

IARE

INSTITUTE OF
AERONAUTICAL ENGINEERING



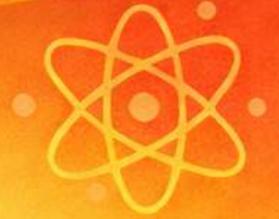
nirf
INDIA RANKING

ENGINEERING
CATEGORY
RANK 151-200

NAAC
ACCREDITATION

A++
GRADE

26
YEARS
OF EXCELLENCE



IQAC

Quality Assurance Standards

Quality is not an option – it is a **Compulsion**



QUALITY ASSURANCE AT IARE

GOVERNANCE AND MANAGEMENT OF QUALITY

In any discussion about quality assurance in Institution, it is clearly important to start by defining the terms and phrases that will be used.

“An examination of a knife would reveal that its distinctive quality is to cut, and from this we can conclude that a good knife would be a knife that cuts well”.

Aristotle

IARE is committed to promoting a robust quality culture by consistently excelling in teaching–learning, research, and service. This is achieved through responsive, reliable, and transparent processes, driven by continuous self-evaluation and external quality assurance, ensuring that every outcome reflects our pursuit of institutional excellence.

Institutional review is a process to verify the effectiveness of an institution’s internal quality assurance and act as a catalyst for improvement.

The following definitions are the commonly accepted ones and should be a useful point of reference for remainder of the handbook.

DEFINITIONS IN QUALITY ASSURANCE

Quality

‘Fitness for purpose’ – Juran

‘Conformance to requirements’ – Crosby

An educational definition is that of an ongoing process ensuring the delivery of agreed standards. These agreed standards should ensure that every educational institution where quality is assured has the potential to achieve a high quality of content and results.

Quality Assurance

The means by which an institution can guarantee with confidence and certainty, that the standards and quality of its educational provision are being maintained and enhanced. This is to ensure that the learning environment (including teaching and research) reaches an acceptable threshold of quality.

Quality Control

Quality control refers to the verification procedures (both formal and informal) used by institutions in order to monitor quality and standards to a satisfactory standard and as intended.

Quality Enhancement

Quality Enhancement is the process of positively changing activities in order to provide for a continuous improvement in the quality of institutional provision.

Quality Assessment

Quality Assessment is the process of external evaluation undertaken by an external body of the quality of educational provisions in institutions, in particular the quality of the student experience.

Quality Audit

Quality Audit is the process of examining institutional procedures for assuring quality and standards and whether the arrangements are implemented effectively and achieve stated objectives. The underlying purpose of Continuation Audit is "to establish the extent to which institutions are discharging effectively their responsibilities for the standards of awards granted in their name and for the quality of education provided to enable students to attain standards."

Standards

Standards describe levels of attainment against which performance may be measured. Attainment of a standard usually implies a measure of fitness for a defined purpose.

Quality Culture

Quality Culture is the creation of a high level of internal institutional quality assessment mechanisms and the ongoing implementation of the results.

Quality Culture can be seen as the ability of the institution, program etc to develop quality assurance implicitly in the day to day work of the institution and marks a move away from periodic assessment to ingrained quality assurance.

Accreditation

Accreditation is the result of a review of an education program or institution following certain quality standards agreed on beforehand. It's a kind of recognition that a program or institution fulfils certain standards.

INTER-RELATED CONCEPTS OF QUALITY IN EDUCATION

Attempts to define quality have followed two main approaches, one dealing with philosophical concepts, the other focused on tangible phenomena thought to reflect quality which in principle are measurable. Five discrete interrelated ways of thinking about quality are envisaged: exceptional, perfection or consistency, fitness for purpose, value for money and transformative. A simple conceptual model is given in Figure 1.



Figure 1: Inter-related concepts of quality in education

- **Quality as exceptional:** This is an excellent standard of academic achievement. Excellence as “an outstanding high level of quality that distinguishes the best Institutions from the rest”. Quality is achieved if the required standards are surpassed. Quality can also be thought of as distinctive or “high class” and can potentially provide benchmarks against which ‘high’ standards can be evaluated.
- **Quality as perfection or consistency:** This focuses on processes and specifications to be met as opposed to inputs and outputs. This notion of quality emphasises reliability and is encapsulated in two interrelated ideas: zero defects and quality culture. This view of quality is perhaps of limited value in higher education where perfect results are unlikely to be achieved.
- **Quality as fitness for purpose:** This emphasises the achievement of minimum standards and the use of numerical indicators to judge the quality of a product or service in terms of the extent to which its stated purpose – defined as meeting student specifications or conformity with the institutional mission – is met. This, to all intents and purposes, focuses on measuring inputs against outputs and is more of a functional definition of quality rather than an exceptional one.

The measuring is done by the institution, demonstrating that it fits either externally-prescribed standards (e.g. specified by a regulatory or professional body) or its own objectives (as specified in its values and mission statement). This concept also evaluates whether the quality-related intentions of institute are adequate and as such it provides a check on fitness for purpose rather than being a definition of quality.

- **Quality as value for money:** This assesses quality in terms of return on investment or expenditure, concentrating on the relationship between the quality of output (product and services) and the financial costs implied, is often linked to notions of efficiency and effectiveness. This is implicitly related to accountability both to funding agencies as well as students.
- **Quality as transformation:** This defines quality as a process of qualitative (or potentially quantitative) change from one state to a higher-level state with emphasis on the enhancement and empowerment of students as learners/participants, adding value to students through the learning process. This concept of quality can also apply to changes within an institution enabling it to better provide transformative learning or research.

STRIVING FOR EXCELLENCE:

The key components identified for achieving educational quality excellence are listed in Figure 2. By aligning educational programs with the evolving requirements of the job market and economic strategies, educational institutions can tailor their curricula to ensure graduates possess the skills and knowledge demanded by employers. This alignment not only enhances graduates' employability, but also contributes to reducing skills mismatches and unemployment rates.



Figure 2: The key components of educational quality excellence

Furthermore, the focus on developing human resources with the necessary skills and competencies for a diversified economy entails investments in teacher training, curriculum development, and educational infrastructure.

These investments lead to the adoption of innovative teaching methods, the integration of emerging technologies in classrooms, and the provision of hands-on learning experiences, all of which contribute to a more engaging and effective learning environment.

Moreover, promoting research and innovation within higher education institutions encourages collaboration between academia, industry, and government, fostering a culture of creativity and problem-solving. This collaboration leads to the development of cutting-edge technologies, the commercialisation of research findings, and the creation of new industries, ultimately driving economic growth and competitiveness.

SIGNIFICANCE OF QUALITY ASSURANCE (QA)

Quality Assurance is a condition that leads to the achievement of transparency. It will ensure the quality of the academic (teaching, curriculum etc) and structural (buildings, computers etc) provision of courses and it will allow an objective review of their quality. The transparency should be dialectical, meaning that the quality assurance should make institutions transparent, but also that the quality assurance in itself should be transparent, allowing the outcomes to be shared by the participants (actors).

QA can guarantee the 'fitness for purpose of our education' and ensure that the outcomes of higher education meet student expectations. Also, QA provide a powerful source of useful information about institutions and qualifications, which would be a great benefit to a wide range of stakeholders.

The main purpose of the QA system is to ensure that the Institute meets the expectations of internal and external stakeholders, complies with laws and regulations, documents roles and accountability, manages risks and identifies opportunities for improvement.

The QA system ensures that the QA Policy is implemented with regular checks and reviews, allowing a cycle of continuous improvement, the PCDA cycle, shows in Figure 3.

