CHAPTER 2
QUALITY INITIATIVES IN MANAGEMENT & TECHNICAL EDUCATION IN INDIA

The Government of India has liberalized the business education in 1990’s which has resulted in a rapid growth of Business school offering the programmes both at graduate & undergraduate levels. The Govt of India has also appointed various committees to take a critical review & the overall growth of Business Education in Country. The Present Research Study is also working on same direction to improve quality of Management Education in India. Management Education is controlled by AICTE which is controlling overall technical Education including pharmacy, Engineering, MCA etc. During 1980s, the Government of India (GOI) and the State Governments had felt the need for revamping the Technician Education System in the country to make it demand-driven with relevant courses in new and emerging technologies, with adequate infrastructure resources, competent faculty and effective teaching-learning processes.

The Government of India supported 25 State Governments and Union Territories of Andaman & Nicobar Islands and Pondicherry through three Technician Education Projects during 1991-2007, financed by the World Bank, which helped to strengthen and upgrade the system and benefited 552 polytechnics. The success of these projects encouraged the Government of India and the State Governments to seek more funding from the World Bank for systemic transformation of the Technical Education System with focus on Degree level Engineering Education. In 2002-03, the Government of India with the financial assistance from the World Bank launched a Technical Education Quality Improvement Programme (TEQIP) as a long-term Programme of 10-12 years, to be implemented in three phases for systemic transformation of the Technical Education System. The first phase of TEQIP commenced in March 2003 and ended in March 2009, covering 127 institutions in 13 States. As this project, covering less than 10% of the institutions, was a beginning, the challenge for systemic transformation remains big. To meet the challenge, serious, organized and converging efforts are needed.
Realizing the potential of socio-political and economic benefits from Higher Education in transforming India into a knowledge society, the Government of India has placed a much higher priority on Higher Education in the Eleventh Five Year Plan (2007 to 2012). This change in priority is supported by a proposed Rs.2,70,000 crore allocation to the Education Sector, which represents a four-fold increase over the Tenth Five Year Plan allocations. The Government of India has initiated schemes to ensure universal access to quality Primary and Secondary Education while significantly expanding the capacity of Higher Education to provide educated and skilled workforce for the 21st century economy. The Government of India has made a bold move by allocating 30% of the total education outlay to the Higher Education sector and thereby committing to an eight-fold increase over the spending on the Higher Education sector during the Eleventh Five Year Plan period. The main target for the Eleventh Five-year Plan for Higher Education (Technical and General) is to increase gross enrolment ratio in Higher Education from 11% to 15%. The goal for Technical Education is an annual growth rate of enrolment of 15%. An equitable expansion is aimed at through the establishment of 80 new centrally-funded institutions, over 1000 new Polytechnics, and 370 new institutions in under-served regions. TEQIP-II, the proposed Project, second phase of Technical Education Quality Improvement Programme is fully integrated with the Eleventh Five-year Plan objectives for technical education as a key component for improving the quality of Education in existing institutions.

QUALITY IMPROVEMENT SCHEMES OF AICTE

The quality improvement schemes are carried out by the Research & Institutional Development Bureau of the All India Council for Technical Education. This Bureau implements the various schemes which promote quality of technical education through faculty development, research & institutional development, modernization of laboratories / setting up state-of-the-art research facilities, and improving industry interaction. A merger of two Bureaus i.e. Faculty Development Bureau with the Research & Institutional Development Bureau has in early 2006 has brought out better coordination and synergy in the implementation of various schemes of AICTE.
Mandate of RID Bureau and its functions:

The activities of Research & Institutional Development (RID) Bureau is as per mandate conferred on the All India Council for Technical Education (AICTE) vide sections 10 (a), (c), (d), (e), (f), (h), and (i) of the AICTE Act:

10 (a) - undertake survey in the various fields of technical; education, collect data on all related matters and make forecast of the needed growth and development in technical education;

10 (c) - allocate and disburse out of the fund of the Council, such grants, on such terms and conditions as it may think fit – (i) to technical institutions and, - (ii) Universities imparting technical education in coordination with the Commission;

10 (d) - promote innovations, research & development in established and new technologies; generation, adoption and adaptation of newer technologies to meet development requirements and for overall improvement of educational process;

10 (e) - formulate schemes for promoting technical education for women, handicapped and weaker sections of the society;

10 (f) - promote an effective link between technical education system and other relevant systems including research & development organizations, industry and the community;

10 (h) – formulate schemes for the initial and in service training of teachers and identify institutions or centers and set up new centers for offering staff development programmes including continuing education of teachers;

10 (i) – to lay down norms and standards for staff qualifications

To meet this huge mission, the Council has instituted several schemes to attract all kinds of stakeholders. Primarily, the schemes of RID Bureau can be categorized into three major heads:

- Faculty Development Schemes,
- Research & Institutional Development Schemes and
- Industry Institute Partnership Schemes.

Besides, the Bureau deals with the assessment of technical manpower information system. Pursuant to the mandate conferred on AICTE under Clause 10 (a), the Council has a
scheme namely: National Technical Manpower Information System (NTMIS) to with a view to generate and maintain reliable information and database needed for planning and administration of technical education.

Pursuant to the mandate conferred on AICTE under Clause 10 (c), (d) and (e), the Council operates three schemes, namely: Modernization and Removal of Obsolescence Scheme (MODROBS), Research Promotion Scheme(s) (RPS), and Nationally Coordinated Projects (NCP).

Pursuant to the mandate conferred on AICTE under Clause 10 (c) and 10 (f), the Council operates schemes, viz. Industry Institute Partnership Cell (IIPC), Entrepreneurship and Development Center (EDC) and National Facilities in Engineering & Technology with Industrial Collaboration (NAFETIC).

A. Faculty Development Schemes

1. **Travel Grant** scheme is aimed at promoting Research and Development activities in various areas of technical education in an approved institution/department by providing opportunity to meritorious faculty to present papers and interact at international conferences level to update their knowledge in the concerned field/area of specialization. The scheme provides financial assistance to faculty for presenting research paper in an International Seminar/Conference/Symposium abroad. Proposals for attending Short Term/Long Term training course(s) are outside the purview of the scheme. Under the scheme, financial assistance is granted on reimbursement basis for an approved proposal.

