



# A COMPREHENSIVE TRAINING POLICY FOR TECHNICAL TEACHERS

**AII INDIA COUNCIL FOR TECHNICAL EDUCATION**

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## 1.0. INTRODUCTION

With rapidly changing technological scenario in the context of ever-increasing global connectivity as well as competitiveness in modern times, the role of technical education in economic 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 for businesses seeking well-rounded engineers and professionals who face global challenges. Further, the concerns for making the educational curricula and training more conducive to the national needs are becoming a top priority.

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 lacking. A large number of technical institutions exist in the country where a huge number of teachers are employed and being recruited. 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 the teaching profession in the technical education domain no longer attracts the best academic performers and many a times, 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 providing quality 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. The AICTE has been seriously concerned over this issue and has adequately prepared itself to launch a number of initiatives to cope up with this situation.

The AICTE Council in its 49<sup>th</sup> meeting held on 14<sup>th</sup> March 2017 comprehensively deliberated on these issues and after several discussions held with the 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; mandatory internship; effective industry interaction; 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 in this direction, the AICTE constituted a Committee to suggest modalities for implementation of the Training Policy for Technical Teachers. The Committee, comprised of the following experts as members:

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|--|----------|
| <b>1. Prof. H. P. Khincha</b><br>Former Vice-Chancellor, VTU, Belgavi,<br>Professor (Rtd), IISC, Bangalore   | Chairman |
| <b>2. Prof. M. M. Malhotra</b><br>Former Director, NITTTR, Chandigarh  | Member   |
| <b>3. Prof. R P Dahiya</b><br>Professor (Rtd), Indian Institute of Technology, Delhi<br>Former Vice Chancellor, DCR University of Science and Technology | Member   |
| <b>4. Prof. R. R. Gaur</b><br>Former Professor of Mechanical Engineering,<br>Indian Institute of Technology, New Delhi                                   | Member   |
| <b>5. Prof. V.H. Radha Krishnan</b><br>Professor of Curriculum Development (Engineering Fields), NITTTR, Bhopal  | Member   |

### Terms of reference:

To suggest modalities for implementation of the scheme of Training Policy for Technical Teachers and scheme for starting a mandatory certificate course for teachers at entry level. The mandate of the Committee was expanded to prepare a “Comprehensive Training Policy for Technical Teachers” which will include a training program at the induction level of newly recruited technical teachers called “inductee teachers” as well as propose additional training inputs at various stages of the teaching career of technical teachers.

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 the AICTE in which salient points of this report were presented and feedback and comments sought for. Also, a special meeting was arranged to discuss the modalities with the Directors of NITTTRs at the AICTE headquarters, New Delhi. The Committee deliberated on all the feedback, comments and suggestions which have been incorporated in the body of the report. The term ‘Technical Education’ in the context of this report includes all the disciplines/domains handled by the AICTE including Engineering,



Management, Pharmacy, Architecture etc. Even though the report refers substantially to the domain of engineering, but similar conclusions can be drawn for other domains and appropriate modifications and alterations can be worked out accordingly.

### 1.1 THE RATIONALE AND NEED FOR THE TRAINING POLICY

The Committee highly appreciated the initiative of the AICTE 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.

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 graduates like M.Sc., M.Tech, MBA or Ph.D are recruited as teachers without undergoing any training and are left to fend for themselves in working out in their profession with an expectation that they will become competent teachers by trial and error, totally un-mentored.

It may be appreciated that to be a proficient teacher in any field, one should have a sound knowledge and associated skills of the subject and its application with the prevailing practice scenario in real life and then one should have the requisite teaching skills needed to scientifically plan for instructional delivery and communicate the knowledge and skills with the students in an effective manner. This has to be done in a manner so that they are motivated and fascinated to acquire the knowledge and associated skills and visualize its application for helping them to become competent professionals, 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 join the academic career normally enjoys 30-35 years of teetotal working period. 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 of working and the third 'impacts' is visualized in a long duration 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 of effective teacher learning and implementation to make the academic career meaningful.

Truly speaking, knowledge of practice, i.e. its application 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 being 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 to carry out meaningful R&D, sponsored projects, consultancy etc. provides such an avenue to some extent for which proper training and exposure is required. Hence, it is essential to have such skills and leadership enhancement programs for young professionals entering the





teaching profession and continuing such efforts to be able to fulfill the expectation better and succeed to face the global challenges.