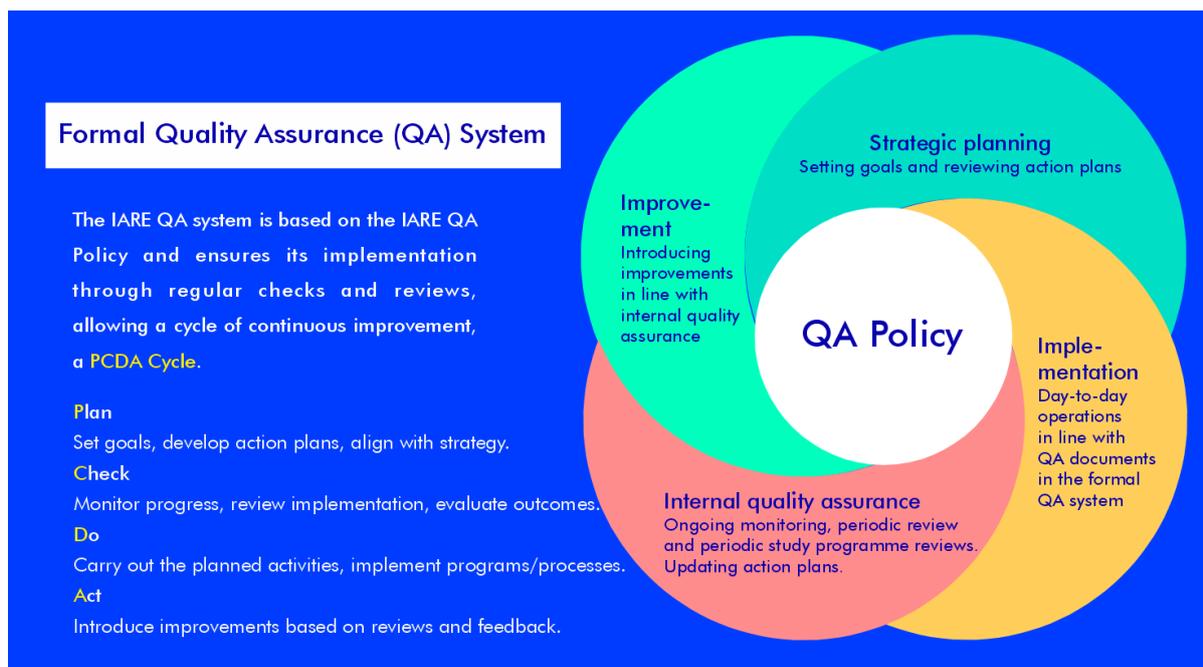


Figure 3: Quality Assurance System

The success of QA Policy implementation will be evaluated every year by the IQAC committee and reviewed in accordance with the results of internal and external quality assurance. Staff, students and external stakeholders will be actively involved in regular improvements within IARE.

PURPOSE

The Institute Quality Assurance Policy is designed to guarantee and enhance the quality of Institute activities. The QA Policy provides a roadmap for staff and students and supports the Strategy of Institute.

The QA Policy lays the foundation for Institute's formal QA system. It describes the Institute's focuses and goals regarding quality assurance for core activities, in order to best meet the expectations of students, the Institute community and external stakeholders.

The QA Policy is based on the Institute's core values of academic freedom, equality and professionalism, as well as its Strategy and Code of Ethics.

The purpose of Internal Quality Assurance Guide is to develop, maintain and systematically improve quality culture at IARE, engaging all groups of stakeholders-internal and external. The Guide describes the main processes of quality assurance of IARE teaching, research and academic management. The Dean of IQAC is responsible for the systematic review and revisions.

IQAC GUIDING PRINCIPLES OF QUALITY ASSURANCE

The Institute takes primarily responsibility for the quality of its operations. Quality assurance is guided through the development and enforcement of internal policies and procedures in compliance with AICTE, UGC, NAAC and NBA.

The guiding principles to design, develop, implement and enhance the quality of education regardless of regulatory approaches. The **Nine** guiding principles that support are:

Principle 1	Taking strategic approach to managing quality and standards
Principle 2	Assuring and enhancing the quality of students learning experience
Principle 3	Resource delivery of a high-quality learning experience
Principle 4	Engaging external review and accreditation
Principle 5	Recruiting, selecting and admitting students
Principle 6	Supporting students to achieve their potential
Principle 7	Teaching learning and assessment
Principle 8	Designing, developing and modifying programs
Principle 9	Operate processes for complaints and appeals

ACCOUNTABILITY AND ROLES

The Governing Body and Principal set the Quality Assurance Policy and the dean of IQAC and dean of strategy and quality management is accountable for its implementation. Staff and students are responsible for putting the QA Policy into action.

Governance

IARE is rooted in a holistic vision of education, through **7 holistic dimensions** that is effective, sustainable, transparent and viable. The Institute is committed to reviewing and monitoring, on a continuous basis, the

- Effectiveness of organisational structures and processes within the Institute.
- Outlining and revising key areas of accountability, roles and line management functions.
- Continuing the development of a robust quality assurance system to inform and support governance and organisational structures.
- Ensuring that strategic targets set for the Institute have built-in mechanisms for monitoring their effectiveness.

Why do students have to be involved in the QA process?

Students are the ones for which education has been primarily designed. They are the ones dealing with it day in day out over several years. This makes them real experts on QA; students know best how their (ideal) education and study environment should look like.

Tasks of QA committee

The committee can assess the strengths and weaknesses of courses and/or entire study programs and even institution. This can be based on surveys which provide an analysis of the problems students face in their studies and/or opinions about it.

The committee may suggest and initiate changes of courses and study programs that lead to improvements. Of course one should take care that this does not distract from the QA assessments. One should avoid the impression that the QA assessment is done in a subjective way, with the aim of implementing changes.

QA committee may critically look at possible effects of changes in education that directors or professors intend to implement. This can be seen as a pre-emptive kind of QA. Although most people cannot see into the future and therefore it's often hard to predict what the effect of changes will be, it's always beneficial to take time to think about possible effects it can have.

Strategic quality assurance begins with understanding the needs of stakeholders, which are then translated into the Institute's vision, mission, goals, and objectives. This ensures that quality assurance and assessment processes are aligned with the mission and goals, culminating in outcomes that meet stakeholder expectations.

Effective quality assurance requires robust systems and policies, including:

1. Establishing a strong internal quality assurance system.
2. Conducting regular internal and external quality assessments.
3. Maintaining a comprehensive internal quality assurance information management system.
4. Continuously enhancing and improving the quality assurance framework.

QUALITY ASSURANCE FRAMEWORK

The Quality Assurance Framework will serve as a common reference point for quality assurance agencies and institutions. The framework uses generic principles and statements of good practice. The framework is not prescriptive; its purpose is to promote good practices of internal and external quality assurance.

The quality assurance framework is based on:

1. Internal Quality Assurance (IQA)
2. External Quality Assurance (EQA)
3. Quality Assessment Audit (QAA)

Internal QA refers to intra-institutional practices and policies used to monitor and improve quality of processes at institution and program level – it is the responsibility of the academic department / faculty or the institution. Internal quality assurance has been identified as concentrating on teaching quality improvements, whereas external quality assurance is concerned with the different stakeholders for quality enhancements and the responsibility to the society.

External QA refers to inter- or supra-institutional policies and schemes of assessing, maintaining and improving quality of institution and/or programs which are the responsibility of specialised agencies with authority and legitimacy to engage in this activity.