2. **Seminar Grant:** In order to promote excellence in teaching and research, there is a need for sharing of knowledge, experience, innovations and inventions amongst the faculty, professionals and researchers. The scheme provides financial assistance to institutions for organizing Symposium/Conference/Seminar/Workshop at National and International level in various fields of technical education. The Scheme intends to promote high standards in technical education by way of extending opportunities to academicians and working professionals by providing a forum for sharing of knowledge, experience,
innovations and inventions. Preference is given to topics of interdisciplinary nature as well as to emerging and thrust areas in technical education.

3. **Staff Development Programme (SDP):** Teachers are the most vital component of the technical education system. Upgradation of their knowledge and skills and thorough training plays a vital role in the development of technical education system. The scheme intends to facilitate up-gradation of teachers’ knowledge and skills. It provides opportunities for induction training to faculties in technical education. The SD Programme covers various aspects of technical education policy, programmes, new concepts, methods and techniques, theory and skills enrichment and up gradation of pedagogical skills, educational technology, motivation, communication skills, management and other relevant issues to keep pace with the changing scenario in technical education. The scheme provides financial assistance to cover training expenses in technical institutions to conduct such induction trainings.

4. **Early Faculty Induction Programme (EFIP):** The quality of technical education largely depends on the quality of teachers. Adequately qualified, highly competent and motivated faculty is becoming scarce in technical institutions all over the country. The shortage of faculty has become more acute due to rapid expansion in technical education. AICTE is giving a high priority to attract bright young persons to teaching profession. In order to attract bright engineering graduates to teaching, MHRD operated the ```Technical Teachers Training Scheme``` in 1950’s and 60’s. With similar objectives, during 2003 AICTE had taken the initiative to launch a revised ```Early Faculty Induction Programme (EFIP) ``` with distinct features. The scheme aims at attracting bright young graduates pursuing PG programme in technical institutions to take Teaching as their career by providing certain incentives. In the Early Faculty Induction Programme bright young Engineering & Technology students pursuing PG programme (M.Tech / ME / MS (by research) or Ph. D) in identified host institutions will be selected and will be given an opportunity to take up teaching career in Engineering Colleges.

5. **Visiting Professorship Scheme:** There is shortage of experienced and talented teachers in technical education, more so in emerging areas of technology. Therefore there is a need for sharing of expertise of such experienced persons especially in emerging fields. The Visiting Professorship scheme aims to supplement and provide expertise to teaching /
research in those areas in which the host institute needs expertise. The visiting Professorship is usually instituted in the emerging fields of Technical Education. The Visiting Professor may be from within the country or outside.

6. Emeritus Fellowship There is acute shortage of experienced and highly competent senior faculty in technical institutions all over the country. Therefore, this Scheme utilizes services of highly qualified and experienced superannuated professors of technical institutions/university departments to stimulate research activities and to provide mentoring and guidance to teachers as well as institutions. The Emeritus Fellowship is of 2 years duration and is awarded for generation of indigenous learning resource materials, manuals, state-of-the-art reports, monographs, reference books, hand-books, codes of practice, etc. in respective fields of specialization. In addition to teaching, an Emeritus Fellow is expected to propose, execute, guide and monitor projects in his/her field of specialization in the host institution as well as neighboring institutions. He / she is expected to give impetus to consultancy, research, redesigning of courses, industry-institute-interaction, and formulation for research of those projects for which expertise is not available in the ‘adopted’ institution. The scheme provides honorarium @ Rs.10,000/- per month to the Fellow and an annual contingency of Rs. 30,000/-.

7. Quality Improvement Programme (QIP) aims at upgradation of qualifications of regular faculty members of AICTE approved technical institutions both at degree and diploma level by way of facilitating admissions to M.Tech & Ph.D programmes in selected premier technical institutions in the country. The scheme also provides for enhancement of expertise and capabilities of faculty members through Short Term Courses. QIP is one of most significant educational initiatives in the country. It has brought about a sea change in the academic ambience of a large number of NITs and Government Engineering Colleges. A large number of teachers in various engineering colleges have successfully made career advancement in the fields of science, technology, and management through QIP. In view of this, the scope of the QIP has to be broadened so that the entire population of young teachers serving in various Government and private engineering colleges are benefited from the programme. In order to generate passion for learning, AICTE and other Government Institutions have to adopt a proactive role. QIP is a very successful initiative, but it has been rather limited in its scope. During the next
phase, QIP has to take the responsibility of grooming the faculty members across the country. It has to review and redefine goals and targets for continuous improvement of qualified teachers in adequate numbers. In order to encourage innovation in teaching, teaching methodology and research, the issue of career advancement of the teachers at various engineering colleges is of paramount importance. The Quality Improvement Programme (QIP) has to enter into a new paradigm. The quality of technical education in the entire country will reach a level of excellence, if the moral of the teaching community remains enthusiastic, innovative and inquisitive. All these will be possible if more teachers get the opportunity to pursue their doctoral studies (PhD) at the well-known Institutes of higher learning. The Government Institutions and AICTE have to share a fundamental focus -- the development of intellectual human capital.

8. **Short Term Training Programme (STTP):** The scheme is operated though Indian Society for Technical Education (ISTE) aimed at upgradation of knowledge base of teachers in upcoming / frontier areas of technology.