There is another very important challenge for the present day technical teachers. On the one hand, they have to keep themselves 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 interaction. This is an area of basic teaching competence. Further, appropriate pedagogical techniques, different modes of learning 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. When the faculty has become comfortable with student development activities and improved competence in teaching-learning and institutional development, there is quantum improvement in the technology development and its relevance to industry at national and international levels and thus contribute effectively for professional grooming of the student, institutional development and industry relevance.

A need of new domains of "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 software, 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 tools without getting lost in the quagmire and not become obsolete is of paramount importance.

### **1.1.1 NEED FOR ORIENTATION IN HUMAN VALUES**

Another very important and yet grossly neglected area of teacher competence has been 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 complimentary 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, jealousy, 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, environment, social and ethical values. During the 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 counselors for younger 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 and IQ alone cannot help to build a nation of good citizens unless it is blended with due and active preparation of students in EQ and SQ.

### 1.1.2 CONTINUOUS TEACHING LEARNING

It may be pointed out that a teacher also has to learn the knack of continuous learning, updating and life-long learning. Also at successive stages of the teaching career, training inputs about curriculum development, infrastructure development, institutional development, discipline 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 inductee teachers and teachers working at different stages of their careers 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 so as 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 quality 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 pedagogical 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 decade or so.

Around the same time, four training-focused Technical Teacher Training Institutes (TTTIs) were established primarily targeted towards the training of polytechnic teachers. These institutes have been actively engaged in training and development of polytechnic education in all aspects. Lately, these institutes were renamed as the National Institutes of Technical Teacher Training and Research (NITTTRs) and are also asked to carry out the training of engineering college teachers along with polytechnic teachers. These institutes have also developed the necessary infrastructure and expertise for online modes of interaction. Further, these institutes have long experience of technical teacher training, curriculum development, instructional resource development, etc., which needs to be appropriately harnessed in the future after appropriate revamping and orientation. Similarly, number of Academic Staff Colleges (ASCs) were established by the UGC for providing a general orientation and some refresher programs for 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 the 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 experiences 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 needs of teachers in their career and visualized two distinct categories of the training program:

- Faculty Induction Program (FIP) to be provided just after the recruitment of inductee teachers.
- In-Service Training Program (ITP) catering to the specific requirement at various levels of their 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 the contents of the training program at different levels.
- To propose a feasible mechanism to effectively implement the desired Training Policy on 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 on line modes) and carrying out action research.
- To recognize the salient implications of the proposed policy and to suggest ways and means to appropriately deal with these to establish a sustainable system for training of technical teachers.
- Continuous updating of technical subject expertise (theory and practice) by making mandatory, the successful completion of at least one subject course offering through technology-based means i.e. Massive Open Online Courses (MOOCs) and/or open online courses every year.

### **4.0 TRAINING NEEDS DURING THE FACULTY INDUCTION PROGRAM (FIP)**

In this phase of Faculty Induction Training (FIP), teaching skills and enhancement of leadership would be required in addition to general academic as well as domain 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 and the spectrum of duties and expectations.
- Basic understanding of the teaching-learning process, the psychology of learning and effective pedagogical techniques.
- Training for preparing lesson plans and effective instructional process and initiatives for 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 in the appropriate use of various modes of student evaluation.
- Training in creative problem-solving; research methodology; conducting guidance for R&D projects etc.
- Guided exposure to good teaching practices, learning methods, lab development and organization of practical classes 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) to be provided to inductee teachers. The Committee deliberated at length on the different aspects of this faculty induction program, including the contents, time duration, structured way of delivery, assessments etc., and suggests the following:

- This phase of the Training Program for the inductee teachers can be provided during a one-year probation period of the teachers just after their selection.
- Keeping in view large numbers of inductee teachers, the training can be conducted through Massive Open Online Courses (MOOCs) mode followed by contact programs organized in summer and winter vacations.
- The induction training will be spread over 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 and exposure to industrial/field practices.

## **5.0 BROAD CONTENTS OF THE INSTRUCTIONAL MODULES TO BE DELIVERED DURING THE FIRST TERM OF FIP**

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 after course completion are also outlined. Each Module/Course will mandatorily comprise the following (i) E-Learning instructional material; (ii) Video Presentation; (iii) Assignments/Activities; (iv) Assessment/Test and (v) Discussion forum/Online feedback mechanism

### **5.1 MODULE 1: ORIENTATION TOWARDS TECHNICAL EDUCATION AND 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 inductee teachers. These 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 curricular 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 Psycho motor as per revised Bloom's Taxonomy; Cognitive process 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 and 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 instruction and learning to ensure effective implementation of the curriculum.