Academic Audits (sometimes referred to as a 'review') are a means of checking that relevant systems and structures in an institution support its key teaching mission and ensure that provision is at or beyond a satisfactory level of quality. In other words, audits

demonstrate how an institution satisfies itself (and thereby external stakeholders) that the academic standards it has set (or which are set by an accreditation bodies) and its own explicit and implicit objectives, are being achieved.

The main approaches to address accountability and quality include international and national accreditation requirements and/or audit processes.

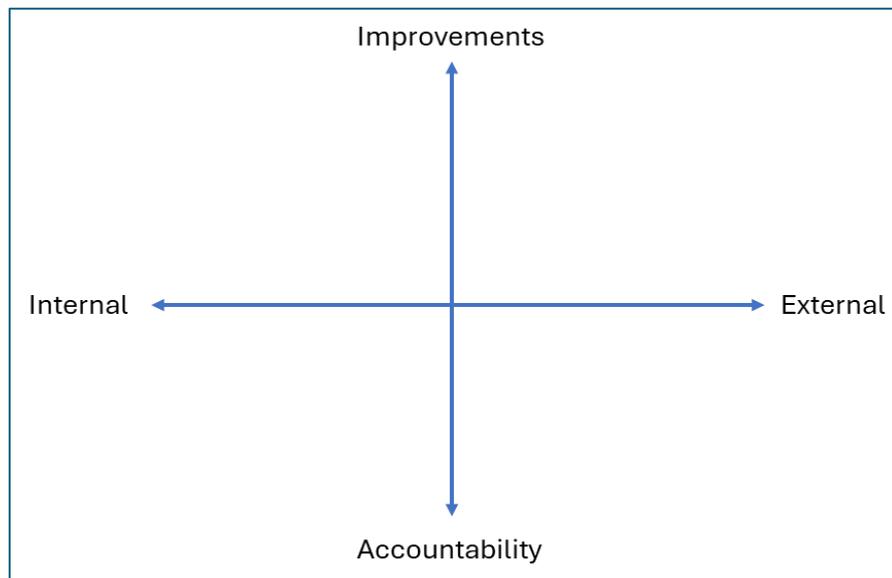


Figure 4: A canvas for describing approaches to quality assurance

The objectives of these formal quality assurance processes, usually implemented by external bodies, typically focus on accountability.

External quality assurance focuses on programs and educational institutions, with accreditation methodologies focusing on conformity and quality developments. Most external quality assurance systems include assessment, accreditation, audit, review, recognition and approval. As the original attention has been on the initiation of external quality assurance, an ongoing movement in the direction of internal quality assurance has also been considered. Internal quality assurance highlights how engineering education quality assurance is reliable with the standards of institutional independence.

STANDARDS FOR INTERNAL QUALITY ASSURANCE

To unlock the full potential, IARE formulated **Nine Internal QA** parameters to measure and track progress, to optimize performance and deliver outstanding education outcomes. These parameters are as follows:

I	<i>Student Academic Progress</i>
II	<i>Admissions and Enrolments</i>
III	<i>Education, Training and Support Services</i>
IV	<i>Employability and Higher Studies</i>
V	<i>Faculty & Staff</i>

VI	<i>Research and Innovation</i>
VII	<i>Financial Management</i>
VIII	<i>Facilities & Resources</i>
IX	<i>Program Monitoring, Review and Revalidation</i>

Developing, right key performance indicators (KPIs), can make better understanding on how effective the programs and services offered in fulfilling mission and educating students. The KPI indicators for each of the above nine parameters, are as follows:

I) Student Academic Progress:

Satisfactory Academic Progress (SAP) is required to monitor a student's academic progress to ensure they are successfully completing the courses needed to complete their program of study.

To remain in good academic standing, the students must maintain a minimum cumulative grade point average, complete the courses in which they register, complete their program of study within stipulated period of study / within a reasonable period of time.

The following standards are applied to all students taking courses for credit to evaluate Satisfactory Academic Progress.

1. **Cumulative Grade Point Average (CGPA):** Students must maintain a CGPA that is greater than or equal to 6.5. Fail courses do not get calculated in the GPA.
2. **Completion Rate (Pace):** Students must successfully complete 65% or more of all registered courses.
3. **Number of times attempted for course clearance (ACC):** Student may make several attempts at the same course throughout his/her existence in the program, but preferable would have completed in a maximum of 3 attempts.
4. **Maximum Time Frame (MTF):** Complete the program within Five (5) years of the scheduled program length of four (4) years.
5. **Percentage of Students Qualifying Competitive Examinations:** At least 8-10% of eligible students shall qualify in national/state-level competitive examinations such as GATE, GRE, CAT, UPSC, or other professional certification exams, indicating academic rigor and higher-order learning outcomes.
6. **Professional Competency Certifications:** All students must complete 2–3 professional competency certifications each year to enhance their academic, technical, and career development.

II) Admissions and Enrolments:

Admissions are conducted through a transparent and merit-based process in accordance with statutory norms, ensuring the intake of academically strong and diverse students across all programmes.

The institution consistently achieves a high percentage of enrolment against the sanctioned intake, reflecting sustained demand and institutional reputation. Equitable access, effective counselling, and systematic admission planning contribute to optimal seat utilization and balanced program distribution. The continuous monitoring of admission trends supports strategic growth and quality enhancement.

The following standards are used to measure the quality of admissions and enrolments.

1. **Admission test scores:** The intake is highly competitive, characterized by the top 10% TG-EAPCET/ECET/ICET/PGECET in the state-level entrance examinations and consistent closing-rank patterns, signifying the strong academic quality of admitted students.
2. **Quality of Students:** A significant proportion of student's secure admission with top ranks in the national-level entrance examinations like, JEE/GATE, TG-EAPCET.
3. **Students Enrolment Rate:** Student enrolment against the sanctioned intake in respective programs must consistently achieve 98–99%, reflecting strong demand for the programs and the institution's ability to attract and admit learners.
4. **Credit Detention Rate:** The dropout rate within four years and beyond should maintain at a minimal level, not exceeding 2-3%, reflecting effective academic support, student engagement, and retention practices.

III) Education, Training and Support Services:

Institute provide appropriate teaching and learning activities and ensure that adequate and readily assessable learning reassures and student support are provided.

For a good education experience, institute provides a range of resources varying from physical resources such as library, student facilities and IT infrastructure to student support in the form of lectures, course videos, course full stack, advising, and career guidance.

Education and training ensure that the courses in the programs are delivered that encourages the students to an active role in creating the learning process. Education and training are strengthened through learner-centric teaching learning processes, modern laboratories, digital resources, and continuous academic support. Structured mentoring, skill-development programs, internships, and industry-aligned training enhance employability and holistic development. Comprehensive support services including library, IT infrastructure, counselling, and career guidance ensure an enabling environment for academic success. Regular feedback and outcome assessment drive continuous improvement in these services.

The following standards are adopted to assess the quality and effectiveness of Education and Training.

1. **Use a variety of pedagogical methods:** The institution adopts innovative and student-centric pedagogical approaches, combining lectures, practical sessions, projects, and digital learning to enhance understanding and skill development.