9. **National Technical Manpower Information System (NTMIS)** aims at generating and maintaining reliable information and database needed for planning and administration of technical education. The objectives assigned to the System include estimation of short-term and long-term requirements of various categories of engineering and technical manpower and their supply, identification of anticipated gaps in demand and supply positions and also assess the adequacy of current enrolment rate in respect of each of the engineering and technical manpower categories. The National Technical Manpower Information System (NTMIS) was established in 1983-84 by the then Ministry of Education & Culture (now MHRD). The System comprises of a Lead Centre at the Institute of Applied Manpower Research (IAMR), New Delhi and 21 Nodal Centers all over the country. Out of these nodal centers, 17 are responsible for Institutional survey as well as Graduate follow-up survey and the remaining 4-conduct establishment survey. The objectives of NTMIS include:

- Estimation of short-term & long-term requirements of technical manpower
- Estimation of supply
- Forecasting anticipated gaps in demand and supply
- Matching job requirements with facilities for education and training
- Assessing the adequacy of the current enrolment rate
Undertaking studies on emerging and specialized areas and fields requiring urgent attention for expansion of facilities for education and training.

Till 2001-2002, NTMIS was covering only engineering Manpower. The managerial manpower, pharmacists and HMCT manpower have also been introduced from the year 2002-2003. Data collection is done at three levels:

- From the Engineering Educational Institutions: Institutional Survey.
- From the Engineering Graduates: Graduate Follow-up Survey.
- From the Establishments: Establishment Survey

The information generated through these surveys is presented through various publications of the NTMIS. These publications include Annual Technical Manpower Review for different states, NTMIS Bulletin (a quarterly publication), Technical Manpower Profile and various analytical reports from time to time, which contain information on:

- Facilities for engineering education.
- Faculty position in the institute.
- Migration of students for engineering education.
- Migration of graduates for employment.
- Absorption of fresh engineers.
- Emoluments earned by fresh engineers.
- Sector of their employment and so on.

B. Research and Development Schemes:

1. PG Scholarship Scheme has been in operation from the beginning of the 4th Five year plan and is continuing till date. The scheme was earlier implemented by the Ministry of Human Resource Development, Government of India till the financial year 1993-94 and was transferred to AICTE from the financial year 1994-95. Under the scheme, financial assistance is provided only for full time regular PG courses in Engineering & Technology / Pharmacy / Architecture. The scheme provides for scholarship and contingency to
eligible GATE qualified PG students, library grant to institution and recurring expenses in the form of salary for sanctioned posts in select institutions.

2. National Doctoral Fellowship (NDF) enables selected research scholars to pursue doctoral programme in exciting and emerging fields of technical education and offer themselves for teaching position in the Technical Education System. It also provides research support to bright young candidates for pursuing exciting and innovative research in the field of Technical Education. The scholarships are for three years and provide scholarship and contingency for research work and overhead for the host institution.

3. Career Award for Young Teachers: In addition to attracting highly motivated persons to teaching, there is need for harnessing the potential of young talented teachers for professional growth by research. Therefore, the purpose of the scheme is to identify young talented teachers who have established competence in their respective area of specialization. The scheme helps them in promoting their professional growth by enabling them to devote maximum time in research and study with minimum teaching responsibility. The award is of three years duration. The age limit is 35 years, with relaxation of 5 years for women teachers.

4. Research Promotion Scheme (RPS) Research and development activities are considered as an essential component of higher education because of their role in creating new knowledge and insight and imparting excitement and dynamism to the educational process, as well as make them need based in view of the national requirements. The objective of this scheme is to create and update the general research capabilities of the faculty members of various Technical Institutes. The proposal should include a specific project theme with a clear statement of the objectives, details of equipment and other research facilities proposed to be acquired and the expected deliverables from the project. The scheme promotes research in technical disciplines and innovations in established and newer technologies and generates Masters and Doctoral degree candidates to augment the supply of research faculty and research personnel in the country. The scheme promotes
research in identified thrust areas of research as well as research in technology development for the physically disabled, disaster management etc.

5. Nationally Coordinated Project (NCP): promotes integrated R&D on themes of national / social significance, involving networking / collaboration amongst several institutions and industry user organizations. The Technical/Financial/Administrative deliverables are to be clearly spelled out by the networking institutions with the lead institution being an IIT/IISc/IIM/NIT or a nationally reputed institution. Funding is limited to Rs. 30-40 lakhs for duration of three years.

6. Modernization and Removal of Obsolescence in Technical Education (MODROBS): Keeping in view the rapid change of technologies, there is a continuous need for modernization of equipment in technical institutions to keep the students as well as the faculty abreast with the modern technology. MODROBS aims at equipping technical institutions with modern infrastructural facilities in laboratory(s) / workshop(s) / computing facilities to enhance functional efficiency for teaching, training and research purposes. Creation of new laboratories is not envisaged. It also supports new innovations in Class Room and Laboratory / Teaching Technology, development of Lab Instructional Material and appropriate technology to ensure that the practical work and project work to be carried out by students is contemporary and suited to the needs of the Industry. The equipment financed under the scheme could be ideally used for upgradation of equipment in existing laboratories, enhancement of performance parameter specification of existing equipment, incorporation of latest development in the field and replacement of old depreciated equipment by modern equipment. Creation of new laboratories is not envisaged. Maximum Funding is Rs.15 lakhs with 2 years duration.

C. Industry Institute Partnership Schemes:

1. Industry Institute Partnership Cell (IIPC) scheme: The objective of the IIP Cell is to reduce the gap between industry expectations (practice) and academic offerings (theory) by direct involvement of industry to attain a symbiosis. All the stakeholders, namely: Institutions, Industry, Students and Society stand to gain as it can be a win-win
partnership. The Institutions stand to gain by way of up to date curricula, source of revenue generation by consultancy and R & D, source of manpower for employment, societal relevance, and most importantly acquisition of brand name/equity; industry stands to gain by way of availability of employable manpower pool, and increased productivity; faculty stand to gain by way of exposure to latest industry practices for more effective teaching-learning processes, etc; students stand to gain by way of hands-on training, reduction of learning curve in industrial practices; and, society stands to gain by way of improved quality of goods and services. The scheme provides financial assistance for setting up of an IIP Cell in a technical institution as focal point for better interaction between the academia and industry. The basic objective of the IIP Cell is to reduce the gap between industry expectations (practice) and academic offerings (theory) by direct involvement of industry to attain a symbiosis. Under this scheme, AICTE has already provided financial support of around Rs. 1441.07 lakhs to establish 161 cells in various technical institutions throughout the country.