## 5.2 MODULE 2: PROFESSIONAL ETHICS AND SUSTAINABILITY

### 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 and sustainable development need to be inculcated in inductee teacher who should play a role model to peers 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.
- Guru-Shishyaparampara- relationship.
- Developing a holistic perception of human happiness; prosperity; life-goals, needs and relationships; ethical human behavior *Sarvejana Sukhino Bhavantu*
- Mentoring and counseling; personality development.
- Understanding the 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 with the 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, 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 forms of speaking, reading, writing, listening etc. The inductee teacher should be made aware of nuances of communication skills and strategies to implement these as knowledge dissemination which is affected by the communication media and hence effective use in instruction is also critical to utilization and delivery.

### **Contents**

- Basic concepts, models, verbal, 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, thesis, manuals etc. Learning to write minutes, a summary of deliberation, executive summary etc. in an effective manner; Nontechnical communication, official correspondence, file notes etc.
- Introduction to modern media & methods, appropriate use of Educational Technology (ET) and audiovisual aids.

### **Expected understanding**

- Develop requisite competence in communication skills and the 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: INSTRUCTIONAL PLANNING AND 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; learning outcome objectives.
- Preparation and effective implementation of the lesson plan for systematic presentation in the classroom.
- Effective chalkboard 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 laboratory work as well as indicating relevance to prevailing practices.
- 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 by students appropriate to the subject matter/ course content.
- Feedback mechanisms for continuous improvement in the teaching-learning process.

### Expected understanding

- Develop requisite learning materials and methodologies that are appropriate to the level of students and the subject content, accomplishment of learning outcomes and development of the competencies in the students as targeted in the program of study, applying the principles related to:
  - i. Learning and instruction
  - ii. Instructional planning and delivery
  - iii. 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 and 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 content for such mediums by appreciating the effectiveness of new technology paradigms. The need and importance of emerging systems of instructions like ICT based Online learning platforms, e-sources of information like MOOCs and other open learning systems; various ICT modes and educational technology 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.

### Expected understanding

- Integrate information and communication technologies in preparing and delivering of teaching-learning online and offline, print and non-print instructional learning material and activities for instructional management and professional development purposes.
- Engage in continuous professional development of self through developing lifelong learning skills.

## 5.6 MODULE 6: STUDENT ASSESSMENT AND EVALUATION

### Rationale

The assessment and evaluation of 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 inductee teacher to scientifically design various tools of assessment and also sensitize towards the guidelines for evaluation and assessment.

### Contents

- Clear identification of outcome expectations.
- Concepts, principles, characteristics and process 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, quizzes, objective questions, viva-voce through home assignments, open book examination, case studies and projects etc.,
- Mechanism for project and thesis evaluation.
- Relevance of alternative modes of evaluation.
- Student self-assessment tools.
- Analysis, interpretation and reporting of test data.

### Expected 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 inductee teacher should be able to increase own attitude towards creativity and innovation and also that of the students. Therefore, the teacher should comprehend the fundamentals of creativity and innovation and apply them in research and development initiatives.

### 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.





### Expected understanding

- Develop an understanding of creating problem-solving processes, research methodology and action research, including familiarity with the reference sources and their use.

## 5.8 MODULE 8: INSTITUTIONAL MANAGEMENT AND 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 problems that affect the quality of life of everyone, everywhere and businesses seeking more well-rounded engineers and professionals who can take on leadership roles.

The public perception of the 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, 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 profession 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 fulfill the 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.

### Expected 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.

## 6.0 DETAILS OF THE SECOND TERM OF FIP

In the second term of the training, the inductee teacher is expected to work under a mentor (who may be one of the senior faculty) at the institute. The inductee teacher 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 courses studied in the first term.



The mentor will assist the teacher in his/ her endeavor to pick up the right practices on curriculum implementation and evaluation etc. The teacher in the laboratory course will have to understand the laboratory class handling and also develop new experiments to understand the working of laboratory equipment, process of conduct of laboratory experiments and student assessment. 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 under the guidance of the mentor. The teacher will also be expected to prepare a mock funding proposal for a research project to be submitted to a funding agency.