The pedagogical methods are:

1	Subject-Based Learning (SBL)
2	Experiential Learning (EL)
3	Project Based Learning (PBL)
4	Active / Collaborative Learning (ACL)
5	Case-Based Learning (CBL)
6	Problem-Based Learning (PBL)
7	Entrepreneurially Minded Learning (EML)

2. **Technology used in teaching and learning activities:** The institution extensively integrates the technology in teaching–learning through smart classrooms, departmental research centres, and campus-wide access to LMS, simulation software, and online learning resources.
3. **Courses with Early Learning Readiness Videos (ELRV):** All the courses offered should have ELRV and a minimum of 2 courses per each PhD degree faculty.
4. **Average Daily Footfall in Learning Resources:** A daily footfall of 50% across all learning resources must be recorded, indicating their consistent and active utilization by users.
5. **Updating date course learning materials:** All course learning materials must be updated annually to ensure the curriculum remains current and relevant.
6. **Number of Internships/ Fellowships:** All students are required to undertake 2 internships during the course of their study at local, national, and international research organizations, premier laboratories, and reputed universities.
7. **Student Satisfaction in terms of quality of education:** Student feedback must consistently reflect a positive perception of the quality of education, with an average satisfaction rating of 3 to 4 on a 5-point scale, indicating effective teaching–learning, academic support, and institutional facilities with scope for continuous improvement.

IV) Employability and Higher Studies:

Employability and higher studies outcomes reflect the institution’s commitment to producing industry-ready graduates and lifelong learners.

Structured training in technical, aptitude, and soft skills, along with internships and industry interaction, enhances placement opportunities in reputed organizations. Career guidance, competitive-exam coaching, and research orientation motivate students to pursue higher education in premier institutions. Continuous tracking of progression data supports quality improvement and alignment with evolving professional demands.

The following standards are utilized to assess the quality, outcomes, and overall impact of employability and higher studies.

1. **Percentage of students finding jobs while studying in the campus:** At least 60–65% of the students must secure campus placements during the course of their study, reflecting strong employability and effective institutional training.
2. **Percentage of students finding jobs within six months of their graduation:** Around 8% of the students must secure employment within six months of graduation, demonstrating successful early career outcomes.
3. **Percentage of students finding jobs within one year of their graduation:** Nearly 8% of the students must secure employment within one year of their graduation, reflecting sustained employability outcomes.
4. **Percentage of students still unemployed:** Not more than 5% of the students must remain unemployed.
5. **Number of students appreciated by the employer:** Approximately 55–60% of students must be appreciated by employers for their performance and industry compliance.
6. **Number of students funding interns:** Nearly 4–6% of students must secure stipend-supported internships, reflecting meaningful industry engagement and experiential learning.
7. **Percentage of students progressing to higher education:** Almost 8–10% of students must progress to higher education in esteemed universities, reflecting strong academic advancement and preparedness for advanced studies.
8. **The number of alumni securing employment within 12 months of graduation:** Around 3–5% of alumni must secure employment within 12 months of graduation, reflecting sustained career progression and employability.
9. **Number of Paid Internships:** Approximately 15–20% of students must secure paid internships annually, reflecting strong industry engagement and practical exposure.
10. **Average CTC:** The average CTC shall be approximately ₹5.5 lakhs per annum, reflecting competitive graduate compensation.

V) Faculty & Staff:

Faculty role is essential in creating high quality student experience and enabling the acquisition of knowledge, competency and skills.

The institution is supported by a team of highly qualified and experienced faculty committed to academic excellence, research, and student mentoring. A healthy faculty student ratio, continuous professional development, and performance appraisal systems ensure effective curriculum delivery and quality enhancement. Competent technical and administrative staff provide strong operational and laboratory support. The institution also promotes recruitment, retention, and career advancement policies aligned with regulatory norms.

The following standards are adopted to assess the quality and effectiveness of faculty and staff.

1. **Faculty-to-Student Ratio:** The institution must maintain a faculty-to-student ratio of 1:20, ensuring effective teaching learning, mentoring, and academic support.
2. **Cadre Ratio:** The institution shall maintain the prescribed cadre ratio of 1:2:6 for Professors, Associate Professors, and Assistant Professors to ensure a balanced academic hierarchy and effective curriculum delivery.
3. **Number of masters and Ph.D degree holders:** The institution must have a significant number of faculty with Master's and Ph.D. qualifications to ensure strong academic expertise, effective curriculum delivery, and a vibrant research environment.
4. **Mentoring / Training junior or new faculty:** At least 2–3 structured mentoring and training programs must be conducted for junior and newly recruited faculty to strengthen their teaching effectiveness, research skills, and academic responsibilities prior to their induction into the teaching process.
5. **Age distribution:** The faculty age distribution must remain balanced, with about 60–70% in the 30–50 years bracket and an institute-level average age of 40 years with 10 years of experience, ensuring a blend of seasoned expertise and dynamic young academicians.
6. **Faculty Experience:** Faculty experience must be distributed across three categories up to 8 years, 8+ to 15 years, and above 15 years in a balanced ratio of 1:1:1.
7. **Training hours and Training places for the faculty per year:** Faculty must annually participate in structured professional training programs of 20–30 hours through on-campus workshops, industry short-term programs, and online platforms to strengthen their teaching, research, and professional competencies.
8. **Percentage of faculty who are women:** The institute must ensure that 50% of the faculty are women, promoting adequate gender diversity and inclusion within the academic team.
9. **Ratio of Employee in terms of gender–top level managers:** Top administrative roles must be held by women academicians on a 1:1 basis, ensuring equitable leadership and effective discharge of responsibilities.
10. **Number of academic employees who upgraded their qualification of them participated in fellowships, training and other events at foreign institutions:** Around 5% of the faculty must regularly undertake visits to foreign institutions for professional training in emerging technologies.
11. **Number of participations in Institution, National, and State level:** Faculty must participate in at least 4–5 professional and societal activities per year to ensure their continuous professional development and meaningful contribution to societal needs.

VI) Research and Innovation:

Research and innovation are promoted through a supportive ecosystem that promotes funded projects, high-quality publications, patents, and consultancy.

Dedicated research centres, advanced laboratories, and collaboration with industry and academia enable interdisciplinary and socially relevant outcomes. Faculty and students are encouraged to participate in innovation, incubation, and product development activities. Structured policies, incentives, and ethical practices ensure sustainable research growth and impact.

The following standards are employed to evaluate the quality, productivity, and impact of research and innovation activities.

1. **Research Collaborations and Partnerships:** The institute has set a target of 20-25 active MoUs and research collaborations with industries, R&D organizations, and academic institutions to promote joint research, internships, faculty exchange, and consultancy.
2. **Type and number of research publications (Q1 | Q2):** On average, a minimum of two research papers per faculty member are published each year. Out of which 30% is expected to be published in Quartile1 and Quartile2 journals.
3. **h-index and Citations:** The institute should record an annual increase of approximately 25%–30% in its h-index, and 50% citations indicating consistent growth in research impact and citation quality.
4. **Number of publications in conferences per faculty:** On average, each faculty member is expected to contribute at least 2 conference papers (for non-doctoral faculty); 1 journal paper along with 1 conference paper (for faculty pursuing a Ph.D.); and 2 journal papers in indexed journals (for doctoral faculty), reflecting a strong upward trajectory in scholarly output and sustained research engagement.
5. **Funded Projects & Grants:** The institute set records an average annual growth of about 15%–20% in research funding through sponsored projects and grants, reflecting a steady increase in externally funded research.
6. **Consultancy work:** The institute's consultancy revenue must maintain a minimum annual growth rate of 25%, indicating accelerated expansion in industry engagement and revenue generation.
7. **Number faculty in Top 2% recognized as scientists:** The institute shall have 2–3 faculty members featured annually among the world's Top 2% scientists, underscoring its globally recognized research excellence.
8. **Technology transfer:** The institute must commercialize at least 5 IPRs annually, demonstrating effective technology transfer and impactful conversion of research into market-ready solutions.
9. **Number of patent Grants, Published, applications (USA, Japan, European, Australia):** Patent applications constitute the dominant share (≈82%) of the total IPR portfolio, reflecting a strong focus on patent-driven innovation.
10. **Student Start-Ups / Commercialized Innovations:** The institute must achieve an annual increase of approximately 2–3% in student start-ups, reflecting steady growth in innovation and entrepreneurial activities.
11. **Research activities carried by the students:** Approximately 20% of the students are expected to publish research papers annually in journals and conferences, fostering a strong culture of scholarly output and active research engagement.
12. **Revenue of Student projects:** The institute must generate ₹10–15 lakhs per year through funded student projects, demonstrating strong industry collaboration and support for innovation-driven research.