2. National Facilities in Engineering & Technology with Industrial Collaboration (NAFETIC) aims at establishment of National Facilities in frontier areas of engineering & Technology in collaboration with industry for design, instrumentation, testing, manufacturing etc. The major objectives are to achieve breakthrough in relevant specific technology areas, intensify technology transfer from participating Institution for the benefit of industrial development, provide effective linkage between industry and academic institutions for sponsored research and consultancy, etc. Under this scheme, AICTE has already provided financial support to establish 8 centers with a financial assistance of around Rs. 2.25 crore to technical institutions of higher learning at national level in collaboration with industry, in emerging areas of engineering and technology. The upper limit of the scheme, i.e., Rs. 50.00 lakhs may be raised in accordance with the magnitude of the proposed national facility.

3. Entrepreneurship Development Cell (EDC): The new education policy of 1986 has emphasized the need for vocationalization of technical education at various levels. Thus, it is necessary to develop mechanisms so that academic institutions could focus their attention on entrepreneurship & self-employment in addition to their present mandate of churning out trained manpower. Adequate infrastructure is available at most of the
academic institutions for promoting entrepreneurship. What is required is to fill the gaps in the form of trained faculty and focused programmes to inculcate entrepreneurial spirit amongst the Science and Technology (S&T) personnel. The academic institutions, which are leaders in developing human resources, with some modulation and change in focus, could then churn out techno entrepreneurs on a continuous basis, which would accelerate the process of economic development and growth. Academic institutions must undertake this role and blend their technical inputs with entrepreneurial and managerial skills in their academic programmes and train S&T personnel for entrepreneurial challenges. The scheme aims at institutionalizing mechanisms and support systems for technocrat entrepreneurs. Under this scheme, AICTE has already provided financial support of around Rs. 1247.92 lakhs to establish 157 cells in various technical institutions throughout the country.

4. AICTE-INAE Distinguished Visiting Professorship: This joint initiative of AICTE and Indian National Academy of Engineers (INAE) was launched in 1999. Under the scheme specialists from industry and research laboratories deliver lectures in the academic institutions as Visiting Professors. The Scheme envisages promotion of industry-institute interaction by facilitating the dissemination of knowledge through the expertise of experienced and knowledgeable persons from industry to integrate their rich industrial experience with technical education. The Scheme has received very enthusiastic response from industry and engineering research institutions over the years.

During the course of teaching engineering at under graduate and postgraduate levels it is desirable to correlate theoretical knowledge with ‘real life’ practical problems encountered in industry. For engineering faculty, this would provide the opportunity to learn about the State-of-the-Art technologies and get exposure to current industrial and commercial practice. This would make the teaching relevant to the industrial realm and add to the realism of the courses taught in engineering institutions. The interaction with captains of the industry will lead to bringing new and innovative ideas, thereby enhancing credibility of the teaching imparted at the institution.

In turn, the engineers in the industry will benefit by being exposed to the latest concepts and research inputs for troubleshooting and development of new processes, products and technologies. The faculty can enhance and update the basic theoretical knowledge of the
engineers in industry by interacting with them, solving problems and conducting short courses relevant to the concerned industry. The advanced research and technological inputs given by the visiting faculty can be thus gainfully utilized by the industry. This can initiate the development of longer-term relationships between the institution and the industry, by way of joint projects, joint student practical training programmes, research and consultancy contracts, donation of equipment and software to the institution and placement of students.

OBJECTIVES

The Industry Professor under the scheme will:

a) Interact with the engineers in industry and get acquainted with the latest technologies and use theoretical knowledge for solving ‘real life’ problems encountered in industry

b) Conduct short seminars/lectures at the industry

c) Initiate joint projects, student-training programmes and explore the possibility of research and consultancy collaborations between the industry and the engineering institution.

d) Recommend suitable modifications to the curriculum at the engineering institution.

5. Financial Assistance to Professional Societies / Bodies Scheme intends to provide limited financial assistance to technical professional / societies to enable them to promote and develop technical education in their professions through various means including emerging technologies.

Financial assistance is provided mainly to:

i. Organize exchange of information with technical institutions and teachers on significant issues of interest through appropriate publications like Handbook / Directory, Audio-Video resource materials, Monographs and proceedings of conferences / seminar etc.
ii. Organize short-term training programmes for teachers and technical professionals, workshops / seminars / symposia / conferences on themes related to technical education in frontal areas of technology, lectures in emerging areas, exhibitions / melas / jathas for promoting technology temper and awareness including traditional practices, technologies and concepts for the benefit of students and the society at large.

iii. Establish Network with libraries of technical institutions; promote interaction with students with the professionals with emphasis on professional practices, ethics, role-plays and professional guidance. Provides limited non-recurring financial support to selected professional bodies / societies including industry bodies and enables them to make useful contribution to the development of technical education.

Table: 2.1
Grant released under different schemes during the financial year 2012-13

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Scheme</th>
<th>No. of total Beneficiary Institution/University</th>
<th>Amount Released (Rs. In Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>MODROBS</td>
<td>534</td>
<td>5364.94</td>
</tr>
<tr>
<td>2.</td>
<td>RPS</td>
<td>267</td>
<td>3234.66</td>
</tr>
<tr>
<td>3.</td>
<td>Travel</td>
<td>25</td>
<td>15.6</td>
</tr>
<tr>
<td>4.</td>
<td>Seminar</td>
<td>103</td>
<td>72.65</td>
</tr>
<tr>
<td>5.</td>
<td>QIP</td>
<td>22</td>
<td>585.78</td>
</tr>
<tr>
<td>6.</td>
<td>SDP</td>
<td>329</td>
<td>890.56</td>
</tr>
<tr>
<td>7.</td>
<td>EDC</td>
<td>30</td>
<td>93.41</td>
</tr>
</tbody>
</table>

OTHER QUALITY ASSURANCE INITIATIVES BY GOVERNMENT OF INDIA

For studying and improving the functioning of various institutions and programmes and critical examination of key system issues, GOI had set up various committees from time to time. Some of the reports of such committees set up in the recent past are:

a) Report of National Appraisal Committee on Scheme of Community Polytechnics (1996)
During 1980s, Government of India (GOI) and the State Governments had felt an urgent need for revamping the technician education system in the country to make it demand-driven, with relevant courses in new and emerging technologies, with adequate infrastructure resources, competent faculty and effective teaching-learning processes. The GOI supported the State Governments through two World Bank assisted Technician Education Programmes, which helped to upgrade the system and benefited 531 polytechnics in 19 States and the UT of Pondicherry.

