). The parent institution of the trainee teacher will be requested to share responsibility and accordingly a senior mentor will have to be assigned to a trainee by the institution. The mentor would be coordinating the complete training activities of the trainee in both the terms. Besides, he/ she will coordinate the subject and lab class to be handled by the teacher and also help in assessing the work done by the trainee in the classroom, laboratory, report and project preparation etc. The mentor would also be coordinating the complete training package of individual trainees. The instructional inputs as designed and indicated will be delivered by experts some of whom may be available within the institution and/ or be outsourced. Online course material will also need to be developed and made available.

The trainee will be assessed for the instructional inputs on the basis of written examination, viva, relevant reports etc. at the end of the first term and the mentor will assist in the evaluation of the work done in the second term including teaching performance as well as the industry/labs visits.

An appropriate certificate would be issued to the trainee teacher at the end of the training program.

8.0 Implementation Aspects

Having provided the basic framework of the training policyy at both induction and career levels and also having provided the components of the syllabi structure and mode of conduction of training, the committee then delkiberated on the aspects of implementation of the program.

The scale of the program to be undertaken is very large considering a large number of technical institutions. The committee, keeping this in view and the wide range of professional subjects to be handled in the trainee schedule, suggests that an apex body (preferably a Board) be created at AICTE for the overall conduct and overseeing of the training program and the effective implementation and monitoring of the same. The suggested apex board will have internal and external members as well as stakeholder representation and would be responsible for taking care of all implementation aspects of the program including complete coordination.

There should be a representation of MHRD, AICTE, UGC, state technology universities, industry, training centres, NITTTRs and eminent academicians, in the Board. The Board would be responsible for all action/ implementations aspects of the proposed training policy.

It is also suggested/ recommended that for proper networking and implementation three categories of institutions be identified viz mentoring institution, training institution and beneficiary institution.

8.1 Mentoring institution

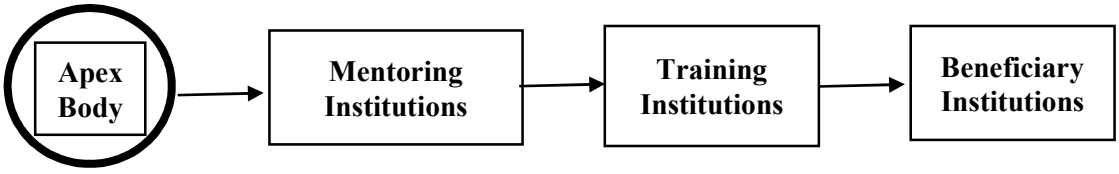
These will be the specialized institutions dedicated to Technical Teacher Training and will be expected to develop resource persons (i.e. training the trainers) and also the training curriculum and resource material (both print and electronic). They will be mentoring the teacher training centre in the training institutions and also monitor their efficacy besides that of the training activity. They will also be engaged in continuous action research to augment the quality of training. Apart from these specialized tasks, these institutions will also be engaged selectively in directly training the teachers.

8.2 Training institution

In this category there should be technical institutions of national repute with well-established infrastructure as well as teaching and research environment. It will be necessary to establish Teacher Training Centres in these institutions which will take up the responsibility of carrying out the training of teachers in the designated institutions in that region. These centers will have necessary course staff which will be supplemented with the part time services of the expert faculty members of their institutions as well as outsourcing experts outsourced from other agencies/industry as needed.

8.3 Beneficiary Institution

These will be the institutions which would avail as well as contribute their resources to get their teachers trained. Their active participation in the training process will be essential. They would be designated as local mentors for the trainee teachers. The networking of these institutes is depicted in the diagram below:



9.0 Financial Implication

There are three major stakeholders in this training program, viz AICTE, the beneficiary institution and the trainee himself/herself and it is suggested that the financial implication of the training programs be jointly shared by all these stakeholders.

i) The teacher trainee during FIP will receive only half the designated salary

ii) The employer institutions will contribute by paying the half-salary during the first semesters when the fresh teacher is engaged fully in the training activity.

iii) A substantial part of the training expenditure e.g. establishing training centres, hiring of experts, cost of training the trainers and resource material etc. will have to be borne by government agencies such as AICTE, MHRD, UGC etc.

10.0 Expected outcome from the Proposed Training Program

- It is strongly believed and expected that the comprehensive training program as envisaged above, if properly implemented, will go a long way in improving the quality of technical education in the country and motivating academically bright candidates to take up teaching profession and making it challenging.
- The institutional environment, discipline and motivation of students/teachers will also boost up, thus improving the quality of processes.
- The grooming in professional skills, values and attitudes will have a profound impact on shaping up the young minds and transforming them into socially responsible technical professionals.
- The continuous in-service training programs will help teachers to keep abreast with the latest developments and also co-relate their teaching with the prevailing practice and indigenous development as per the needs of the country.
- It will also promote a culture of continuous learning from the seniors and a cohesive Team work within the department as well as institutions.
- A major area of student-teacher interaction outside the classroom which is presently conspicuous by its absence will also develop enabling proper mentoring, counselling and healthy personality development among the students.

11.0 Other Possible Implications

There may be some other possible policy and implementation implications of the proposed training programs, some of which are listed below:

- Need for revamping and restructuring of existing institution such as NITTTRs and ASCs to be able to implement the new mandate and if necessary set up new institutions.
- Networking with prospective teacher trainee institutions for initiating teacher trainee centres.
- Possibility of linking the inductee/other training programs with probation, promotion of faculty.
- The possible implications of impact of the training programs with accreditation processes.
- Motivating technical institution not approved by AICTE also to implement the training programs.
- The possible following of the training in institution of higher learning.
- The issues involved in the process of certification and recognition of certification agencies.

12.0 Issuing of the certificate by the mentoring institution with the approval of AICTE

The training programs proposed for development of faculty members embeds the concepts of flexibility and responsibility. The flexibility is in the hands of the faculty member to plan, execute and bring to fruition their academic goals in line with the academic vision of the institution. Also, the responsibility of concluding the academic activities places a few requirements on the conduct of faculty members on the fronts of personal ethics, stakeholders' engagement, professionalism and academic value system. With the constructive contribution from the government bodies, mentor institutions and the beneficiary institution, the proposed training policy will light up new avenues.

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