VII) Financial Management:

Financial management ensures the optimal utilization of resources to support academic, research, and infrastructure development in alignment with the institution's strategic goals.

A transparent budgeting system, periodic internal and external audits, and effective cost control mechanisms promote accountability and sustainability. Diversified revenue through tuition fees, research grants, consultancy, and endowments strengthens financial stability. Continuous monitoring of financial performance enables informed decision-making and long-term growth.

The following standards are applied to evaluate the institution's financial performance and effectiveness.

1. **Cost per student:** The annual cost per student shall range between ₹1.0 lakh and ₹1.1 lakh, reflecting efficient resource utilization and financial planning.
2. **Student Financial Aid Percentages:** Approximately Around 1%–2% of the total institutional budget shall be allocated toward student financial aid to support economically disadvantaged students.
3. **Funds supported by alumni - Number and amount:** A minimum of 10% of alumni must contribute to the alumni fund, which should generate around ₹12 lakhs annually, demonstrating strong engagement and sustained financial support for institutional development.
4. **Department Budget:** The institution shall allocate approximately 10–15% of the total budget to departments to support laboratory development, equipment procurement, consumables, and academic activities.

VIII) Facilities & Resources

Facilities and resources provide a modern, technology-enabled environment that supports effective teaching learning, research, and innovation.

Well-equipped laboratories, smart classrooms, a comprehensive library, high-speed internet, and advanced computing facilities ensure academic excellence. Adequate physical infrastructure, including hostels, sports, healthcare, and common amenities, promotes holistic student development. Continuous upgradation and optimal utilization of resources align with regulatory standards and emerging institutional needs.

The following standards are applied to assess the adequacy, utilization, and effectiveness of facilities and resources.

1. **Maintain right classrooms and offices:** The institution provides adequate classrooms and office spaces as per statutory norms, aligned with student intake and faculty strength to ensure an effective teaching-learning and academic administrative environment.

2. **Maintain right laboratories:** The institution shall maintain adequate, well-equipped computing and core laboratories in accordance with statutory norms and student intake, ensuring effective practical learning and research.
3. **Maintain modern tools, equipment and computing resources:** The institution ensures the availability of modern tools, equipment, and advanced computing resources aligned with curricular requirements and current industry needs.
4. **Maintain modern computing and information infrastructure:** The institute must maintain a computer–student ratio of 1:4, with adequate systems, licensed software, a dedicated IT park, high-speed internet, and robust LAN connectivity to support academic and laboratory activities.
5. **Maintain modern library services:** The institute should maintain a fully automated library with the required number of titles and volumes for all programs, along with at least 6 national and 6 international journals, catering to the approved intake.
6. **Maintain efficient use of energy:** The institution must achieve an average monthly energy savings of approximately 25% through the extensive use of LED lighting and solar power generation systems.
7. **Hostel facility:** The institution shall provide hostel accommodation with a minimum capacity to house approximately 20% of the total student strength, ensuring adequate amenities and essential services.

IX) Program Monitoring, Review and Revalidation:

Institute effectively monitor and periodically review the programs offered to ensure continued maintenance of the quality and standards of academic programs and the identification of improvements and enhancements and the dissemination of good practice, responding to the need of students and society.

Monitoring is conducted by checking the reflections in operation of academic programs in relation to its aims and objectives, using qualitative and quantitative evidence. It is an on-going activity which requires the participation of staff, support services and the engagement of external expertise.

Students are given the opportunity to evaluate their experiences during the academic year by completing anonymous surveys and Program End of Year surveys. The institute leadership team take steps to encourage students to complete these questionnaires (for example by making time available for completion in-class / online without teaching staff being present).

The quality monitoring and review framework consists of the following elements:

- Annual Program Evaluation
- Module curriculum content
- Periodic Revalidation
- Approval and monitoring of new research centres
- External Examining

The following sources are used as evidence for the Program Monitoring, Review and Revalidation:

- Student progression, achievement and student placement data
- Program action plans
- Program end of year surveys and external surveys
- Timeliness of action taken on feedback
- Volume of additional considerations requests and self-learning / study plans on the program
- Data on faculty qualifications
- Any student complaints specifically relevant to the program
- Volume of academic grievances on the program

IQAC prepared benchmarks are used to analyse the data for each metric for each program by quality assurance committee. The data outputs are reviewed by the governing for each program, to include the areas have not met the benchmark.

When a program meets or exceeds a benchmark for any metric, no further evaluation of that area is required, but focus on areas that require improvement.

The quality assurance committee will be responsible for ensuring the timely implementation of the action plans arising from the monitoring process, and will review progress at each of the scheduled meetings during the academic year.

Schedule for submission of reports to quality assurance committee:

- **Odd semester:** Outcomes of data analysis for programs ending in March / April.
- **Even semester:** Outcomes of data analysis for programs ending in September / October.

A process of periodic review for each program will normally take place every five years. The process allows an opportunity for the Institution to conduct a full internal review of program and to consider whether to make any significant changes to the content or direction of the program.

Criteria for closing an academic department, for example, include one or more of the following:

- Poor admission enrolment number
- Poor student recruitment
- Inadequate resources
- Lack of financial viability
- Changing market
- Changing requirements within the subject discipline
- Changes in the strategic direction of the Institution

Standards shall be applied to assess the adequacy, utilization, and effectiveness of facilities and resources during annual program evaluation, review of module curriculum content, periodic revalidation and approval, and monitoring of new research centres.

- 1. Annual Program Evaluation:** Each academic program shall undergo an annual structured review with 100% submission of the Annual Program Evaluation Report based on key academic and stakeholder performance indicators.
A minimum of 80% of the identified improvement actions shall be implemented in every academic year to ensure continuous quality enhancement.
- 2. Module Curriculum Content:** Each course/module shall have defined objectives, learning outcomes, assessments, and CO–PO mapping aligned with program outcomes, with 100% documentation of COs. At least 20–30% of the curriculum shall incorporate emerging technologies, industry practices, or skill-based components.
- 3. Periodic Revalidation:** Academic programs shall be revalidated at defined intervals, with comprehensive curriculum revision once every four years and approval from statutory academic bodies. Stakeholder feedback from industry and alumni shall be incorporated in at least 50% of the revised courses to ensure relevance and compliance.
- 4. Approval and Monitoring of New Research Centres:** All the departments should have research centres and each proposed centre shall demonstrate availability of qualified faculty (minimum 2 Ph.D.-qualified members), defined research focus areas, infrastructure readiness, and funding roadmap.

STANDARDS FOR EXTERNAL QUALITY ASSURANCE

External quality assurance is a synergistic relationship of NBA, NAAC, Rankings and ISO 21001:2018 to Quality Assurance.

The parameters identified for External Quality Assurance (EQA) are:

1	Accreditations by NBA
2	Accreditation by NAAC
3	Rankings and Ratings
4	International Organization for Standardization (ISO) Management System Standards - ISO 21001:2018

National Board of Accreditation (NBA), National Assessment and Accreditation Counsel (NAAC), National Institutional Ranking Framework (NIRF) and International Organization for Standardization (ISO) ensure meaningful external quality assurance for public trust. They evaluate, review, audit, assess, accreditate at program or institutional level.