An expert group set up by MHRD in 1998 on Policy Initiatives for Technician Education recommended that due to rapid development in technology, significant and qualitative change in the requirement of technician engineering manpower has occurred. It can no longer be classified as a single type of position between craftsmen and engineers, as technicians are required to occupy multiple level positions to perform and manage activities on the shop floor and in the field.

A third Technician Education Programme is currently under execution. With World Bank assistance, in the States that had not been included in the earlier two projects.
The success of these projects has encouraged the GOI and the State Governments to seek similar external assistance for systemic transformation of the technical education system as a whole with primary focus on engineering education.

INSTITUTIONAL FRAMEWORK

Following two are the main organizations which have been established at the National Level for setting norms and standards and seeing to their observance in the field of higher and technical education

Table No. : 1 Institutional Establishment for Quality Standards

<table>
<thead>
<tr>
<th>S. No</th>
<th>Sector</th>
<th>Institution Established for Quality Standards at National level</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Universities &amp; General Colleges</td>
<td>University Grants Commission (UGC)</td>
<td>Statutory body</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Assessment and Accreditation Council (NAAC)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Technical &amp; Management Education</td>
<td>All India Council for Technical Education (AICTE)</td>
<td>Statutory body</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Board of Accreditation (NBA)</td>
<td></td>
</tr>
</tbody>
</table>

Control over the Technical education system is affected at Central government level through:

Bureau of Technical Education (BTE) in ministry of HRD

This agency undertakes the monitoring and evaluation of centrally funded institutes. All
proposals for new plan schemes and assistance through foreign agencies are processed by BTE.

**University Grants Commission (UGC)**

This apex body undertakes funding of Central Universities, maintenance of standards of teaching, examinations and research in Universities. It also recommends recognition of new universities.

**All India Council for Technical education (AICTE)**

is a statutory body responsible for planned growth of the technical education system, maintenance of standards and norms, funding for Research and Continuing education, QIP and Industry partnership schemes.

**The National Board of accreditation (NBA)**

Functions under AICTE and is responsible for ensuring norms and standards are met and through a rigorous process of Course wise study grades are awarded by NBA for guidance of all stakeholders and help the college in Quality up-gradation (AICTE Reports).

**National Assessment and Accreditation Center (NAAC)**

An autonomous body of UGC was set up for Assessment of Quality in Universities, by examination of the affiliated colleges as a sample and assessment of Colleges by study of attached Departments. The rating by means of Stars serves to guide stakeholders and the concerned college (NAAC Reports).

**Source: Various Reports of AICTE**

**ORGANISATONS ENGAGED IN QUALITY CONTROL AT CENTRAL GOVT LEVEL**

1) **Board of assessment of qualifications**

The Board of Assessment of Qualifications of the Government of India, which also deals with professional qualifications and equivalence of various awards has a limited view of assessment for a specific purpose, i.e., for governmental employment. Further, as it is practiced, the work of the Assessment Board is a sort of one time evaluation based on a minimum requirement. For a healthy and effective growth, what is
required is a sort of continuous and objective assessment aiming at higher and still higher standards. Even though many agencies, particularly, statutory agencies are involved and any such attempt may not be looked upon with unmixed favor, to strengthen the system, by identifying the weaknesses and strength of a particular sector/course/institutions so that there is adequate motivation and direction for further improvement. To achieve these objectives two bodies NBA and NAAC were set up by MHRD.

2) **The National Board of accreditation** (NBA)

Functions under AICTE and is responsible for ensuring norms and standards are met and through a rigorous process of Course wise study grades are awarded by NBA for guidance of all stakeholders and help the college in Quality up-gradation(AICTE Reports).

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Having understood the system of technical education in India, relevant issues identified by expert bodies, constraints of the system and importance attached by MHRD to continuous monitoring of standards, we can now attempt to study the Quality assessment mechanisms of NBA and NAAC.

**Towards Accreditation-Role of NAAC**

In pursuance of the policy declaration of the National policy on education (NPE) in 1986, NAAC (national Assessment and accreditation Council) was set up by the UGC in 1994 at Bangalore by the UGC which observed that “Excellence of Institutions of Higher education is a function of many aspects. Self evaluation and self improvement are important. By setting up of a mechanism to encourage self assessment and accreditation by a council, the quality process, participation, achievements etc will be constantly monitored and improved”

Thus the mandate of NAAC is to accredit institutions to help them to work continuously for quality improvement. Assessment is accomplished through a self study by the University,
followed by a peer group review which ends with a grade of Accreditation.

The unit of study in the NAAC process is either a University or a College or a department. Thus the scope of process will be decided by the applicant first. Based on the unit of study, formats have been designed to get information from applicants and also self study formats have been prepared. The general theme in these formats is that information captured is used subsequently to provide inputs to the peer group on Identified 7 criteria and the key aspects studied under each criterion are which are summarized as follows:

1. **Curricular aspects:**
   - Compatibility of the Program with goals and objectives.
   - Initiation, review and redesign of Programs
   - Feedback on Programs
   - Interaction with academic peers and employers
   - Program options

2. **Teaching learning and evaluation:**
   - Programs account for individual differences in learners and provides academic flexibility
   - The evaluation procedures are rigorous and fair
   - Regularity of examinations and confidentiality
   - Recruitment process of qualified faculty
   - Institution has an open and participative mechanism for evaluation of teaching, research and work satisfaction of the faculty.
   - Opportunities for academic progress and professional advancement.