The teacher will also be undergoing four weeks of training in an industry/research laboratories/field organization as decided by the mentor. The mentor will choose the training organization to ensure coordination with the subject discipline of the programme of the teachers. The mentor should also make sure that the training is organized and supervised in the right perspective.

Broad guidelines suggesting the mode of content and evaluation of both the terms i.e., Term I and Term II are given in section 8.

## 7.0 IN-SERVICE TRAINING NEEDS 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 mandate for these teachers to undergo MOOCs in a phased manner as discussed in FIP as well as 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 Intellectual Property Right (IPR) issues, sustainable development, action research, curricular review, infrastructure development etc.

### 7.1 SOME DETAILS OF THE IN-SERVICE TRAINING PROGRAMS AT VARIOUS STAGES OF TEACHING CAREER

(a) Stage 1– Faculty Induction Program (already described above)

(b) Stage 2– During Lecturer/Assistant Professorship -having experience of 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 and preparing manuals.
- Training on IPR issues, patenting, technology transfer/dissemination and ethical issues in R & D.
- Training on organization of conferences, workshops, symposia etc.
- Training in basic principles of education technology through MOOCs.





(c) Stage 3– During Associate Professorship – having an experience of 10–15 years

- Refresher Modules for knowledge updating, newer developments and thrust areas in the concerned fields.
- Training in curriculum development, resource material development and best practices in teaching and research through MOOCs.

(d) Stage 4– During Professorship/HOD–around 20–30 years

- Refresher Modules for knowledge updating, newer developments and thrust areas in the concerned fields.
- Training courses in Institutional Management and promotion of Entrepreneurship development
- Training in leadership; preparing vision, mission and strategy by involving all stakeholders.
- 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 institutional handling disciplinary issues.
- Liaison with governmental monitoring/ regulatory bodies.

## 8.0 MODE OF CONDUCT AND EVALUATION

The training program will be coordinated and supervised by the respective National Technical Teacher Training Institute/Identified Training Centres to which the institution of the inductee teacher is associated. NITTTRs will prepare MOOCs within the frame work of broad guidelines given in FIP. As far as possible, these programs will be based on applied aspects which are useful for technical teachers.

The parent institution of the inductee teacher will be required to share responsibility and accordingly well experienced senior faculty member will be identified as a mentor by the Principal.

The mentor would be coordinating the complete training activities of the inductee teacher in both the terms. Besides, he/she will coordinate the subject and laboratory class to be handled by the inductee teacher and also help in assessing the work done by the inductee teacher in the classroom, laboratory, training in industry/research laboratory/field organisation and project preparation etc. The mentor will keep a complete record of the progress of the inductee teacher.

The instructional inputs as designed and indicated will be delivered by the coordinating Technical Teacher Training Institutes. Keeping in view the magnitude



of training, these institutes can avail the services of eminent experts or outsource some of the modules.

Online MOOCs will also have to be developed by the coordinating NITTTR/training institute(s) and made available to the inductee teacher. Besides training through MOOCs, inductee teachers will undergo contact programs during summer and winter vacations at NITTTR/training institutes.

The inductee teacher 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 a teaching performance as well as the laboratory work and industrial training as per standard practices.

A certificate of having undergone both phases of the inductee training shall be issued to the inductee teacher at the end of the training program. The Committee suggests the following nomenclature for the certificate:

Induction Training in Educational Technology or Induction Training in Technical Education.

However, the certification process and nomenclature may be decided by the Apex Body/ Board discussed in section 9.

## 9.0 IMPLEMENTATION ASPECTS

Having provided the basic framework of the Training Policy at both the stages i.e. induction and during different career levels and also having spelt out the broad components of the training, the mode of conducting the training phases, the Committee then deliberated on various aspects of implementation of the program, keeping in view the scale of the program to be offered to a large number of teachers as well as a large number of technical institutions.

The Committee, keeping in view above aspects and the wide range of professional subjects to be handled in the training schedule, suggests that an Apex Body (preferably a Board) be created at AICTE for overall planning, coordination and monitoring of the Training Policy for its effective implementation. The suggested Apex Board (for education technology) will have representation of MHRD, AICTE, UGC, State Technical Universities, NITTTRs other Training Centers, Industry representatives and eminent academicians. 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.