A comprehensive understanding (Figure 5) of the definitions, objectives and fundamental components of NBA, NAAC, NIRF rankings and ISO 21001:2018 are essential for appreciating their roles in institutional quality assurance.

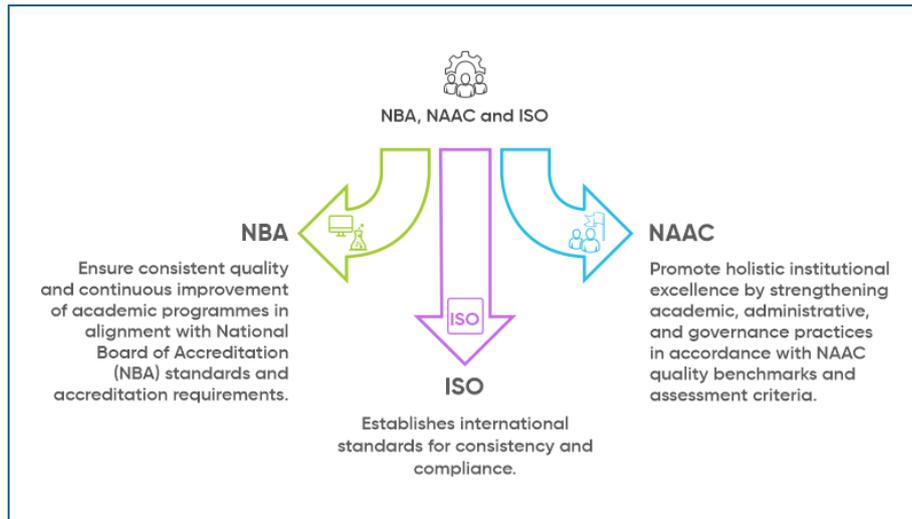


Figure 5: A comprehensive understanding of NBA, NAAC and ISO

I. Accreditations by National Board of Accreditation (NBA)

NBA Tier-1 accreditation is the highest standard for engineering education in India, specifically designed for autonomous institutions, IITs, NITs, and premier private universities. It signifies that the engineering program is aligned with international benchmarks specifically the Washington Accord enabling global recognition of the degree.

NBA accreditation operates at the program level, making it essential for technical and professional education. NBA evaluates the quality and effectiveness of individual academic programs. Quality assurance indicates having several NBA-accredited programs, each undergoes separate evaluation by external experts.

What NBA Evaluates:

The NBA assessment framework canters on measurable educational quality:

- **Program Outcomes and Educational Objectives:** Are your stated learning outcomes aligned with industry needs? Can you demonstrate that students actually achieve these outcomes?
- **Curriculum Design:** Does your curriculum reflect current industry practices and emerging technologies? Is it aligned with Outcome-Based Education principles?
- **Faculty Qualifications:** Do you have faculty with appropriate academic credentials and industry experience? What's their contribution to research and professional development?
- **Infrastructure and Resources:** Are laboratories, libraries, and digital resources adequate for program delivery? Do students have access to industry-standard tools and software?
- **Continuous Improvement:** Can you show evidence of systematic program evaluation and enhancement based on stakeholder feedback?

Benefits of NBA accreditation

NBA accreditation delivers concrete advantages:

- **Enhanced Employability:** Employers recognize NBA-accredited programs as producing job-ready graduates with verified competencies.
- **Industry Alignment:** The OBE framework ensures programs remain relevant to evolving industry requirements.
- **Global Recognition:** NBA is a provisional member of the Washington Accord, which provides international recognition and mobility for graduates.

II. Accreditation by National Assessment and Accreditation Council (NAAC)

NAAC accreditation takes a holistic, institution-wide approach. Rather than evaluating individual programs, NAAC assesses the entire college or university across all departments and functions.

This comprehensive evaluation examines not just academic programs, but institutional culture, governance systems, research output, and community engagement.

What NAAC Evaluates:

NAAC's assessment framework covers seven key criteria, now reinforced by the government's "One Nation, One Data" initiative, which aims to centralize data submission for NAAC, NBA, and NIRF:

- **Curricular Aspects:** How well does your curriculum design incorporate flexibility, skill development, and experiential learning?
- **Teaching-Learning and Evaluation:** Are your pedagogical approaches student-centric? Do assessment methods truly measure learning outcomes?
- **Research, Innovations and Extension:** What's your research output? How do you promote innovation and community engagement?
- **Infrastructure and Learning Resources:** Beyond basic facilities, do you provide enabling environments for holistic development?
- **Student Support and Progression:** How effectively do you support diverse learner needs? What are your placement and progression outcomes?
- **Governance and Leadership:** Are decision-making processes transparent? Do you have effective quality assurance mechanisms?
- **Institutional Values and Best Practices:** How do you demonstrate gender equity, environmental consciousness, and inclusivity?

Benefits of NAAC accreditation

NAAC accreditation strengthens institutional positioning:

- **Institutional Reputation:** High Maturity Levels (Level 4 or 5) significantly influence student choice and stakeholder confidence.
- **Funding Access:** High NAAC levels unlock DST, UGC grants, RUSA funding, and various government schemes.
- **Quality Culture:** The assessment process itself drives institutional reflection and systematic improvement.

- **Stakeholder Confidence:** Accreditation assures students, parents, and employers of institutional credibility.

Key Quality Benchmarks and Accreditation Indicators

The following are the essential quality benchmarks and accreditation indicators required to demonstrate institutional excellence in higher education. It includes NAAC accreditation with a strong CGPA, significant NBA-accredited programs, competitive NIRF rankings, and recognition in reputed national ranking frameworks. These indicators collectively reflect the institution's commitment to academic quality, outcome-based education, research performance, governance, infrastructure, and societal impact.

1. **Programs Accredited by NBA:** A significant percentage of eligible undergraduate and postgraduate engineering programs should be accredited by the National Board of Accreditation (NBA). Preferably, at least 66% or more of eligible programs shall hold NBA accreditation, ensuring compliance with Outcome-Based Education (OBE) standards and industry-aligned curriculum quality.
2. **NAAC Accreditation Status with CGPA:** The institution shall maintain valid accreditation from the National Assessment and Accreditation Council (NAAC). The NAAC Grade Point Average (CGPA) should preferably be 3.0 or above (on a 4.0 scale), reflecting high standards in teaching learning processes, research, governance, infrastructure, and student support systems.

III. Rankings and Ratings

Rankings have long been seen as an external instrument for assessing the performance of institute globally. At their core, rankings provide transparency, benchmarking, and comparability essential traits in an increasingly competitive and complex higher education landscape. As quality assurance represents an internal and external process that ensures institutions meet established standards and continuously improve. Rather than being in tension, rankings and quality assurance can in fact be complementary tools when designed and used with intentionality.

Analysing detailed scoring across criteria and sub-criteria, the ranking offers institutions a roadmap for improvement. Institute can examine its strengths and gaps in discreet but interrelated domains, from internal governance and quality culture to community impact and educational innovation.

The National Institutional Ranking Framework (NIRF) provides a comprehensive evaluation of higher education institutions in India across multiple dimensions. The **NIRF Engineering ranking** assesses institutions based on teaching-learning processes, research performance, graduation outcomes, outreach and inclusivity, and overall perception. The **NIRF Innovation ranking** evaluates the strength of an institution's innovation and entrepreneurship ecosystem, including incubation, technology transfer, patents, and Start-Up support. In addition, **NIRF SDGs** examine the institution's commitment to sustainable development through social impact, environmental responsibility, inclusivity, and ethical governance, reflecting its broader contribution to society.