3. **Research, Consultancy and extension:**
   - Promotion of a culture of research in students and faculty
   - Outcomes by way of research, consultancy projects.
   - Interaction with the Industry

4. **Infrastructure and Learning resources:**
   - Adequacy of Infrastructure availability in relation to Programs being run
   - Mechanism for effective and optimal use of the infrastructure.

5. **Student support and progression:**
   - Departmental support to the student for his experiences on the campus
➢ Student and alumni feedback

6. Organization and Management:
   ➢ Organization design for delegation of powers and clarity of responsibilities for facilitating action on earmarked goals.
   ➢ Transparency in administration
   ➢ Academic and administrative planning to be in tandem
   ➢ Realistic academic calendar and adherence to schedules
   ➢ Recruitment policy for faculty and staff
   ➢ Transparent admission policy
   ➢ Effective Financial policy

7. Healthy practices:
   ➢ Efficient running of academic and administrative decisions

To account for variances in Universities, colleges and Departments being assessed, differential weight ages have been assigned to above criteria is mentioned in Table-2

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>UNIVERSITY</th>
<th>COLLEGE</th>
<th>DEPARTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular aspects</td>
<td>15</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Teaching learning and evaluation</td>
<td>25</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Research, Consultancy and extension</td>
<td>15</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Infrastructure and Learning resources</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Student support and progression</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Organization and Management</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Healthy practices</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
Score of any College is calculated as Sum of Wi * Ci where C is the score given by peer group and W is the weight of 1st criterion.

Based on the weighted scores, the colleges are graded as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>A *****</td>
<td>&gt;=75</td>
</tr>
<tr>
<td>A****</td>
<td>70-75</td>
</tr>
<tr>
<td>A***</td>
<td>65-70</td>
</tr>
<tr>
<td>A**</td>
<td>60-65</td>
</tr>
<tr>
<td>A*</td>
<td>55-60</td>
</tr>
<tr>
<td>Not accredited</td>
<td>&lt; 55</td>
</tr>
</tbody>
</table>

Duration: The Accreditation award by NAAC is for a period of 5 years.

Source: Various Reports of NAAC

Accreditation of Technical Education Institutions: Role of NBA

The National Board of Accreditation (NBA) has been constituted by the All India Council for Technical Education, as an Autonomous Body, under Section 10(u) of the AICTE Act, 1987 in order to periodically conduct evaluation of undergraduate and postgraduate degree Programs being offered in various approved technical institutions, on the basis of specified guidelines, norms, benchmarks and criteria (NBA Reports).

The basic objectives of Accreditation are:-

- To assist all the stakeholders in Technical Education to identify those Institutions and their specific Program which meet the Norms and Standards and Criteria prescribed by the Council
- To provide guidelines to the Technical Institutions for the improvement of existing Programs and also for the development of new Program:-
- To stimulate the process of continual improvement in the Technical Education system in our country.
To develop a Quality Conscious system of Technical Education where excellence, relevance to market needs and participation by all stakeholders are prime the major determinants

NBA is dedicated to building a technical education system, as vendors of human resources, that will match the national goals of growth by competence, contributions to economy through competitiveness and compatibility to societal development

NBA will provide the Quality benchmarks targeted at Global and National Stockpile of human capital in all fields of technical education.

Though the processes of arriving at the final Accreditation decision are substantially objective, they do involve an element of subjective assessment. The providers outlined here are neither exhaustive nor prescriptive, and the strengths and weaknesses of each Program are to be examined in the context of the overall goal of quality assurance. The underlying philosophy and the approach should be to assist the Institutions to achieve and maintain the quality of their Programs, and not to condemn or stifle their efforts.

*The basic criteria have been formulated to ensure that:*-

- The Programs provide their grades with a judicious mix of Basic Sciences, Engineering Sciences, Professional Theory, Engineering Design, Laboratory Experience, Workshop skills, Management, Humanities and social Sciences, Oral, Written and Graphical Communication skills, Computing techniques and Project work.

- The Programs give the graduates the capabilities to formulate and solve engineering problems through the application of basic and engineering sciences appropriate to their discipline; to design components, systems and processes to satisfy identified needs; to apply experimental or computational techniques in their professional tasks; to communicate effectively with peers and other relevant groups; to understand the impact of engineering slotting in the context of real-life constraints involving economic, social and safety, health and environmental considerations; and to sustain their professional competence through life-long learning.

- The postgraduate Programs prepare their students to acquire mastery in a specialized area through inputs in theory, practice and a project which results in a substantial contribution
to research, development or design.

- The Management of the Institution displays the requisite vision and commitment and provides the necessary resources and support to enable the achievement of the above educational Objectives. This is one of the most crucial and important requirements for securing Accreditation of the academic Programs.

**Basic concepts of Accreditation:**

Literally Accreditation means Recognition and guarantee of minimum quality

For the **NBA** it means:

A process of quality assurance, giving credit where it is due for some clearly visible and demonstrable strategies of academic activities and objectives of the institutions, known to be honestly pursued and efficiently achieved by the resources currently available with a potential for continuous improvement in quality for effective growth.

Benefits to institutions to go for Accreditation by NBA: If an institution and its Programs are accredited by NBA, it enables Identification of the Programs with excellence in technical education be assured of conformity to good practices and bench marks of global requirements. Rating the Programs on a national platform to attract better students should intake.

Enable an appraisal of Institution’s facilities, faculty vis-à-vis performance, be a satisfied vendor of human capital to world-class employers and other stake holders.

**Significance of Accreditation for Various Stakeholders**

Accreditation signifies different things to different stake holders for the parents; it signifies that their child goes through a teaching-learning environment as per accepted good practices. For the students, it signifies that he has entered the portals of an institution, which has the essential and desirable features of Quality Professional Education.