### 9.1 MENTORING INSTITUTION

NITTTRs which are specialized institutions dedicated to Technical Teacher Training and some of the IITs having management & educational technology departments will be mentoring institutions and will be expected to develop resource persons (i.e. training the trainers) and also the training curriculum and resource material through MOOCs. They will also be helping other Teacher Training Centers through MOOCs, offer guidance and monitor their efficacy besides that of the training activities. They will also be engaged in continuous action research to augment the



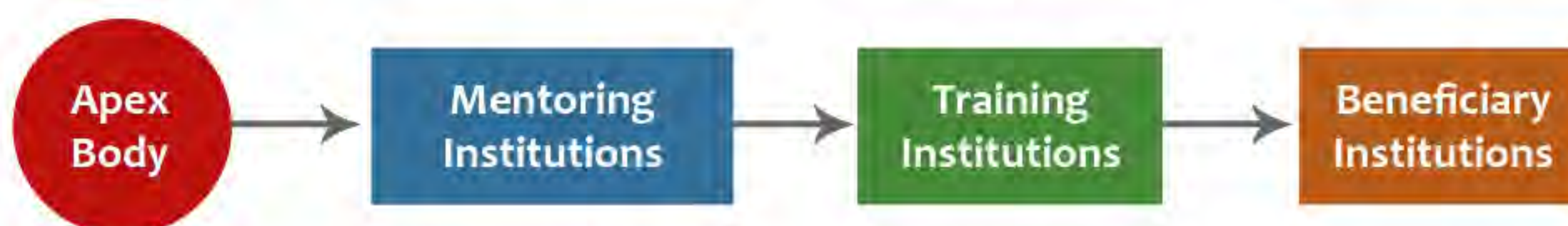
quality of training. Apart from these specialized tasks, these institutions will also be engaged in directly training of the inductee teachers as well as conducting in service training programs.

## 9.2 TRAINING INSTITUTION

In this category, there should be select technical institutions of national repute, like IITs/NITs with well-established infrastructure as well as teaching and research environment. It will be necessary to establish Teacher Training Centers 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 core faculty which will be supplemented with the part time services of the expert faculty members of their institutions as well as outsourcing experts from other agencies as needed.

## 9.3 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 teachers under training. The networking of these institutes is depicted in the diagram given below:



## 10.0 FINANCIAL IMPLICATION

There are three major stakeholders in the training program:

1. The teacher under training.
2. The beneficiary institutions
3. MHRD/AICTE/UGC

The Committee deliberated in detail regarding financial implications of the training and made the following suggestions in this regard:

- a) The inductee teacher during FIP will be on a probation till he/she complete mandatory faculty development program, i.e. FIP in letter & spirit to fulfill the desired objectives for effective teaching learning process. He/she will earn the annual increment only after successful completion of FIP.
- b) The institution will bear the cost of training and other expenses including the cost of certification if any, industrial training expenses and the subsequent activities under the mentor during the contact mode.
- c) Substantial part of the training expenditure, for example strengthening/establishing additional training centers, hiring experts, the cost of training the trainers and development of resources like MOOCs will have to be borne by the government agencies such as MHRD, AICTE/UGC.



## 11.0 EXPECTED OUTCOME FROM THE PROPOSED TRAINING PROGRAM

- It is strongly believed and expected that the Comprehensive Training Program as envisaged in this policy document if properly implemented, will go a long way in improving the quality of technical education in the country.
- The institutional environment, discipline and motivation of students/teachers will also boost up, thus improving the quality of teaching-learning 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.
- Organization of continuous in-service training programs will help the teachers to keep themselves abreast with the latest developments and also co-relate their teaching to 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 ensure 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, counseling and healthy personality development among the students.

## 12.0 OTHER POSSIBLE IMPLICATIONS

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

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

The training programs proposed in this Policy Document embed the concept of flexibility and responsibility. The flexibility is in the hands of the faculty to plan, execute and bring





to fruition their academic goals in line with the academic vision of the institution. Also, the institutions have to play a proactive role in understanding the importance of faculty training and preparing a Plan of Action for effective implementation. The Policy throws a great responsibility on NITTTRs to prepare MOOCs, training the trainers, hire the services of other resource organization/persons for effective implementation of MOOCs through online and contact modes for bringing positive improvements in teacher-learning process.

All connected agencies are supposed to play a proactive role in the success of proposed Policy.