The Ministry of Education's Innovation Cell **Institution's Innovation Council (IIC) Star Rating** recognizes higher education institutions for their efforts in fostering innovation, entrepreneurship, and Start-Up culture are shown in Figure 6. The rating evaluates the performance of IICs based on activities such as innovation programs, Start-Up support, incubation initiatives, industry interaction, and student participation. Institutions are awarded star ratings according to their level of engagement and impact in promoting an innovation-driven ecosystem on campus.

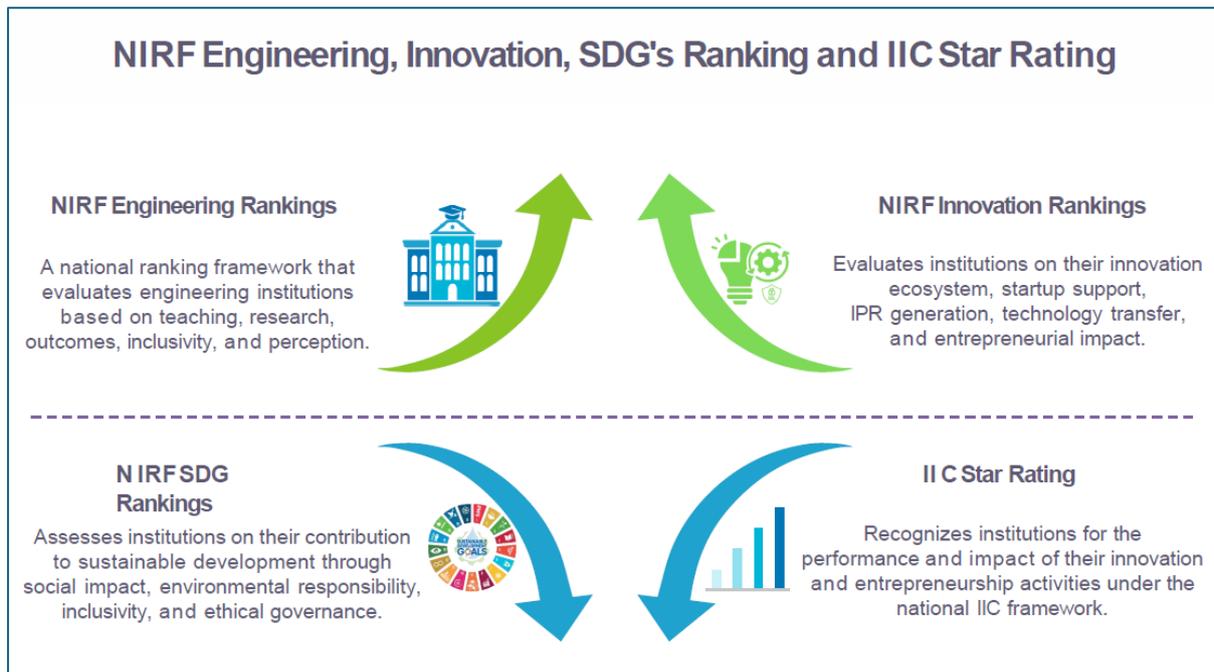


Figure 6: Benchmarking by NIRF ranking and IIC Innovation

Benefits of Integrating Rankings and QA

When universities embrace the NIRF Ranking methodology in combination with quality assurance, several benefits emerge:

- **Strategic alignment:** Ranking indicators align with institutional mission and stakeholder expectations.
- **Benchmarking with substance:** Institution can compare performance across multiple domains, not just research or reputation.
- **Continuous improvement:** As ranking scores evolve, they deliver feedback loops that feed quality assurance cycles.
- **Transparency and trust:** External ranking complements internal quality assurance, enhancing trust among students, employers, funding agencies and regulators.
- **Institutional learning:** The process promotes reflection and adaptation rather than short-term metrics chasing.

Rankings and quality assurance play distinct but complementary roles in higher education: external visibility and accountability on one hand, internal evaluation and development on the other.

Key Quality Benchmarks of Rankings

1. **NIRF Rankings – Engineering / Innovation / SDGs:** The institution should secure a position in the Top 200 institutions in NIRF (Engineering category). Additionally, participation and ranking in NIRF Innovation and NIRF SDG categories should demonstrate performance in research output, patents, start-ups, sustainability initiatives, and societal impact.
2. **Other National Ranking Agencies (Outlook, India Today, Times, etc.):** The institution should consistently secure rankings within the Top 150–200 institutions nationally in reputed ranking frameworks such as Outlook, India Today, Times Engineering Survey, QS India Rankings, or similar credible agencies. Continuous improvement in ranking position shall reflect institutional competitiveness, academic quality, industry perception, and research performance.

IV. ISO 21001:2018 Standards

ISO 21001:2018 (Educational Organizations Management System - EOMS) serves as reference for maturity assessment of process capability. It is a primary international standard designed to bring quality assurance to engineering education, bridging the gap between educational goals and industry needs.

Institute can measure, analyze, and improve teaching-learning processes, ensuring - not just providing knowledge but creating competent, industry-ready engineers.

The key benefits of implementing ISO 21001:2018.

- Better alignment of educational mission, vision, objectives and action plans.
- Inclusive and equitable quality education for all students.
- Promotion of self-learning and lifelong learning opportunities.
- More personalized learning and effective response to special educational needs.
- Consistent processes and evaluation tools to demonstrate and increase effectiveness and efficacy.
- Increased credibility of the educational institution.
- Bringing national standards within the institution.

QUALITY ASSURANCE AUDITS

A quality assurance audit can be conducted either internally or externally and is usually administered at the whole-of-institution level, or at the program level. This include external evaluation, quality audits involve the auditee conducting a critical self-analysis, and an external review team verifying the self-report, making recommendations for improvement, and monitoring progress.

The QA audits make no attempt to comprehensively review an institution's or program's resources and activities, nor to directly assess the quality of teaching or student learning, although they help to place improvement of teaching and learning. Instead, they focus on those processes by which institution exercise their responsibility to assure academic standards and improve the quality of their teaching and learning.

The output of such an audit is a description of the extent to which the claims are correct. Audits also serve to aid dean of IQAC and provide system-wide information on best practices. This highlights further strengths of the Quality Audit including providing a sense of ownership through self-analysis, encouraging continuous improvement and self learning, in comparison with their stated strategic objectives and mission. Audits normally involve both qualitative and quantitative assessments.

BENEFITS OF QUALITY ASSURANCE

The introduction of QA lead to positive outcomes on the overall quality of education.

1. It provides a mechanism to ‘modernise’ education systems and change institutional culture as a direct result of external review outcomes.
2. It improves transparency and accountability in the overall system on quality and standards leading to increased trust among the general public.
3. Extrinsic motivation can encourage to document, critique and enhance its internal capability, and identify its own shortcomings and strategies for self-remediation, continuous QA, improvement and innovation.
4. QA helps to professionalise quality processes, with standardised processes and norms and special divisions / tasks or positions to facilitate the tasks.
5. It can lead to the creation of an evidence-based culture in decision making and strengthen surveys and feedback mechanisms.
6. It enhances the development of policy and the structure of institutional quality work; the development of student influence in QA; documentation structures; cooperation with stakeholders; internal evaluations; reviews and follow-up processes.
7. QA helps to establish new formal standards and impacted positively on new program development, resulting in more cohesive, student-centred, programs.
8. Retention rates, graduation rates, employment and levels of CGPA increases.
9. It puts educational quality on the agenda, thereby increasing its importance.
10. It provides information on best practice and common problem areas.
11. There is evidence of improvements in pedagogical practices (teaching and student learning), student advising and learning communities, through facilitation of active discussion and faculty cooperation in departments.
12. It improves performance development and review processes for faculty.
13. It leads to improvements in the institutional approach to the collection of student survey data and feedback and to the creation of new routines and systems for the handling of data and information on educational performance and quality.
14. QA provides visible confirmation to the public that attention is being paid to academic QA.