For the employers, it signifies that the students passing out has competence based on well grounded technical inputs.
For AICTE, it signifies that the institutional performance is based assessment through a competent body of Quality assessors, with of Strengths & Weaknesses emanating as a feedback for policy-making.

For the institution, it signifies its strengths, weaknesses and opportunities for future growth.

For the industry and infrastructure providers it signifies identification of quality of institutional capabilities and Skills & Knowledge.

For the country, it signifies confidence in the Suitability for sustaining stockpiles of market sensitive human capital and a pragmatic national development perspective.

For the alumni, it signifies attachment through the pride of passing out with credentials. Market sensitivity of Program output, to avoid imbalance in supply of qualified manpower.

Accreditation of the Institutional Programs by NBA is based Availability of potential for sustaining and improving upon assessment criteria Recognition by all stake holders like the end-users, institutional products and the community at large Demonstrated capability of the institution and Program to adhere to the qualitative criteria of Accreditation.

The basic objectives of Accreditation are:-

- To assist all the stakeholders in Technical Education to identify those Institutions and their specific Program which meet the Norms and Standards and Criteria prescribed by the Council
- To provide guidelines to the Technical Institutions for the improvement of existing Programs and also for the development of new Program.
- To stimulate the process of continual improvement in the Technical Education system in our country.
- To develop a Quality Conscious system of Technical Education where excellence, relevance to market needs and participation by all stake holders are prime the major determinants
- NBA is dedicated to building a technical education system, as vendors of human resources, that will match the national goals of growth by competence, contributions to economy through competitiveness and compatibility to societal development
NBA will provide the Quality bench marks targeted at Global and National Stockpile of human capital in all fields of technical education.

**Quality Assurance implementation by Washington Accord Countries**

Globalization “is the flow of technology, economy, knowledge, people, values, ideas…across the borders. Globalization affects each country in a different way due to a nation’s individual history, traditions, culture and priorities.” To cope with the ‘Globalization’, the higher education system has to re-orient its structure and function to meet the challenges of Globalization.

The globalization of economies brings in the mobility of knowledge workers and seekers across the world which could translate into an influx of skilled labor to meet growth in Industry needs in a Country or migration of jobs due to relocation to comparative advantageous locations of plant and Machinery for economies of scale.

Globalization has increased the tendency of engineering practice to be international in scope, and thus has led to the need for the credentialing of graduate engineers who want to practice in venues other than the one in which they were educated and initially licensed.

**Accreditation** of engineering education programs had evolved as the primary basis upon which mutual recognition across national borders is based – both for educational equivalency, and increasingly for practice mobility.

**Trends in engineering accreditation:** A quick examination of developments in engineering accreditation in several countries around the world can illustrate various ways in which it is having major impacts upon engineering education.

Germany – In response to declining interest in engineering study by both natives and international students, and to pressures from the Bologna Declaration and other sources to harmonize its engineering programs with those of other developed countries, universities in Germany are developing new engineering education systems in the bachelors plus masters
pattern. At present these new programs are being offered in parallel with the traditional long programs leading to the Diplom-Ingenieur, and students are given the choice of which pattern to pursue. To assist in the development of these new programs, and to evaluate and certify their quality, a new Accreditation Agency for Programs in Engineering and Computer Science (ASII) has been established.

Japan – In the recent past, graduates of engineering programs in Japan were readily hired by its major corporations, given significant additional training by those corporations both initially and throughout their careers to enable them to contribute effectively to the economic goals of their employers, and then almost guaranteed lifetime employment and security by those employers. But the economic downturn in recent years has made job security a thing of the past, and globalization has made it imperative that Japanese engineering graduates are prepared for more self directed career development, and that they are prepared for practice in the global marketplace. A new Japan Accreditation Board for Engineering Education has been established to provide quality assurance as new engineering programs are developed and implemented.

Jordan – In many developing countries, public university engineering programs do not have sufficient capacity to educate all those students who want to prepare themselves for employment in hot technological areas such as information technology. Private universities – often of questionable quality – typically spring up to meet the demand. In Jordan, the government has taken two steps to meet these challenges – the establishment of a new engineering program at a new public university, and the establishment of a stringent accreditation system for private universities. The Council on Higher Education has developed and implemented detailed prescriptive specifications for areas such as faculty/student ratios, laboratory equipment and space, libraries, and financial stability in order to assure that quality is provided in private universities offering degree programs within its borders.

United States of America – The Accreditation Board for Engineering and Technology (ABET) has been the major quality assurance mechanism for engineering education in the US since the 1930’s. It is mature, and covers essentially all of the engineering, technology, computer science, and related programs in the country. It also has served as a model for engineering
accreditation developments in other countries, and it has developed major international thrusts such as substantial equivalency reviews of engineering programs in foreign countries where it has been invited. In the past several years, ABET has made a major change in its evaluation criteria – moving from technique specifications to outcomes assessment. Its ‘Criteria 2000’ is based upon institutional self study and goal setting against which it will be evaluated, continuous improvement requirements for accredited programs, and detailed assessment of the outcomes of the engineering programs as the fundamental criterion for accreditation.

Latin America – As engineering programs have developed in Latin American countries, several countries have moved toward the establishment of accreditation programs. Both ABET and the Canadian Engineering Accreditation Board (CEAB) have conducted workshops and training efforts in Latin America to assist in the development of engineering accreditation systems there. One major system recently developed is the Consejo de Acreditación de la Enseñanza de la Ingeniería (CACEI) in Mexico, at least partially stimulated by the North American Free Trade Agreement. A new ‘Western Hemisphere Initiative’ has recently been announced by ABET, CEAB and CACEI – aimed at further assisting Latin American countries in the development of effective engineering accreditation systems, and furthering regional mutual recognition efforts.

Outcome of assessment

Education as a whole, particularly in developed countries, has in recent years focused on outcomes assessment for quality assurance and evaluation of educational programs. This trend has been driven both by educators and by publics interested in quality education – parents, legislators, funding agencies, etc. In engineering education, ABET has been a leader in moving to outcomes assessment as the primary mechanism for accreditation of engineering programs, in its ‘Criteria 2000’. The following statement of outcomes from the ABET criteria was developed with substantial input from employers of engineering graduates, and other organizations concerned with quality assurance in engineering education:

“Engineering programs must demonstrate that their graduates have:

a) An ability to apply knowledge of mathematics, science and engineering
b) An ability to design and conduct experiments, as well as to analyze and interpret data

c) An ability to design a system, component, or process to meet desired needs

d) An ability to function on multi-disciplinary teams

e) An ability to identify, formulate and solve engineering problems

f) An understanding of professional and ethical responsibility

g) An ability to communicate effectively

h) The broad education necessary to understand the impact of engineering solutions in a
global and societal context

i) Recognition of the need for, and an ability to engage in life-long learning

j) Knowledge of contemporary issues

k) An ability to use the techniques, skills, and modern engineering tools necessary for
engineering practice”

These statements of desired outcome could serve in many engineering education venues.

**International agreements**

International agreements on engineering education and practice have been developed in recent years, based upon engineering accreditation. One such agreement, establishing full reciprocity for engineering graduates between ABET in the US and the CEAB in Canada, has been in place for several decades. It is based upon essentially identical accreditation systems, and extensive reciprocal visits between them. A much broader mutual recognition agreement, the **Washington Accord**, was developed several years ago among several English speaking countries: Australia, New Zealand, Canada, the United States, Ireland, and the United Kingdom.

While there are significant differences in the engineering accreditation systems in these countries, it was agreed – after extensive reciprocal visits – that the resulting engineering graduates were essentially equivalent. Thus graduates from each of the **Washington Accord countries** are accepted in all of the other countries as equivalent, for purposes such as graduate study and licensure applications. In recent years two additional countries have joined the **Washington Accord** – Hong Kong and South Africa – and several more have recently applied.

Educational equivalency agreements can be the basis for cross-border practice
agreements, and the groups of countries involved in the Washington Accord have set in motion a parallel effort – the Engineers Mobility Forum – which is developing an international register of engineers approach. In Europe, the European Federation of National Engineering Associations (FEANI) has established an international practice system, based upon a seven year formation process for engineers, which leads to erring status.

In North America, the three countries which have entered into the North American Free Trade Agreement (NAFTA) have attempted to develop a mechanism for the mobility of practicing engineers across their borders. Canada and Mexico have agreed on such a system of mobility, but efforts to include the United States have been stymied by licensure issues controlled at the state level by 55 separate jurisdictions. In the Asia-Pacific area, several countries have developed an agreement on engineering practice mobility, the APEC Engineer Register.

Process of assessment used by the national Quality Assurance bodies-institution, faculty, department or program-the outcome of such assessment should ultimately reflect on the Qualifications offered by them.

Nearly all the countries of the world have or in the process of developing quality assessment systems based on the four stage model of external evaluation of higher education, i.e.

1) A dedicated coordinating agency
2) Submission of self-study and self-evaluation report by the institutions to the agency
3) A peer review visit, usually on-site and
4) The preparation of a report accrediting on a two-point scale or on multi-point grade. Apparently, it would appear that this uniformity might provide a basis for a strong system of comparable quality assurance leading to the recognition of the studies and qualifications.

Feedback on Accreditation by ABET:

After nearly a decade, the leaders of the stakeholder workshops were reconvened in 2002
to assess the progress of ABET’s accreditation reform effort. After careful consideration of the progress, observations, and feedback from the institutions, the following specific concerns were identified

- The apparent focus of programs on the quantity of data collected rather than the assessment of quality, which can create heavy workloads and the perception of accreditation as an onerous task;
- Sustainability of efforts at the institutional level;
- Continuity and sustained commitment of ABET, institutional, and professional society leadership;
- Inconsistent quality in selecting, training, and evaluating program evaluators by professional societies;
- Confusion regarding processes that ensure not only continuous quality improvement but also that minimum standards are met;
- The need for professional societies and ABET to respond to the blurring of disciplines in updating program criteria.

Despite these concerns, the workshop leaders also identified positive factors that portend cautious optimism:

- Growing acceptance of the value of the systematic engagement of external constituencies in improving program quality;

The EC2000 Study

To provide a data-based evaluation of the status and impact of its reforms, ABET engaged the Center for the Study of Higher Education at Pennsylvania State University to conduct a study to answer the question “Are engineers who graduated from programs since implementation of the EC2000 standards better prepared for careers in engineering than their counterparts.

Continuing Issues for Engineering Accreditation

- Based on the authors’ observations over many years, the following key issues must be addressed continually to ensure that outcomes-based accreditation remains an effective
instrument for quality assurance in engineering education. Outcomes assessment and continuous improvement have been foreign to academic experience and culture, leading to a high initial level of discomfort.

- Active communication and educational efforts are essential both for evaluators and those undergoing evaluation.
- Developing an effective program of outcomes assessment and continuous improvement requires a significant investment of effort. Once established, less effort is required to maintain such a system, but continued, not episodic, attention is required.
- Accrediting agencies must resist the powerful human tendency to require excessive documentation.
- A much higher level of professional judgment by program evaluators and team chairs is needed for sound evaluation based on outcomes and continuous improvement (as required under EC 2000) than was required with the older prescriptive criteria. As a consequence, the effectiveness of program evaluator training becomes the critical element for the success or failure of the entire process.
- ABET must be strongly proactive in recruiting program evaluators and team chairs of the highest quality from industry and a broad spectrum of academic institutions

**INDIA IS WASHINGTON ACCORD FULL MEMBERSHIP**

India has been accorded full signatory status of Washington Accord in the meeting of International Engineering Alliance held on 13th June 2014 in wellington, Newzeland. The other signatories are Australia, Canada, Chinese Taipei, Hongkong China, Ireland, Japan, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Turkey, the United Kingdom, and the United States. Since its inception the NBA as an autonomous body, has accredited as many as 486 programmes in various discipline which include 338 programmes in the under graduate engineering programmes till year 2013.