Academic Audit Structure

1. Institutional Quality Assurance Audits and Feedback Mechanism

These audits evaluate the overall academic quality, administration, and institutional performance.

S.No	Audit / Survey	Timeline	Frequency	Web Link
1	Academic and Administrative Audit (AAA)	End of academic year	Once per year	View
2	Course Accomplishment and Student success (CASS)	End of each semester	Twice per year	View
3	Research Accomplishment Scoring System success (RASS)	During academic year	Three times per year	View
4	Alumni Feedback	On Annual Alumni Meet (July/August) & after placement cycle (Jan–April)	Once per year	View
5	Employer / Industry Feedback (Placements)	Post-placement cycle (Jan–April)	Once per year	View

2. Departmental Academic Audits

These audits focus on program effectiveness, curriculum relevance, and department academic performance.

S.No	Audit / Survey	Timeline	Frequency	Web Link
1	Curriculum Feedback from Faculty	Before semester begins (May–June)	Once per year	View
2	Curriculum Feedback from Students	During course registration (June / July & Dec / Jan)	Twice per year	View
3	Curriculum Feedback from Alumni	During Annual Alumni Meet	Once per year	View
4	Curriculum Feedback from Employers	Before syllabus revision (Feb–April)	Once per year	View

3. Faculty Academic Audits

These audits evaluate teaching effectiveness, course delivery, and faculty performance.

S.No	Audit / Survey	Timeline	Frequency	Web Link
1	Early Semester Course– Faculty Feedback	Before semester begins	Twice per year	View
2	End Semester Course Feedback (OBE Based CO Attainment)	During the last academic week before examinations	Twice per year	--
3	Course File Audit	15 days after course allocation	Twice per year	--

4. Student Academic Audits

These focus on student satisfaction, learning experience, and academic outcomes.

S.No	Audit / Survey	Timeline	Frequency	Web Link
1	NAAC Student Satisfaction Survey (SSS)	End of even semester (April / May)	Once per year	View
2	Program Exit Survey	After project viva / before graduation	Once per batch	View
3	Early Semester Course– Faculty Feedback	Before semester begins	Twice per year	View
4	Feedback on Academic & Support Facilities	Mid semester	Twice per year	View
5	Project Work Questionnaire	After project viva / before graduation	Once per batch	View
6	End Semester Course Feedback (OBE Based CO Attainment)	During the last academic week before examinations	Twice per year	--

SERVICE QUALITY

Service quality is mostly recognised in the commercial arena. It is well known that improving service quality can have a direct impact on a Institute ability to satisfy stakeholders needs while remaining competitive and thereby increase Institution profits and reputation.

There are five dimensions of service quality recognised: reliability (ability and consistency in performing a certain service that satisfies stakeholder needs); tangibility (the ability to portray service quality to stakeholders); empathy (delivery of services in a way that suggests empathy to stakeholders demands and needs); responsiveness (ability to provide prompt services and responses to stakeholders requests); assurance (the element of trust the stakeholder has in the Institution ability to deliver services).

Service quality can and has been readily applied to educational institutions and increasingly is included in institutional QA reviews. The focus will, of course, differ from the teaching and learning activity and will also vary depending on the administrative structures and foci of the institution in question. QA may include student-facing services and offices such as admissions, student experience, library, health, sports and examinations (some of which can be offered within academic departments as well as centrally), as well as staff-facing services and offices such as human resources, research support, academic administration, finance etc.

There are a range of recognised stakeholders at whom the various services are targeted are shown in Table 1, and who expect a quality service .

Table 1. Stakeholders of the service provision and their attributes.

Stakeholders	Stakeholder attributes
Students	Pay for educational instruction, utilise administrative functions, purchase auxiliary services (e.g. hostel, food, transport).
Parents	Select or assist in the selection of institution, pay for service and associated costs on behalf of student, provide primary contact point for some services.
Future employers of graduates	Recruit, sometimes provide advice in service design or funding, sometimes offer learning opportunities.
Staff / faculty members	Develop, design, and deliver product/service, consume some services.
Research sponsors	Provide funds to institution or individual faculty members in exchange for service, information, or activities.
Accreditation bodies	Exercise various degrees of control over product/service design and delivery.
Alumni	The reputation grows when by producing successful graduates continuously - intelligent, innovative and effective in their fields. Alumni can also be helpful in providing valuable financial, intellectual and human resource.
Society	Pays (through taxes) for portions of the services and benefits from the services provided by Institution.

QUALITATIVE MODEL FOR QUALITY ASSURANCE (QMQA)

The QMQA model is a statistical framework for a qualitative model for quality assurance to enhance education performance indicators. It is a statistically-validated approach to make forecasts to analyse the performance indicators and assist in institutional decision making.

It evaluates the performance of education twice each year. The data were collected from various sources at institute and program level, such as Student Balanced Score Card, IDEA TRL Form Report, Annual Report, Strategic Plan, Alumni Survey, Program Outcomes, Courses Outcomes, Average PEOs, Research and Assessment, Courses and Assessment, Target-Based Activities for division/department Assessment, and Facilities Evaluation. The Figure 7 shows the three dimensions of the QMQA model of engineering education:

1. **Purpose:** Evaluation, comparison, ranking, accreditation, guidance, and improvement.
2. **Unit of Focus:** Institute, department, program, faculty, students, and alumni.
3. **Criteria:** Students, Learning Outcomes (PEOs, POs, PSOs, COs and Wks), continuous improvement, curriculum, faculty, facilities, and institutional support.

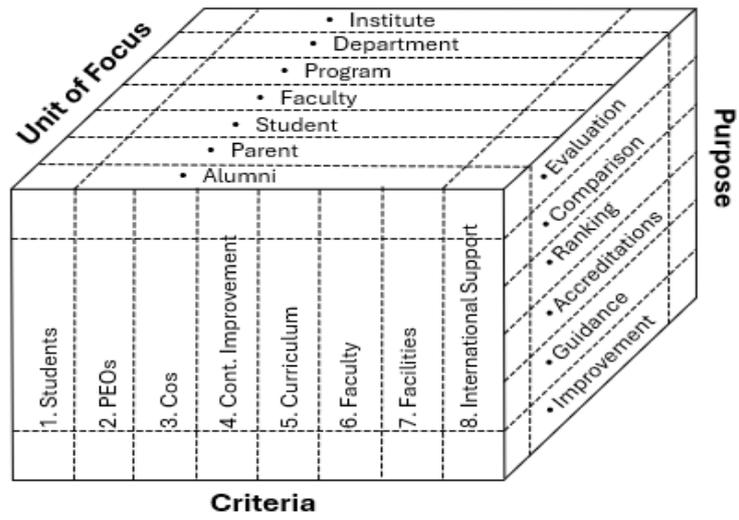


Figure 7: The dimensions of the QMQA model of engineering education



INSTITUTE OF AERONAUTICAL ENGINEERING

Dundigal, Hyderabad – 500043, Telangana, India

www.iare.ac.in

Quality is a journey – not a destination

Institute of Aeronautical Engineering

Dundigal, Hyderabad – 500043, Telangana, India

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